Refinement of genome-scale reconstructions through the DEMETER pipeline

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Introduction

This tutorial introduces the semi-automated reconstruction pipeline DEMETER (Data-drivEn METabolic nEtwork Refinement) and its use for semi-automated, data-driven reconstruction of microbial strains [1]. DEMETER was first applied to the reconstruction of 773 human gut microbial organisms [2]. More recently, DEMETER was used to reconstruct 7,206 human microbial strains, resulting in AGORA2, an update to AGORA both in size and scope [3]. While DEMETER was built with reconstructing human gut microbial reconstructions in mind and is tailored towards this purpose, it can be applied to any types of bacterial or archaeal microorganisms. The minimal prerequisite is the availability of a sequenced genome for the target organism. The tutorial demonstrates how to use DEMETER to build a refined genome-scale reconstruction for one or more target organisms from a draft reconstruction retrieved from KBase. Steps include input data collection, input data integration, running the refinement pipeline, and testing the refined reconstruction against the input data. Steps Figure 1 summarizes the steps used to create a curated reconstruction.

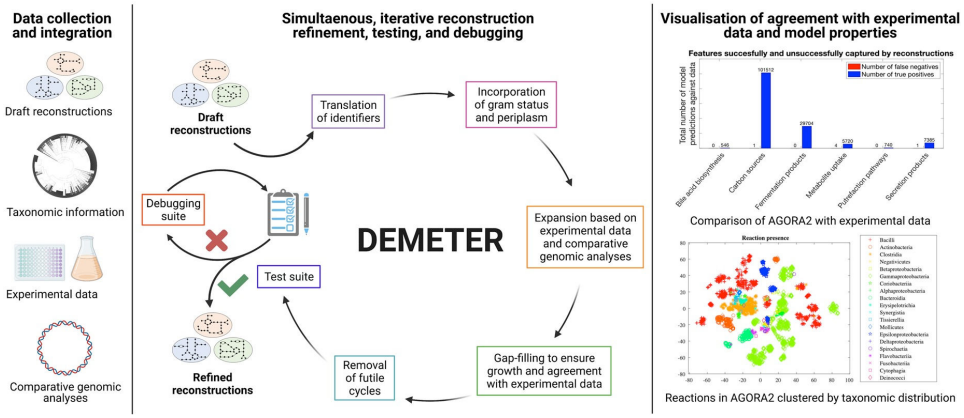

Figure 1: Overview of the DEMETER pipeline [1]. The pipeline consists of 1. collection of draft reconstructions, comparative genomic data, biochemical and physiological data, and drug structures and microbial conversion reactions, 2. conversion of data into a MATLAB-readable format, and integration into pipeline functions, and 3. data-driven refinement of KBase draft reconstructions with continuous testing against input data and subsequent update to pipeline functions to correct for false predictions.

DEMETER has been designed to handle large-scale tasks of refining hundreds or even thousands of draft reconstructions. This may be time-consuming. It is recommended to use parallel computing for improved efficiency. If the pipeline run is interrupted, it can be rerun and already performed steps will be skipped.

Requirements

This tutorial requires the Parallel Computing Toolbox, Bioinformatics Toolbox, and Statistics and Machine Learning Toolbox add-ons in MATLAB.

Step 1: Data collection and data integration

This part explains how to collect input data and convert it into a format readible by the pipeline. The minimal input for building a refined reconstruction is a KBase draft reconstruction. Recommended inputs include taxonomic information on the target organism, experimental data if the species is not yet found in the already collected data, and comparative genomic analyses.

1.1. KBase draft reconstructions-required

Create KBase draft reconstruction(s) for the target organism(s) by using the apps at kbase.us/. A template narrative to facilitate this is available at https://narrative.kbase.us/narrative/ws.82195.obj.8. The narrative assumes that the genomes to reconstruct are available as FASTA files and imported into the Staging Area as a zipped file. Alternatively, genomes available in KBase can be directly imported into the Narrative. Note that it will not be possible to reconstruct organisms without a sequenced genome. Export the generated draft reconstructions by downloading them.

Next, please place all draft reconstructions that you want to refine into one folder. For the sake of this tutorial, we will use four AGORA2 strains as well as six example strains that were randomly chosen from genomes present at KBase and are not present in AGORA2. Draft reconstructions for these strains have already been retrieved from KBase and placed into the folder cobratoolbox/papers/2021_demeter/exampleDraftReconstructions. Alternatively, they are available in the template narrative https://narrative.kbase.us/narrative/81207.

% Start DEMETER by initializing the COBRA Toolbox.

```
initCobraToolbox
```

```
      _____    _____    _____    _____      _____      |
     /  ___| /  _  \ |  _  \ |  _  \    / ___ \     |   COnstraint-Based Reconstruction and Analysis
     | |     | | | | | |_| | | |_| |   | |___| |    |   The COBRA Toolbox - 2021
     | |     | | | | |  _  {  |  _  /   |  ___  |    |
     | |___  | |_| | | |_| | | | \ \   | |   | |    |   Documentation:
     \_____| \_____/ |_____/ |_|  \_\ |_|   |_|    |   http://opencobra.github.io/cobratoolbox
                                                     |

  > Checking if git is installed ...  Done (version: 2.30.1).
  > Checking if the repository is tracked using git ...  Done.
  > Checking if curl is installed ...  Done.
  > Checking if remote can be reached ...  Done.
  > Initializing and updating submodules (this may take a while)... Done.
  > Adding all the files of The COBRA Toolbox ...  Done.
  > Define CB map output... set to svg.
  > TranslateSBML is installed and working properly.
  > Configuring solver environment variables ...
    - [*---] ILOG_CPLEX_PATH: /Applications/CPLEX_Studio129/cplex/matlab/x86-64_osx
    - [*---] GUROBI_PATH: /Library/gurobi912/mac64/matlab
    - [----] TOMLAB_PATH: --> set this path manually after installing the solver ( see instructions )
    - [----] MOSEK_PATH: --> set this path manually after installing the solver ( see instructions )
    Done.
  > Checking available solvers and solver interfaces ...     0

       0

  Check osense*c - A'*lam - w = 0 (stationarity):
       0
       0
```

```
 > [gurobi] Primal optimality condition in solveCobraLP satisfied.
 > [gurobi] Dual optimality condition in solveCobraLP satisfied.
Original LP has 1 row, 2 columns, 1 non-zero
Objective value = 0
OPTIMAL SOLUTION FOUND BY LP PRESOLVER

 > [glpk] Primal optimality condition in solveCobraLP satisfied.
   ------------------------------------------------------
   pdco.m                     Version pdco5 of 15 Jun 2018
   Primal-dual barrier method to minimize a convex function
   subject to linear constraints Ax + r = b,  bl <= x <= bu

   Michael Saunders       SOL and ICME, Stanford University
   Contributors:     Byunggyoo Kim (SOL), Chris Maes (ICME)
                     Santiago Akle (ICME), Matt Zahr (ICME)
                     Aekaansh Verma (ME)
   ------------------------------------------------------

The objective is linear
The matrix A is an explicit sparse matrix

m        =        1     n        =        2      nnz(A)  =        1
max |b | =        0     max |x0| =  1.0e+00      xsize   =  1.0e+00
max |y0| =        1     max |z0| =  1.0e+00      zsize   =  1.0e+00

x0min    =        1     featol   =  1.0e-06      d1max   =  1.0e-04
z0min    =        1     opttol   =  1.0e-06      d2max   =  5.0e-04
mu0      =  1.0e-01     steptol  =     0.99     bigcenter=     1000

LSMR/MINRES:
atol1    =  1.0e-10     atol2    =  1.0e-15      btol    =  0.0e+00
conlim   =  1.0e+12     itnlim   =       10      show    =        0

Method   =        2     (1 or 11=chol  2 or 12=QR  3 or 13=LSMR  4 or 14=MINRES 21=SQD(LU)  22=SQD(MA57))
Eliminating dy before dx


Bounds:
  [0,inf]  [-inf,0]  Finite bl  Finite bu  Two bnds   Fixed    Free
        0         0          0          0         0       2       0
  [0, bu]  [bl,  0]  excluding fixed variables
        0         0

Itn   mu stepx stepz  Pinf  Dinf  Cinf   Objective    nf  center       QR
  0                  -6.6 -99.0  -Inf  1.2500000e-07        1.0
  1 -1.0 1.000 1.000 -99.0 -99.0  -Inf  0.0000000e+00  1     1.0        1
  2 -3.0 1.000 1.000 -99.0 -99.0  -Inf  0.0000000e+00  1     1.0
  3 -5.0 1.000 1.000 -99.0 -99.0  -Inf  0.0000000e+00  1     1.0
  4 -7.0 1.000 1.000 -99.0 -99.0  -Inf  0.0000000e+00  1     1.0
   Converged

max |x| =     0.000    max |y| =     0.000    max |z| =     0.000   scaled
max |x| =     0.000    max |y| =     0.000    max |z| =     0.000 unscaled
max |x| and max |z| exclude fixed variables
PDitns  =         4     QRitns =         0    cputime =       0.2

Distribution of vector     x         z
[      1,     10 )         0         2
[    0.1,      1 )         0         0
[   0.01,    0.1 )         0         0
[  0.001,   0.01 )         0         0
[ 0.0001,  0.001 )         0         0
[  1e-05, 0.0001 )         0         0
```

```
[  1e-06,  1e-05 )         0         0
[  1e-07,  1e-06 )         0         0
[  1e-08,  1e-07 )         0         0
[      0,  1e-08 )         2         0
Elapsed time is 0.165924 seconds.

 > [pdco] Primal optimality condition in solveCobraLP satisfied.
 > [pdco] Dual optimality condition in solveCobraLP satisfied.
Elapsed time is 0.001496 seconds.
In 0.0033641 sec, file written to /Users/almut.heinken/Documents/Code/cobratoolbox/binary/maci64/bin/minos
 Done.
 > Setting default solvers ... Done.
 > Saving the MATLAB path ... Done.
   - The MATLAB path was saved in the default location.

 > Summary of available solvers and solver interfaces

          Support        LP      MILP        QP      MIQP       NLP        EP
    ------------------------------------------------------------------------------
    gurobi          active               1         1         1         1         -         -
    ibm_cplex       active               0         0         0         0         -         -
    tomlab_cplex    active               0         0         0         0         -         -
    glpk            active               1         1         -         -         -         -
    mosek           active               0         -         0         -         -         0
    matlab          active               1         -         -         -         1         -
    pdco            active               1         -         1         -         -         1
    quadMinos       active               1         -         -         -         -         -
    dqqMinos        active               1         -         1         -         -         -
    cplex_direct    active               0         0         0         -         -         -
    cplexlp         active               0         -         -         -         -         -
    qpng            passive              -         -         1         -         -         -
    tomlab_snopt    passive              -         -         -         -         0         -
    lp_solve        legacy               1         -         -         -         -         -
    ------------------------------------------------------------------------------
    Total           -                    7         2         4         1         1         1

 + Legend: - = not applicable, 0 = solver not compatible or not installed, 1 = solver installed.


 > You can solve LP problems using: 'gurobi' - 'glpk' - 'pdco'
 > You can solve MILP problems using: 'gurobi' - 'glpk'
 > You can solve QP problems using: 'gurobi' - 'pdco'
 > You can solve MIQP problems using: 'gurobi'
 > You can solve NLP problems using:
 > You can solve EP problems using: 'pdco'

 > Checking for available updates ...
> You cannot update your fork using updateCobraToolbox() because this is a development branch.
> The current branch is: demeterFixes
> The last commit to the current branch is: 4fcaac
> You can use MATLAB.devTools (https://github.com/opencobra/MATLAB.devTools) to update your fork.
removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/componentContribution/new
removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/groupContribution/new
removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/inchi/new
removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/molFiles/new
removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/protons/new
removing: /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/thermo/trainingModel/new
```

Please ensure that the COBRA/papers folder is up to date and in the MATLAB path as DEMETER depends on files located in COBRA/papers/demeter.

Set a solver (recommended: IBM CPLEX)

```
solverOK=changeCobraSolver('ibm_cplex','LP');
```

```
 > changeCobraSolver: Solver ibm_cplex is not installed.
```

```
global CBTDIR
```

To start DEMETER, define the path to the folder where the draft reconstructions are located (required).

```
draftFolder = [CBTDIR filesep 'papers' filesep '2021_demeter' filesep 'exampleDraftReco
```

1.2. Taxonomic and strain information

Information on the taxonomic classification and organism properties (e.g., gram status, oxygen status, metabolism type, pathogenicity) has been collected for all 7,206 AGORA2 strains and is available in the file "input/AGORA2_infoFile.xlsx". It is highly recommmended to collect taxonomic information for your organism as this enables the propagation of experimental data from related strains that are already present in AGORA2. Taxonomic information can be retrieved from NCBI Taxonomy: https://www.ncbi.nlm.nih.gov/taxonomy/. Note that this step can be skipped, but will prevent informing the refined reconstructions through available experimental data. To provide taxonomic information for your organisms, prepare a file in the same format as cobratoolbox/papers/2021_demeter/example_infoFile.xlsx. Please provide the path to the file with taxonomic information as the variable infoFilePath.

```
infoFilePath = [CBTDIR filesep 'papers' filesep '2021_demeter' filesep 'example_infoFil
```

IMPORTANT: The IDs in the column 'MicrobeID' need to match the names of the resulting refined reconstructions exactly. Prepare the file with taxonomic information accordingly. During the pipeline run, the names of draft reconstruction files will be adapted. To find out what the names of the refined reconstructions will be, run the function

```
refinedModelIDs = printRefinedModelIDs(draftFolder);
```

1.3. Propagating existing experimental data

The DEMETER pipeline contains experimental data for >1,500 microbial species for (i) carbon sources, (ii) fermentation pathways, (iii) growth requirements, (iv) consumed metabolites, and (v) secreted metabolites. The data are stored in MATLAB-readable format in the input folder as the files CarbonSourcesTable.txt, FermentationTable.txt, NutrientRequirementsTable.txt, secretionProductTable.txt, and uptakeTable.txt. If a strain related to your organism is already present in the DEMETER resource and has data available, this data can be propagated to your new organism. This requires taxonomic information organized in a table as described in the previous step. Note that you can still adapt the experimental data to strain-specific findings and add new data afterwards as needed. The input file with taxonomic information will also be supplemented with gram staining information if possible, which serves to additionally inform and refine the reconstructions. If no related organisms are already present in DEMETER from which gram status information can be propagated, gram status can be retrieved from literature searches or by querying the Integrated Microbial Genomes Database (https://img.jgi.doe.gov/) [4].

1.4. Using compatative genomic data as input data for DEMETER

It is possible to inform the reconstruction with comparative genomics data retrieved from PubSEED. This will require either retrieving publicly available spreadsheets from PubSEED or the generation of such spreadsheets through PubSEED (https://pubseed.theseed.org). Under https://pubseed.theseed.org/seedviewer.cgi?page=SubsystemSelect, over 1,000 curated subsystems for thousands of bacteria are available that can serve as input for DEMETER. See "Subsystem Spreadsheet" tab on PubSeed or cobratoolbox/papers/2021_demeter/exampleSpreadsheets for an example. To map the strains in subsystems to strains to reconstruct, the column PubSeedID needs to contain the translation to the respective IDs in the PubSeed spreadsheets.

Moreover, appropriate reactions in VMH nomenclature need to be mapped to each functional role in the spreadsheet (see "Functional Role" tab on PubSeed). Functional roles need to be provided as columns and mapped to corresponding reactions through the file cobratoolbox/papers/2021_demeter/input/InReactions.txt.

If comparative genomics data is available for your organism(s), please place it in a folder and provide the path to the folder as the variable spreadsheetFolder.

```
spreadsheetFolder = [CBTDIR filesep 'papers' filesep '2021_demeter' filesep 'exampleSpr
```

Additionally, the PubSEED IDs for each strain to refine, as well as the annotation version, need to be added to the "PubSeedID" and "Annotation version ID" columns, respectively, in the taxonomic information file as shown in example_infoFile.xlsx.

To propagate available gram staining information, comparative genomics data, and experimental data to your organism(s), use the code

```
[infoFilePath,inputDataFolder] = prepareInputData(infoFilePath,'spreadsheetFolder',spre
```

```
Warning: Directory already exists.
i = 1
i = 1
i = 1
i = 2
i = 3
i = 4
```

The variable adaptedInfoFilePath contains the path to the taxonomic information file adapted with gram staining information.

1.5. Manual gathering of experimental data as input data for DEMETER

In the folder inputDataFolder, you will find experimental data for your organism(s) retrieved and propagated from the already available data that had been collected for DEMETER. It is highly recommended that you manually inspect the propagated experimental data for your organism(s) at this point to verify it as organisms may differ on the strain level. Moreover, it is recommended that you perform additional literature searches to inform the refinement of your organism(s). As you can see from inspection of the newly generated text files, for three of the four new strains used in this tutorial, experimental data could be propagated from already reconstructed strains of the same species. For the fourth strain, Acetitomaculum ruminis DSM 5522, no related strain in present in DEMETER. To find experimental data on this organism, we go to PubMed (https://pubmed.ncbi.nlm.nih.gov/) and enter "Acetitomaculum ruminis" as a search term. This yields a published reference describing the

metabolism of this species: PubMed ID 2500921, https://link.springer.com/article/10.1007/BF00416597. The paper reports that A. ruminis generates acetate through the acetogen pathway and uses formate and glucose as carbon sources. By converting this data into a MATLAB-readable format, we can ensure the associated pathways are present in the refined reconstruction.

To incorporate this data into the files with experimental data, use the following code.

Read the file with carbon source information.

```
data=readInputTableForPipeline([inputDataFolder filesep 'CarbonSourcesTable.txt']);
```

Add information that glucose is used as a carbon source.

```
findRow=find(strcmp(data(:,1),'Acetitomaculum_ruminis_DSM_5522'));
findCol=find(strcmp(data(1,:),'D-glucose'));
data{findRow,findCol}='1';
writetable(cell2table(data),[inputDataFolder filesep 'CarbonSourcesTable'],'FileType','
```

Read the file with information on consumed metabolites.

```
data=readInputTableForPipeline([inputDataFolder filesep 'uptakeTable.txt']);
```

Add information that formate is consumed.

```
findRow=find(strcmp(data(:,1),'Acetitomaculum_ruminis_DSM_5522'));
findCol=strcmp(data(1,:),'Formate');
data{findRow,findCol}='1';
writetable(cell2table(data),[inputDataFolder filesep 'uptakeTable'],'FileType','text','
```

Read the file with fermentation product information.

```
data=readInputTableForPipeline([inputDataFolder filesep 'FermentationTable.txt']);
```

Add information that the acetogen pathway is used.

```
findRow=find(strcmp(data(:,1),'Acetitomaculum_ruminis_DSM_5522'));
findCol=find(strcmp(data(1,:),'Acetogen pathway'));
data{findRow,findCol}='1';
writetable(cell2table(data),[inputDataFolder filesep 'FermentationTable'],'FileType','t
```

Alternatively, you can inspect the files manually and edit as needed.

To check the experimental data available that will be used for refinement for each strain to reconstruct, run the function:

```
curationStatus = getCurationStatus(infoFilePath,inputDataFolder,false);
```

```
Warning: Column headers from the file were modified to make them valid MATLAB identifiers
before creating variable names for the table. The original column headers are saved in the
VariableDescriptions property.
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
```

2 indicates that experimental data is available to curate the reconstruction. 1 indicates that published literature is available but contains no usable data. 0 indicates no available experimental data.

Step 2: Iterative refinement

2.1. Running the DEMETER pipeline

With the experimental and comparative genomic data in place, the pipeline can be run. This will result in a refined reconstruction for each strain in the draft reconstruction folder as a mat file and optionally as a SBML file. Moreover, a summary of refinement steps, such as addition and removal of reactions during gap-filling, will be provided. Steps that are automatically carried out during this step include # translation of KBase reaction and metabolite to Virtual Metabolic Human [5] (https://www.vmh.life) nomenclature, # expansion of the reconstruction by pathways supported by experimental data, # refinement of pathways and gene rules against comparative genomic data, and # quality control ensuring e.g., thermodynamic feasibility.

Define the number of workers for parallel computing.

```
numWorkers = 4;
```

Define a name for the reconstruction resource (optional)

```
reconVersion = 'TutorialExample';
```

Run the pipeline.

```
[reconVersion,refinedFolder,translatedDraftsFolder,summaryFolder] = runPipeline(draftFo
```

```
Starting parallel pool (parpool) using the 'local' profile ...
Connected to the parallel pool (number of workers: 4).

ans =

 Pool with properties:

            Connected: true
           NumWorkers: 4
              Cluster: local
        AttachedFiles: {}
    AutoAddClientPath: true
          IdleTimeout: 30 minutes (30 minutes remaining)
          SpmdEnabled: true

Each model.subSystems{x} has been changed to a character array.
Warning: Reaction with the same name already exists in the model, updating the reaction
> In addReaction (line 129)
  In translateKBaseModel2VMHModel (line 145)
  In refinementPipeline (line 67)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
bio1    41.257 h[c] + 0.00719528 thmpp[c] + 0.00719528 ribflv[c] + 0.00719528 nad[c] + 0.00719528 fe2[c] +
```

Inspection of the output of the pipeline

Let us have a look at the results of the pipeline run. The refined reconstruction in mat format are located in the folder "RefinedReconstructions", and in SBML format in "RefinedReconstructions_SBML". The folder "TranslatedDraftReconstructions" contains the draft reconstructions with exchange reactions translated (no other changes were made to this version). The folder "RefinementSummary" contains a detailed overview of the gap-filling and expansion performed for each refined reconstruction. If the files "untranslatedMets.txt" and "untranslatedRxns.txt", are present and contain any entries, it is recommended to translate these metabolites and/or reactions. Go to Part 2.3 for more details.

2.2. Testing the refined reconstructions

DEMETER includes a comprehensive test suite that was developed to ensure good quality and agreement with known metabolic traits of the reconstructed strains in AGORA2 [3].

To run the test suite, enter the code.

```
[testResultsFolder,curationReport] = runTestSuiteTools(refinedFolder, infoFilePath, inp
```

```
Warning: Directory already exists.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Model grows on unlimited media (aerobic), flux through BOF: 3.397560e+01 mmol/gDW/h
Model grows on unlimited media (aerobic), flux through BOF: 4.867244e+01 mmol/gDW/h
Model grows on unlimited media (aerobic), flux through BOF: 3.981277e+01 mmol/gDW/h
Model grows on unlimited media (aerobic), flux through BOF: 6.761999e+01 mmol/gDW/h
Warning: Model cannot grow on unlimited media (anaerobic)
> In testGrowth (line 72)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on complex medium (aerobic)
> In testGrowth (line 96)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on complex medium (anaerobic)
> In testGrowth (line 112)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on unlimited media (anaerobic)
```

```
> In testGrowth (line 72)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ala_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ala_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on unlimited media (anaerobic)
> In testGrowth (line 72)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds ...
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
```

```
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
Report for draft models:
All models are able to produce biomass on rich medium.
```

```
10 models are unable to produce biomass on rich medium under anaerobic conditions.
7 models are unable to produce biomass on complex medium.
10 models are unable to produce biomass on complex medium under anaerobic conditions.
Report for refined models:
All models are able to produce biomass on rich medium.
All models are able to produce biomass on rich medium under anaerobic conditions.
All models are able to produce biomass on complex medium.
Warning: Directory already exists.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_q8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sheme(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_succ(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Aerobic ATP flux on complex medium: 61 mmol/gDW/h
Anaerobic ATP flux on complex medium: 1.560000e+01 mmol/gDW/h
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ac(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 83...
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
```

```
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
Report for draft models:
3  models produce too much ATP under aerobic conditions.
3  models produce too much ATP under anaerobic conditions.
Report for refined models:
All models produce reasonable amounts of ATP under aerobic conditions.
All models produce reasonable amounts of ATP under anaerobic conditions.

 > changeCobraSolver: Gurobi interface added to MATLAB path.

 > changeCobraSolver: Gurobi interface added to MATLAB path.

 > changeCobraSolver: Gurobi interface added to MATLAB path.

 > changeCobraSolver: Gurobi interface added to MATLAB path.
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
```

```
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
Finished refinement and testing of the project TutorialExample.
10 draft reconstructions have been refined.
Growth requirements were refined for 6 reconstructions.
83.33 % of reconstructions agree with all known media.
```

Biomass production

Test and plot whether all reconstructions can produce reasonable amounts of biomass on the Western diet and on "rich" medium (consisting of every metabolite the model can consume) aerobically and anaerobically.

You can see that for the examples, all refined reconstructions produce biomass under anaerobic conditions and on Western diet while no draft reconstruction can grow anaerobically. If the refined reconstructions for your own organisms are unable to produce biomass under any conditions, proceed to Step 2.3 of the pipeline.

ATP production

% Test and plot whether all reconstructions produce reasonable amounts of ATP on the Western diet aerobically and anaerobically.

You can see that for the examples, all refined reconstructions produce realistic amounts of ATP on Western diet while the draft reconstructions produce near unlimited amounts of ATP. If the refined reconstructions for your own organisms produce too much ATP, proceed to Step 2.3 of the pipeline below.

QC/QA and test against available experimental and comparative genomic data

The variable curationReport contains a summary of the results of performed quality control and quality assurance tests.

The folder "TestResults" contains information on tests against the available experimental data that passed or failed the test suite. Carefully inspect these results. If there are any false negative predictions for your organism(s), proceed to Step 2.3 of the pipeline below.

To view the results for the tutorial example, run the following code.

Sensitivity of reconstructions for capturing the experimental data

```
testResults1 = readtable([testResultsFolder filesep reconVersion '_refined' filesep 'Tu
testResults1 = table2cell(testResults1);
```

Fraction of refined reconstructions that agree with all experimental data

```
testResults2 = readtable([testResultsFolder filesep reconVersion '_refined' filesep 'Tu
testResults2 = table2cell(testResults2);
```

The test suite also reports any cases of leaking metabolites, mass- and charge-imbalanced reactions, incorrectly formulated gene rules. Inspect these cases. Note that some mass- and charge-imbalanced reactions currently cannot be corrected.

2.3. Debugging the refined reconstructions

2.3.1. Translation from KBase to VMH nomenclature

For the tutorial example, all metabolites and reactions have been translated. For your own reconstructions, check the files "untranslatedMets.txt" and "untranslatedRxns.txt", if present, for any KBase metabolites and reactions that are not yet translated to VMH nomenclature. This requires the reconstruction tool rBioNet [6]. To prepare the use of rBioNet, run the function

```
createRBioNetDBFromVMHDB
```

Translating metabolites

If the files 'untranslatedMets.txt' contains metabolites, run the code

```
if isfile([summaryFolder filesep 'untranslatedMets.txt'])
[translatedMets]=translateKBaseToVMHMets('untranslatedMets.txt');
end
```

Carefully inspect the output 'translatedMets.txt'. If you are satisfied with the translation, add the KBase IDs with the corresponding VMH IDs to the file cobratoolbox/papers/2021_demeter/input/MetaboliteTranslationTable.txt.

Metabolites that could not be translated this way will need to be inspected manually. Try finding them in the VMH database by consulting KEGG (https://www.genome.jp/kegg) [7] or HMDB (https://hmdb.ca) [8] IDs. For metabolites that are not yet present in the VMH database, formulate a metabolite ID following the standards of the field as described in Thiele and Palsson [9]. Afterwards, add the new metabolites to the file cobratoolbox/papers/2021_demeter/input/MetaboliteDatabase.txt while ensuring that the format of the file is kept. Also add the KBase to VMH metabolite translation to the file cobratoolbox/papers/2021_demeter/input/MetaboliteTranslationTable.txt.

Translating reactions

If the files 'untranslatedRxns.txt' contains reactions, run the code

```
if isfile([summaryFolder filesep 'untranslatedRxns.txt'])
[translatedRxns]=propagateKBaseMetTranslationToRxns('untranslatedRxns.txt');
end
```

When translated from KBase to VMH nomenclature, some reactions will afterwards be mass-and charge-imbalanced. Especially the proton in the reaction will need to be adjusted.To test if any translated reactions are now unbalanced, use the reconstruction tool rBioNet [6].

Afterwards, run the command

ReconstructionTool

This opens an interface. Choose File -> Add Text File -> With Reactions -> Load text file.

Choose the text file translatedRxns.txt that was just generated. When it says "Metabolites not in Database", choose Yes. When it says "Unbalanced reactions", carefully inspect every reaction with unbalance charge or atoms. Adjust the formulas in the file translatedRxns.txt accordingly and save the file afterwards. Note that some mass- and charge-imbalanced reactions currently cannot be corrected.

Now we will check if the mass-and charge-balanced but untranslated reactions are already present in the VMH database but not yet translated. To check which of the translated reactions are already present in the VMH reaction database, run the function

```
if isfile('translatedRxns.txt')
[sameReactions,similarReactions] = mapKBaseToVMHReactions('translatedRxns.txt');
end
```

After verifying the content of the output variable sameReactions, add the KBase reaction IDs with the corresponding VMH reaction IDs to the file cobratoolbox/papers/2021_demeter/input/ReactionTranslationTable.txt

Note that multiple KBase reactions may translate to the same VMH reaction. Now inspect the content of the output variable similarReactions. Typically, this will contain reactions that are reversible in KBase but irreversible in VMH. It is optional but recommended that you also add these reactions to ReactionTranslationTable.txt.

For reactions that are not yet present in the VMH database, formulate a reaction ID following the standards of the field as described in Thiele and Palsson [9]. Import the reactions in ReconstructionTool as described above to ensure they are mass-and charge-balanced. Afterwards, add the new reactions to the file cobratoolbox/papers/2021_demeter/input/ReactionDatabase.txt

while ensuring that the format of the file is kept. Also assign subsystems to the reactions following the existing nomenclature in the database. Also add the KBase to VMH reaction translation to cobratoolbox/papers/2021_demeter/input/ReactionTranslationTable.txt.

2.3.2 Debugging the reconstructions

After performing the data-driven refinement, there may still be reconstructions that cannot grow anaerobically and/or on Western diet, produce unrealistic amounts of ATP on Western diet, or do not agree with experimental data. Since DEMETER was built on the principle of inspecting patterns of reactions across many

reconstructions, there may still be reconstructions (especially of non-gut organisms) with previously unobserved patterns that are not yet caught by the gap-filling functions in DEMETER.

Too inspect and attempt to correct these reconstructions, a suite of debugging tools is available. The suite will gap-fill the reconstructions that fail tests and re-test them afterwards.

To run the debugging suite, enter the code

```
[debuggingReport, fixedModels, failedModels]=runDebuggingTools(refinedFolder,testResult
```

```
Starting parallel pool (parpool) using the 'local' profile ...
Connected to the parallel pool (number of workers: 4).

ans =

 Pool with properties:

            Connected: true
           NumWorkers: 4
              Cluster: local
        AttachedFiles: {}
    AutoAddClientPath: true
          IdleTimeout: 30 minutes (30 minutes remaining)
          SpmdEnabled: true

Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
bio1    0.0071953 10fthf[c] + 0.0071953 2dmmq8[c] + 0.0071953 5mthf[c] + 0.0071953 ACP[c] + 0.0018061 PGP[
Warning: Directory already exists.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Model grows on unlimited media (aerobic), flux through BOF: 3.705852e+01 mmol/gDW/h
Model grows on unlimited media (anaerobic), flux through BOF: 3.705852e+01 mmol/gDW/h
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

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  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
```

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  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
```

```
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
```

```
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Model grows on unlimited media (aerobic), flux through BOF: 6.068227e+01 mmol/gDW/h
Model grows on unlimited media (aerobic), flux through BOF: 6.429268e+01 mmol/gDW/h
Model grows on unlimited media (anaerobic), flux through BOF: 6.429268e+01 mmol/gDW/h
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gln_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gln_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Model grows on unlimited media (aerobic), flux through BOF: 5.042479e+01 mmol/gDW/h
Model grows on unlimited media (anaerobic), flux through BOF: 5.040614e+01 mmol/gDW/h
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
```

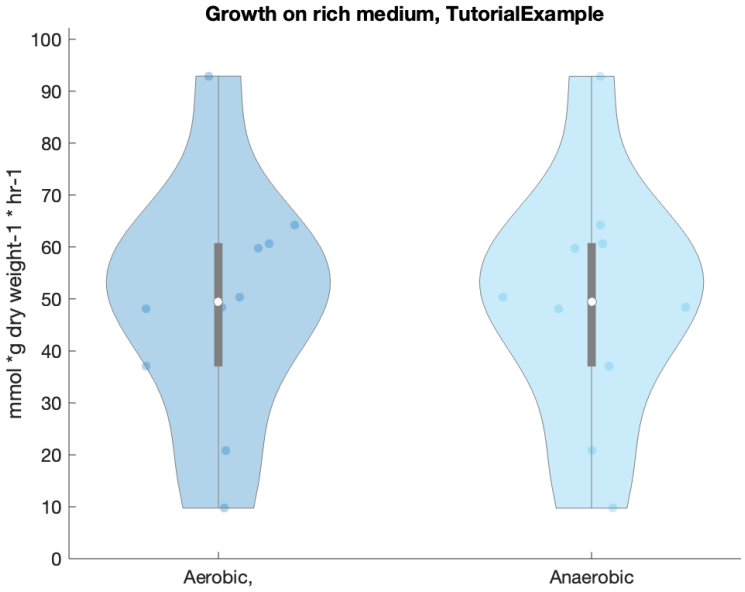
```
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_ocdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testGrowth (line 84)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)...
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
```

```
    ShowNotches: 1
       ShowMean: 1
```




```
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
Report for refined models:
All models are able to produce biomass on rich medium.
All models are able to produce biomass on rich medium under anaerobic conditions.
All models are able to produce biomass on complex medium.
Warning: Directory already exists.
Each model.subSystems{x} is a character array, and this format is retained.
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glcn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_drib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rib_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_xyl_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_oxa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cellb(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdca(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ttdca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ser_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asp_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_akg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amet(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_amp(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arab_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chor(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_csn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cytd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dad_2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dcyt(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ddca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_dgsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_etoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fe3dcit(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fum(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glu_D(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc3p(e) not in model
> In changeRxnBounds (line 59)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gsn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthox(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gthrd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gua(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_h2s(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hom_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_indole(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ins(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lac_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lanost(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mal_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn7(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_mqn8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nac(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nac(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ncam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_nmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no2(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_no3(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_orot(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pime(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydx5p(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_pydxn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_sel(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 50)
```

```
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thymd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_urea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_uri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_duri(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_meoh(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Aerobic ATP flux on complex medium: 4.437500e+01 mmol/gDW/h
Anaerobic ATP flux on complex medium: 1.650000e+01 mmol/gDW/h
Testing flux through the ATP demand reaction
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
```

```
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gal(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_fuc_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_rmn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lcts(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_strch1(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_melib(e) not in model
```

```
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arachd(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_chsterol(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_glyc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_hdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlc(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlnca(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_lnlncg(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ocdcea(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_octa(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_cys_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
```

```
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_arg_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_his_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_his_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_asn_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_thr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_tyr_L(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_gly(e) not in model
```

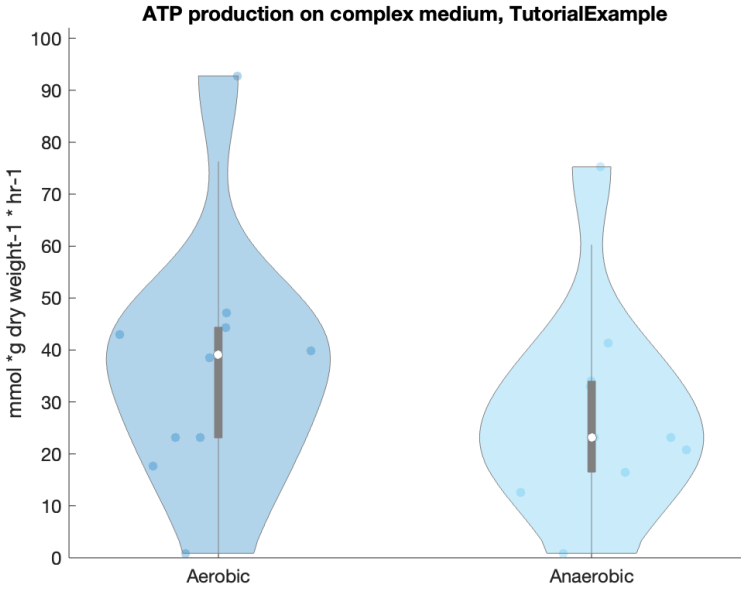
```
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_26dap_M(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2dmmq8(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_2obut(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_3mop(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
```

```
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4abz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_4hbz(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acald(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acmana(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_acnam(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
```

```
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ade(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_adn(e) not in model
> In changeRxnBounds (line 59)
  In useDiet (line 54)
  In testATP (line 30)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_ala_D(e) not in model
> In changeRxnBounds (line 50)
  In useDiet (line 54)
  In testATP (line 30)
  ...
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
```




```
Report for refined models:
All models produce reasonable amounts of ATP under aerobic conditions.
All models produce reasonable amounts of ATP under anaerobic conditions.

 > changeCobraSolver: Gurobi interface added to MATLAB path.

 > changeCobraSolver: Gurobi interface added to MATLAB path.

 > changeCobraSolver: Gurobi interface added to MATLAB path.

 > changeCobraSolver: Gurobi interface added to MATLAB path.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
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 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
All metabolites have formulas.
All metabolites have formulas.
All metabolites have formulas.
All metabolites have formulas.
Model contains 0 (0.00%) imbalanced reactions.
Mass imbalanced reactions: 0
Charge imbalanced reactions: 0
 L =  1601
 L =  1330
 L =  1238
 L =  1195
 L =  1168
 L =  1140
 L =  1113
 L =  1086
 L =  1070
Model contains 5 (0.37%) imbalanced reactions.
Mass imbalanced reactions: 1
```

```
Charge imbalanced reactions: 0
 L =  1354
 L =  1175
 L =   779
 L =   751
 L =   677
 L =   665
 L =   653
 L =   637
 L =   625
 L =   616
 L =   607
 L =   593
 L =   586
 L =   577
Model contains 0 (0.00%) imbalanced reactions.
Mass imbalanced reactions: 0
Charge imbalanced reactions: 0
 L =  1646
 L =  1387
 L =   932
 L =   900
 L =   884
 L =   858
 L =   840
 L =   826
 L =   817
 L =   810
 L =   803
 L =   796
 L =  1050
 L =  1040
 L =  1032
 L =  1026
 L =  1014
 L =   968
 L =   962
 L =   958
 L =   954
 L =   949
 L =   945
 L =   910
 L =   906
 L =   893
 L =   888
 L =   881
 L =   869
 L =   862
 L =   852
 L =   844
 L =   841
 L =   836
 L =   584
 L =   581
 L =   578
 L =   576
 L =   532
 L =   515
 L =   507
 L =   500
 L =   496
 L =   492
 L =   488
 L =   484
```

```
 L =   482
Model contains 6 (0.61%) imbalanced reactions.
Mass imbalanced reactions: 2
Charge imbalanced reactions: 1
 L =   983
 L =   534
 L =   514
 L =   501
 L =   491
 L =   483
 L =   479
 L =   472
 L =   467
 L =   460
 L =   453
 L =   449
 L =   442
 L =   433
 L =   393
 L =   387
 L =   385
 L =   385
 L =   385
 L =   385
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 L =   569
 L =   565
 L =   562
 L =   559
 L =   556
 L =   552
 L =   549
 L =   536
 L =   530
 L =   527
 L =   525
 L =   521
 L =   512
 L =   510
 L =   506
 L =   504
 L =   502
 L =   499
 L =   497
 L =   493
 L =   491
 L =   480
 L =   474
 L =   471
 L =   466
 L =   465
 L =   465
 L =   465
 L =   463
```

```
 L =   463
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
No experimental data on growth requirements available for the organism.
 L =   480
 L =   477
 L =   474
 L =   474
 L =   474
 L =   474
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 L =   780
 L =   776
 L =   771
 L =   763
 L =   759
 L =   755
 L =   672
 L =   646
 L =   637
 L =   626
 L =   614
 L =   605
 L =   603
 L =   601
 L =   596
 L =   593
 L =   590
 L =   589
 L =   588
 L =   587
 L =   583
 L =   583
 L =   583
 L =   583
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Brevibacillus_laterosporus_GI_9" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (963,983)
 >> Only 1 reactions of 983 are solved (~ 0.10%).
 >> 0 reactions out of 1 are minimized (0.00%).
 >> 0 reactions out of 1 are maximized (0.00%).
 >> 1 reaction out of 1 is minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 1
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:36 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 1.
 -- End time:     Mon Sep 27 14:36:37 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testFermentationProducts (line 85)
  In runTestsOnModel (line 194)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (963,983)
 >> Only 1 reactions of 983 are solved (~ 0.10%).
 >> 0 reactions out of 1 are minimized (0.00%).
 >> 0 reactions out of 1 are maximized (0.00%).
 >> 1 reaction out of 1 is minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 1
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:41 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
```

```
        -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 1.
 -- End time:     Mon Sep 27 14:36:41 2021
No experimental data on growth requirements available for the organism.

 > changeCobraSolver: Gurobi interface added to MATLAB path.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testMetaboliteUptake (line 87)
  In runTestsOnModel (line 223)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (963,983)
 >> Only 1 reactions of 983 are solved (~ 0.10%).
 >> 0 reactions out of 1 are minimized (0.00%).
 >> 0 reactions out of 1 are maximized (0.00%).
 >> 1 reaction out of 1 is minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 1
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:43 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 1.
 -- End time:     Mon Sep 27 14:36:43 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1392,1601)
 >> Only 13 reactions of 1601 are solved (~ 0.81%).
 >> 0 reactions out of 13 are minimized (0.00%).
 >> 0 reactions out of 13 are maximized (0.00%).
 >> 13 reactions out of 13 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 13
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:40 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 13. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 13.
 -- End time:     Mon Sep 27 14:36:40 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
```

```
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1454,1646)
 >> Only 13 reactions of 1646 are solved (~ 0.79%).
 >> 0 reactions out of 13 are minimized (0.00%).
 >> 0 reactions out of 13 are maximized (0.00%).
 >> 13 reactions out of 13 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 13
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:42 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 13. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 13.
 -- End time:     Mon Sep 27 14:36:42 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acetitomaculum_ruminis_DSM_5522" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testFermentationProducts (line 85)
  In runTestsOnModel (line 194)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1392,1601)
 >> Only 4 reactions of 1601 are solved (~ 0.25%).
 >> 0 reactions out of 4 are minimized (0.00%).
 >> 0 reactions out of 4 are maximized (0.00%).
 >> 4 reactions out of 4 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 4
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:46 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 4. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 4.
 -- End time:     Mon Sep 27 14:36:46 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
```

```
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:

 > changeCobraSolver: Gurobi interface added to MATLAB path.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testFermentationProducts (line 85)
  In runTestsOnModel (line 194)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1454,1646)
 >> Only 2 reactions of 1646 are solved (~ 0.12%).
 >> 0 reactions out of 2 are minimized (0.00%).
 >> 0 reactions out of 2 are maximized (0.00%).
 >> 2 reactions out of 2 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 2
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:36:49 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 2. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 2.
 -- End time:     Mon Sep 27 14:36:49 2021
No experimental data on growth requirements available for the organism.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
Model grows on at least one carbon source on defined medium for the organism (anaerobic), flux through BOF
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Acinetobacter_pittii_TG6411" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
All metabolites have formulas.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Achromobacter_insuavis_AXX_A" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Model contains 4 (0.38%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
```

```
 L =  1056
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.

 > changeCobraSolver: Gurobi interface added to MATLAB path.
 L =   993
 L =   936
 L =   909
 L =   895
 L =   892
 L =   889
 L =   885
 L =   882
 L =   880
 L =   873
 L =   863
 L =   853
 L =   851
 L =   849
 L =   847
 L =   845
 L =   833
 L =   831
 L =   829
 L =   825
 L =   819
 L =   815
 L =   812
 L =   807
 L =   484
 L =   478
 L =   477
 L =   476
 L =   472
 L =   471
 L =   470
 L =   469
 L =   465
 L =   463
 L =   462
 L =   461
 L =   460
 L =   459
 L =   457
 L =   455
 L =   454
 L =   446
 L =   443
 L =   422
 L =   418
 L =   415
 L =   414
 L =   413
 L =   412
 L =   407
 L =   403
 L =   402
 L =   398
 L =   396
 L =   393
 L =   392
 L =   389
 L =   388
```

```
 > changeCobraSolver: Gurobi interface added to MATLAB path.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
 L =   386
 L =   383
 L =   381
 L =   380
 L =   367
 L =   366
 L =   364
 L =   351
 L =   341
 L =   337
 L =   334
 L =   334
 L =   334
 L =   334
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
No experimental data on growth requirements available for the organism.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Streptococcus_ratti_FA_1_DSM_20564" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Microbe "Streptococcus_ratti_FA_1_DSM_20564" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Streptococcus_ratti_FA_1_DSM_20564" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Streptococcus_ratti_FA_1_DSM_20564" not found in aromatic amino acid degradation data fi
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

 > changeCobraSolver: Gurobi interface added to MATLAB path.
All metabolites have formulas.
Model contains 5 (0.37%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
 L =  1364
 L =   780
```

```
 L =   679
 L =   651
 L =   597
 L =   559
 L =   539
 L =   513
 L =   489
 L =   471
 L =   448
 L =   429
 L =   415
 L =   401
 L =   397
 L =   394
 L =   384
 L =   378
 L =   378
 L =   378
 L =   378
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
All metabolites have formulas.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
All metabolites have formulas.
Model contains 0 (0.00%) imbalanced reactions.
Mass imbalanced reactions: 0
Charge imbalanced reactions: 0
 L =  1007
Model contains 4 (0.36%) imbalanced reactions.
Mass imbalanced reactions: 1
Charge imbalanced reactions: 0
 L =  1100
 L =   611
 L =   582
 L =   529
 L =   496
 L =   462
 L =   440
 L =   428
 L =   411
 L =   405
 L =   395
 L =   388
 L =   376
 L =   365
 L =   360
 L =   354
 L =   350
 L =   344
 L =   341
 L =   340
 L =   334
 L =   329
 L =   328
 L =   327
 L =   326
```

```
 L =   324
 L =   311
 L =   311
 L =   311
 L =   311
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
 L =   872
 L =   831
 L =   781
 L =   710
 L =   671
 L =   657
 L =   642
 L =   622
 L =   615
 L =   606
 L =   299
 L =   294
 L =   290
 L =   289
 L =   286
 L =   281
 L =   280
 L =   263
 L =   252
 L =   252
 L =   252
 L =   252
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1172,1364)
 >> Only 21 reactions of 1364 are solved (~ 1.54%).
 >> 0 reactions out of 21 are minimized (0.00%).
 >> 0 reactions out of 21 are maximized (0.00%).
 >> 21 reactions out of 21 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 21
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:15 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 21. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 21.
 -- End time:     Mon Sep 27 14:37:15 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
All metabolites have formulas.
Model contains 0 (0.00%) imbalanced reactions.
Mass imbalanced reactions: 0
Charge imbalanced reactions: 0
 L =  1757
 L =  1467
 L =  1384
 L =  1335
 L =  1286
```

```
 L =  1255
 L =  1227
 L =  1203
 L =  1184
 L =  1148
 L =  1139
 L =  1101
 L =  1088
 L =  1075
 L =  1063
 L =  1044
 L =  1022
 L =  1014
 L =  1002
 L =   997
 L =   993
 L =   983
 L =   978
 L =   971
 L =   967
 L =   963
 L =   921
 L =   917
 L =   912
 L =   908
 L =   904
 L =   901
 L =   888
 L =   884
 L =   876
 L =   863
 L =   860
 L =   855
 L =   615
 L =   612
 L =   611
 L =   610
 L =   608
 L =   602
 L =   597
 L =   591
 L =   567
 L =   554
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testFermentationProducts (line 85)
  In runTestsOnModel (line 194)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1172,1364)
 >> Only 9 reactions of 1364 are solved (~ 0.66%).
 >> 0 reactions out of 9 are minimized (0.00%).
 >> 0 reactions out of 9 are maximized (0.00%).
 >> 9 reactions out of 9 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 9
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:20 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
```

```
        -- Minimization (iRound = 0). Number of reactions: 9. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 9.
 -- End time:     Mon Sep 27 14:37:20 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (995,1100)
 >> Only 5 reactions of 1100 are solved (~ 0.45%).
 >> 0 reactions out of 5 are minimized (0.00%).
 >> 0 reactions out of 5 are maximized (0.00%).
 >> 5 reactions out of 5 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 5
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:20 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 5. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 5.
 -- End time:     Mon Sep 27 14:37:20 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (955,1007)
 >> Only 5 reactions of 1007 are solved (~ 0.50%).
 >> 0 reactions out of 5 are minimized (0.00%).
 >> 0 reactions out of 5 are maximized (0.00%).
 >> 5 reactions out of 5 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 5
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:20 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 5. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 5.
 -- End time:     Mon Sep 27 14:37:20 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Model grows on at least one carbon source on defined medium for the organism (anaerobic), flux through BOF
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
```

```
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Prevotella_bivia_DNF00320" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Model cannot grow on defined medium for the organism (anaerobic)
> In testGrowthOnDefinedMedia (line 170)
  In runTestsOnModel (line 204)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testFermentationProducts (line 85)
  In runTestsOnModel (line 194)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (995,1100)
 >> Only 4 reactions of 1100 are solved (~ 0.36%).
 >> 0 reactions out of 4 are minimized (0.00%).
 >> 0 reactions out of 4 are maximized (0.00%).
 >> 4 reactions out of 4 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 4
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:27 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 4. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 4.
 -- End time:     Mon Sep 27 14:37:27 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Warning: Microbe "Prevotella_bivia_DNF00320" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Prevotella_bivia_DNF00320" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Prevotella_bivia_DNF00320" not found in aromatic amino acid degradation data file.
```

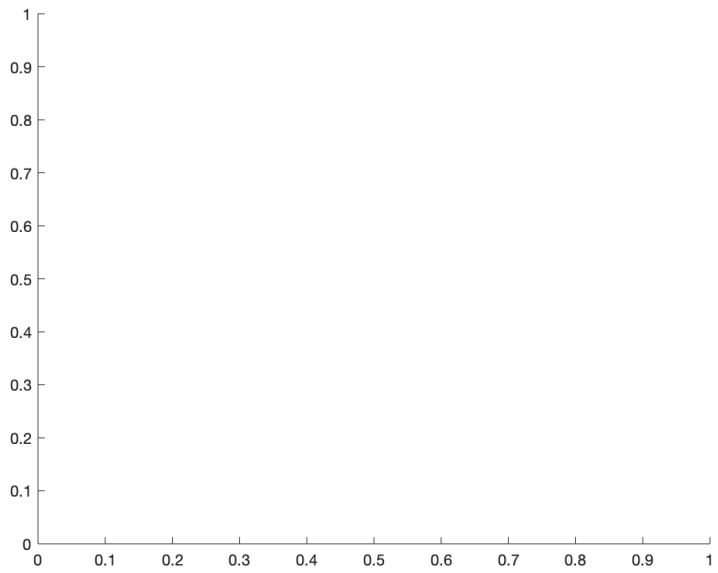
```
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)

 > changeCobraSolver: Gurobi interface added to MATLAB path.
 L =   542
 L =   531
 L =   527
 L =   526
 L =   525
 L =   522
 L =   520
 L =   517
 L =   517
 L =   517
 L =   517
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testDrugMetabolism (line 75)
  In runTestsOnModel (line 259)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1172,1364)
 >> Only 1 reactions of 1364 are solved (~ 0.07%).
 >> 0 reactions out of 1 are minimized (0.00%).
 >> 0 reactions out of 1 are maximized (0.00%).
 >> 1 reaction out of 1 is minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 1
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:30 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 1.
 -- End time:     Mon Sep 27 14:37:30 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testPutrefactionPathways (line 69)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1172,1364)
 >> Only 4 reactions of 1364 are solved (~ 0.29%).
 >> 0 reactions out of 4 are minimized (0.00%).
 >> 0 reactions out of 4 are maximized (0.00%).
 >> 4 reactions out of 4 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.
```

```
 >> The number of reactions retrieved is 4
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:32 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 4. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 4.
 -- End time:     Mon Sep 27 14:37:32 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Model cannot grow on defined medium for the organism (anaerobic)
> In testGrowthOnDefinedMedia (line 170)
  In runTestsOnModel (line 204)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
 > The compatibility can only be evaluated on the following mac OS versions: macOS 10.13+.
 > The solver compatibility is not tested with MATLAB R2019b.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testCarbonSources (line 85)
  In runTestsOnModel (line 177)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testSecretionProducts (line 86)
  In runTestsOnModel (line 237)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (995,1100)
 >> Only 9 reactions of 1100 are solved (~ 0.82%).
 >> 0 reactions out of 9 are minimized (0.00%).
 >> 0 reactions out of 9 are maximized (0.00%).
 >> 9 reactions out of 9 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 9
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:34 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 9. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 9.
 -- End time:     Mon Sep 27 14:37:34 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Lactobacillus_brevis_EW" not found in bile acid product data file.
> In testBileAcidBiosynthesis (line 39)
  In runTestsOnModel (line 248)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Microbe "Lactobacillus_brevis_EW" not found in drug metabolite data file.
> In testDrugMetabolism (line 39)
  In runTestsOnModel (line 259)
```

```
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Lactobacillus_brevis_EW" not found in putrefaction pathway data file.
> In testPutrefactionPathways (line 37)
  In runTestsOnModel (line 270)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Microbe "Lactobacillus_brevis_EW" not found in aromatic amino acid degradation data file.
> In testAromaticAADegradation (line 38)
  In runTestsOnModel (line 294)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1506,1757)
 >> Only 27 reactions of 1757 are solved (~ 1.54%).
 >> 0 reactions out of 27 are minimized (0.00%).
 >> 0 reactions out of 27 are maximized (0.00%).
 >> 27 reactions out of 27 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 27
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:35 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 27. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 27.
 -- End time:     Mon Sep 27 14:37:35 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
Model grows on at least one carbon source on defined medium for the organism (aerobic), flux through BOF:
Model grows on at least one carbon source on defined medium for the organism (anaerobic), flux through BOF
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creating
Set 'PreserveVariableNames' to true to use the original column headers as table variable names.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In testMetaboliteUptake (line 87)
  In runTestsOnModel (line 223)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1506,1757)
 >> Only 1 reactions of 1757 are solved (~ 0.06%).
 >> 0 reactions out of 1 are minimized (0.00%).
 >> 0 reactions out of 1 are maximized (0.00%).
 >> 1 reaction out of 1 is minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 1
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:37:44 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 1. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 1.
```

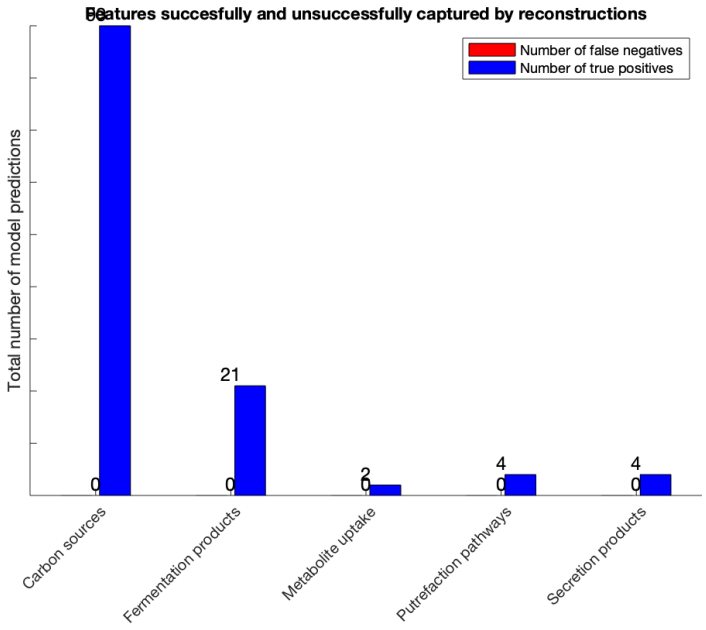
```
 -- End time:     Mon Sep 27 14:37:44 2021
Warning: Column headers from the file were modified to make them valid MATLAB identifiers before creatin..
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
```

```
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
```




```
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
    WhiskerPlot: []
     MedianPlot: []
     NotchPlots: []
       MeanPlot: [1×1 Line]
    ShowNotches: 1
       ShowMean: 1
obj =
  Violin with properties:

    ScatterPlot: [1×1 Scatter]
     ViolinPlot: []
        BoxPlot: []
```

```
WhiskerPlot: []
 MedianPlot: []
 NotchPlots: []
   MeanPlot: [1×1 Line]
ShowNotches: 1
   ShowMean: 1
```



If any models still fail a test as indicated by the output variable failedModels, inspect the results in debuggingFolder -> Retest.

For models that still produce too much ATP, run the debugging function

futileCycleReactions = identifyFutileCycles(model);

Inspect the models that do not agree with experimental data manually to find out which steps of the biosynthesis pathway are blocked.

If this should be unsuccessful, feel free to open an issue at the COBRA Toolbox GitHub.

3.1 Analysis and vidualization of model properties and features

Once refined reconstructions have been successfully created, the DEMETER pipeline also provides functions to retrieve properties of the reconstructions, e.g., average size and gene count and stochiometric consistency. Moreover, the pipeline enables the computation of reaction content, uptake and secretion profiles, and internal metabolite biosynthesis profiles per reconstruction and their subssequent clustering by taxon.

Run the computation and visualization of model properties.

```
computeModelProperties(refinedFolder, infoFilePath, reconVersion, 'numWorkers', numWork
```

```
Each model.subSystems{x} is a character array, and this format is retained.
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Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (963,983)
 >> Only 102 reactions of 983 are solved (~ 10.38%).
 >> 0 reactions out of 102 are minimized (0.00%).
 >> 0 reactions out of 102 are maximized (0.00%).
 >> 102 reactions out of 102 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 > The version of CPLEX is 129.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1392,1601)
 >> Only 143 reactions of 1601 are solved (~ 8.93%).
 >> 0 reactions out of 143 are minimized (0.00%).
 >> 0 reactions out of 143 are maximized (0.00%).
 >> 143 reactions out of 143 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of reactions retrieved is 102
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:11 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 102. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 102.
```

```
 -- End time:     Mon Sep 27 14:41:11 2021
 >> The number of reactions retrieved is 143
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:11 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 143. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 143.
 -- End time:     Mon Sep 27 14:41:11 2021
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1454,1646)
 >> Only 140 reactions of 1646 are solved (~ 8.51%).
 >> 0 reactions out of 140 are minimized (0.00%).
 >> 0 reactions out of 140 are maximized (0.00%).
 >> 140 reactions out of 140 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 140
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:11 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 140. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 140.
 -- End time:     Mon Sep 27 14:41:12 2021
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1164,1354)
 >> Only 117 reactions of 1354 are solved (~ 8.64%).
 >> 0 reactions out of 117 are minimized (0.00%).
 >> 0 reactions out of 117 are maximized (0.00%).
 >> 117 reactions out of 117 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 117
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:11 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 117. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 117.
 -- End time:     Mon Sep 27 14:41:12 2021
Each model.subSystems{x} is a character array, and this format is retained.
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Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
```

```
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (955,1007)
 >> Only 83 reactions of 1007 are solved (~ 8.24%).
 >> 0 reactions out of 83 are minimized (0.00%).
 >> 0 reactions out of 83 are maximized (0.00%).
 >> 83 reactions out of 83 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 83
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:16 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 83. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 83.
 -- End time:     Mon Sep 27 14:41:16 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1172,1364)
 >> Only 162 reactions of 1364 are solved (~ 11.88%).
 >> 0 reactions out of 162 are minimized (0.00%).
 >> 0 reactions out of 162 are maximized (0.00%).
 >> 162 reactions out of 162 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 162
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:17 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 162. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 162.
 -- End time:     Mon Sep 27 14:41:17 2021
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (995,1100)
 >> Only 144 reactions of 1100 are solved (~ 13.09%).
 >> 0 reactions out of 144 are minimized (0.00%).
 >> 0 reactions out of 144 are maximized (0.00%).
 >> 144 reactions out of 144 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 144
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:18 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 144. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 144.
 -- End time:     Mon Sep 27 14:41:18 2021
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
```

```
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (857,941)
 >> Only 132 reactions of 941 are solved (~ 14.03%).
 >> 0 reactions out of 132 are minimized (0.00%).
 >> 0 reactions out of 132 are maximized (0.00%).
 >> 132 reactions out of 132 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 132
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:19 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 132. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 132.
 -- End time:     Mon Sep 27 14:41:19 2021
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (977,1056)
 >> Only 112 reactions of 1056 are solved (~ 10.61%).
 >> 0 reactions out of 112 are minimized (0.00%).
 >> 0 reactions out of 112 are maximized (0.00%).
 >> 112 reactions out of 112 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 112
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:18 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 112. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 112.
 -- End time:     Mon Sep 27 14:41:19 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1506,1757)
 >> Only 156 reactions of 1757 are solved (~ 8.88%).
 >> 0 reactions out of 156 are minimized (0.00%).
 >> 0 reactions out of 156 are maximized (0.00%).
 >> 156 reactions out of 156 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 156
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:41:22 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 156. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 156.
 -- End time:     Mon Sep 27 14:41:22 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
```

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Each model.subSystems{x} is a character array, and this format is retained.
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Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Directory already exists.
ans =

     3


ans =

     1

Each model.subSystems{x} is a character array, and this format is retained.

ans =

     2

Each model.subSystems{x} is a character array, and this format is retained.

ans =

     4

Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 50)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
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  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpalm2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe120(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe120(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe140(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe140(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe141(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe141(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe160(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe160(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe161(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe161(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpe181(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_1agpe181(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg120(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg120(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg140(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg140(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg141(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg141(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg160(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg160(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg161(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg161(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg181(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1agpg181(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daipdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr120(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr120(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr140(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr140(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr141(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr141(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr160(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr160(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ditdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ditdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dixdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dixdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12npthldl(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12npthldl(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
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Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
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  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_12daipdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr120(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr120(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr140(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr140(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr141(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr141(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr160(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr160(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

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Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(e) not in model
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  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dixdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_12daihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12daipdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr120(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr120(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr140(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr140(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr141(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr141(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr160(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr160(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr161(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr180(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
```

```
Warning: Reaction EX_12dgr181(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dihdglyc(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12dipdglyc(...
```

3.2. Visualization of the features of large-scale reconstruction resources and their subsets

We can also use the properties module in DEMETER to analyze and visualize the features of large-scale reconstruction resources, e.g., AGORA [1]. We can also do this for a subset of AGORA reconstructions. For instance, we can cluster all representatives of a given taxon, e.g., Bacteroidetes, by similarity. Note that this part of the tutorial is time-consuming.

Download all AGORA reconstructions.

```
system('curl -LJO https://github.com/VirtualMetabolicHuman/AGORA/archive/master.zip')
```

```
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed

  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
100   132  100   132    0     0    267      0 --:--:-- --:--:-- --:--:--   267

100 3990k    0 3990k    0     0  2912k      0 --:--:--  0:00:01 --:--:-- 2912k
100 24.5M    0 24.5M    0     0  10.3M      0 --:--:--  0:00:02 --:--:-- 20.5M
100 44.1M    0 44.1M    0     0  13.2M      0 --:--:--  0:00:03 --:--:-- 20.4M
100 64.0M    0 64.0M    0     0  14.6M      0 --:--:--  0:00:04 --:--:-- 19.9M
100 82.9M    0 82.9M    0     0  15.4M      0 --:--:--  0:00:05 --:--:-- 19.8M
100  102M    0  102M    0     0  16.2M      0 --:--:--  0:00:06 --:--:-- 19.8M
100  117M    0  117M    0     0  15.9M      0 --:--:--  0:00:07 --:--:-- 18.6M
100  121M    0  121M    0     0  14.4M      0 --:--:--  0:00:08 --:--:-- 15.3M
100  124M    0  124M    0     0  13.3M      0 --:--:--  0:00:09 --:--:-- 12.2M
100  128M    0  128M    0     0  12.4M      0 --:--:--  0:00:10 --:--:-- 9345k
100  132M    0  132M    0     0  11.6M      0 --:--:--  0:00:11 --:--:-- 5997k
100  135M    0  135M    0     0  10.9M      0 --:--:--  0:00:12 --:--:-- 3767k
100  139M    0  139M    0     0  10.4M      0 --:--:--  0:00:13 --:--:-- 3755k
100  143M    0  143M    0     0  10.0M      0 --:--:--  0:00:14 --:--:-- 3799k
100  148M    0  148M    0     0  9871k      0 --:--:--  0:00:15 --:--:-- 4006k
100  152M    0  152M    0     0  9561k      0 --:--:--  0:00:16 --:--:-- 4192k
100  156M    0  156M    0     0  9240k      0 --:--:--  0:00:17 --:--:-- 4266k
100  160M    0  160M    0     0  8929k      0 --:--:--  0:00:18 --:--:-- 4201k
100  163M    0  163M    0     0  8678k      0 --:--:--  0:00:19 --:--:-- 4181k
100  167M    0  167M    0     0  8441k      0 --:--:--  0:00:20 --:--:-- 4037k
100  171M    0  171M    0     0  8221k      0 --:--:--  0:00:21 --:--:-- 3860k
100  175M    0  175M    0     0  8033k      0 --:--:--  0:00:22 --:--:-- 3840k
100  179M    0  179M    0     0  7858k      0 --:--:--  0:00:23 --:--:-- 3907k
```

```
100  182M    0  182M    0     0  7690k      0 --:--:--  0:00:24 --:--:-- 3878k
100  186M    0  186M    0     0  7544k      0 --:--:--  0:00:25 --:--:-- 3883k
100  190M    0  190M    0     0  7399k      0 --:--:--  0:00:26 --:--:-- 3876k
100  193M    0  193M    0     0  7241k      0 --:--:--  0:00:27 --:--:-- 3709k
100  197M    0  197M    0     0  7127k      0 --:--:--  0:00:28 --:--:-- 3727k
100  201M    0  201M    0     0  7023k      0 --:--:--  0:00:29 --:--:-- 3773k
100  204M    0  204M    0     0  6888k      0 --:--:--  0:00:30 --:--:-- 3567k
100  208M    0  208M    0     0  6807k      0 --:--:--  0:00:31 --:--:-- 3700k
100  212M    0  212M    0     0  6715k      0 --:--:--  0:00:32 --:--:-- 3824k
100  215M    0  215M    0     0  6616k      0 --:--:--  0:00:33 --:--:-- 3725k
100  228M    0  228M    0     0  6813k      0 --:--:--  0:00:34 --:--:-- 5575k
100  243M    0  243M    0     0  7060k      0 --:--:--  0:00:35 --:--:-- 8094k
100  256M    0  256M    0     0  7226k      0 --:--:--  0:00:36 --:--:-- 9850k
100  273M    0  273M    0     0  7502k      0 --:--:--  0:00:37 --:--:-- 12.2M
100  291M    0  291M    0     0  7792k      0 --:--:--  0:00:38 --:--:-- 15.2M
100  309M    0  309M    0     0  8035k      0 --:--:--  0:00:39 --:--:-- 15.8M
100  328M    0  328M    0     0  8330k      0 --:--:--  0:00:40 --:--:-- 16.9M
100  336M    0  336M    0     0  8343k      0 --:--:--  0:00:41 --:--:-- 16.1M
100  340M    0  340M    0     0  8235k      0 --:--:--  0:00:42 --:--:-- 13.4M
100  344M    0  344M    0     0  8130k      0 --:--:--  0:00:43 --:--:-- 10.4M
100  347M    0  347M    0     0  8035k      0 --:--:--  0:00:44 --:--:-- 8029k
100  351M    0  351M    0     0  7943k      0 --:--:--  0:00:45 --:--:-- 4842k
100  356M    0  356M    0     0  7887k      0 --:--:--  0:00:46 --:--:-- 4117k
100  360M    0  360M    0     0  7804k      0 --:--:--  0:00:47 --:--:-- 4154k
100  364M    0  364M    0     0  7725k      0 --:--:--  0:00:48 --:--:-- 4218k
100  368M    0  368M    0     0  7637k      0 --:--:--  0:00:49 --:--:-- 4124k
100  370M    0  370M    0     0  7547k      0 --:--:--  0:00:50 --:--:-- 3924k
100  375M    0  375M    0     0  7486k      0 --:--:--  0:00:51 --:--:-- 3781k
100  379M    0  379M    0     0  7416k      0 --:--:--  0:00:52 --:--:-- 3743k
100  382M    0  382M    0     0  7347k      0 --:--:--  0:00:53 --:--:-- 3696k
100  386M    0  386M    0     0  7273k      0 --:--:--  0:00:54 --:--:-- 3684k
100  389M    0  389M    0     0  7207k      0 --:--:--  0:00:55 --:--:-- 3801k
100  393M    0  393M    0     0  7154k      0 --:--:--  0:00:56 --:--:-- 3737k
100  397M    0  397M    0     0  7098k      0 --:--:--  0:00:57 --:--:-- 3768k
100  401M    0  401M    0     0  7040k      0 --:--:--  0:00:58 --:--:-- 3768k
100  405M    0  405M    0     0  6993k      0 --:--:--  0:00:59 --:--:-- 3939k
100  409M    0  409M    0     0  6941k      0 --:--:--  0:01:00 --:--:-- 4007k
100  412M    0  412M    0     0  6885k      0 --:--:--  0:01:01 --:--:-- 3862k
100  417M    0  417M    0     0  6860k      0 --:--:--  0:01:02 --:--:-- 4130k
100  421M    0  421M    0     0  6816k      0 --:--:--  0:01:03 --:--:-- 4209k
100  425M    0  425M    0     0  6773k      0 --:--:--  0:01:04 --:--:-- 4160k
100  430M    0  430M    0     0  6740k      0 --:--:--  0:01:05 --:--:-- 4296k
100  434M    0  434M    0     0  6702k      0 --:--:--  0:01:06 --:--:-- 4444k
100  438M    0  438M    0     0  6665k      0 --:--:--  0:01:07 --:--:-- 4235k
100  442M    0  442M    0     0  6627k      0 --:--:--  0:01:08 --:--:-- 4225k
100  446M    0  446M    0     0  6587k      0 --:--:--  0:01:09 --:--:-- 4190k
100  450M    0  450M    0     0  6552k      0 --:--:--  0:01:10 --:--:-- 4090k
100  454M    0  454M    0     0  6521k      0 --:--:--  0:01:11 --:--:-- 4122k
100  458M    0  458M    0     0  6488k      0 --:--:--  0:01:12 --:--:-- 4101k
100  462M    0  462M    0     0  6459k      0 --:--:--  0:01:13 --:--:-- 4179k
100  466M    0  466M    0     0  6428k      0 --:--:--  0:01:14 --:--:-- 4230k
100  470M    0  470M    0     0  6401k      0 --:--:--  0:01:15 --:--:-- 4274k
100  475M    0  475M    0     0  6373k      0 --:--:--  0:01:16 --:--:-- 4263k
100  479M    0  479M    0     0  6345k      0 --:--:--  0:01:17 --:--:-- 4291k
100  483M    0  483M    0     0  6314k      0 --:--:--  0:01:18 --:--:-- 4174k
100  486M    0  486M    0     0  6281k      0 --:--:--  0:01:19 --:--:-- 4091k
100  490M    0  490M    0     0  6247k      0 --:--:--  0:01:20 --:--:-- 3942k
100  494M    0  494M    0     0  6223k      0 --:--:--  0:01:21 --:--:-- 3938k
100  498M    0  498M    0     0  6194k      0 --:--:--  0:01:22 --:--:-- 3849k
100  502M    0  502M    0     0  6168k      0 --:--:--  0:01:23 --:--:-- 3885k
100  506M    0  506M    0     0  6145k      0 --:--:--  0:01:24 --:--:-- 3998k
100  510M    0  510M    0     0  6127k      0 --:--:--  0:01:25 --:--:-- 4188k
100  514M    0  514M    0     0  6102k      0 --:--:--  0:01:26 --:--:-- 4135k
100  518M    0  518M    0     0  6082k      0 --:--:--  0:01:27 --:--:-- 4235k
```

```
100  522M    0  522M    0     0  6061k      0 --:--:--  0:01:28 --:--:-- 4280k
100  526M    0  526M    0     0  6040k      0 --:--:--  0:01:29 --:--:-- 4247k
100  530M    0  530M    0     0  6018k      0 --:--:--  0:01:30 --:--:-- 4156k
100  534M    0  534M    0     0  5994k      0 --:--:--  0:01:31 --:--:-- 4126k
100  538M    0  538M    0     0  5971k      0 --:--:--  0:01:32 --:--:-- 4032k
100  542M    0  542M    0     0  5950k      0 --:--:--  0:01:33 --:--:-- 4000k
100  554M    0  554M    0     0  6015k      0 --:--:--  0:01:34 --:--:-- 5589k
100  573M    0  573M    0     0  6161k      0 --:--:--  0:01:35 --:--:-- 8717k
100  592M    0  592M    0     0  6294k      0 --:--:--  0:01:36 --:--:-- 11.4M
100  608M    0  608M    0     0  6395k      0 --:--:--  0:01:37 --:--:-- 13.8M
100  627M    0  627M    0     0  6539k      0 --:--:--  0:01:38 --:--:-- 17.1M
100  645M    0  645M    0     0  6651k      0 --:--:--  0:01:39 --:--:-- 18.1M
100  662M    0  662M    0     0  6764k      0 --:--:--  0:01:40 --:--:-- 17.9M
100  682M    0  682M    0     0  6891k      0 --:--:--  0:01:41 --:--:-- 18.0M
100  701M    0  701M    0     0  7015k      0 --:--:--  0:01:42 --:--:-- 18.7M
100  721M    0  721M    0     0  7145k      0 --:--:--  0:01:43 --:--:-- 18.5M
100  737M    0  737M    0     0  7241k      0 --:--:--  0:01:44 --:--:-- 18.6M
100  757M    0  757M    0     0  7364k      0 --:--:--  0:01:45 --:--:-- 18.9M
100  776M    0  776M    0     0  7473k      0 --:--:--  0:01:46 --:--:-- 18.8M
100  787M    0  787M    0     0  7517k      0 --:--:--  0:01:47 --:--:-- 17.3M
100  791M    0  791M    0     0  7485k      0 --:--:--  0:01:48 --:--:-- 14.1M
100  795M    0  795M    0     0  7450k      0 --:--:--  0:01:49 --:--:-- 11.5M
100  799M    0  799M    0     0  7416k      0 --:--:--  0:01:50 --:--:-- 8510k
100  802M    0  802M    0     0  7384k      0 --:--:--  0:01:51 --:--:-- 5493k
100  806M    0  806M    0     0  7350k      0 --:--:--  0:01:52 --:--:-- 3779k
100  809M    0  809M    0     0  7312k      0 --:--:--  0:01:53 --:--:-- 3568k
100  813M    0  813M    0     0  7281k      0 --:--:--  0:01:54 --:--:-- 3561k
100  816M    0  816M    0     0  7246k      0 --:--:--  0:01:55 --:--:-- 3466k
100  819M    0  819M    0     0  7214k      0 --:--:--  0:01:56 --:--:-- 3414k
100  822M    0  822M    0     0  7182k      0 --:--:--  0:01:57 --:--:-- 3395k
100  826M    0  826M    0     0  7152k      0 --:--:--  0:01:58 --:--:-- 3521k
100  830M    0  830M    0     0  7124k      0 --:--:--  0:01:59 --:--:-- 3541k
100  833M    0  833M    0     0  7094k      0 --:--:--  0:02:00 --:--:-- 3588k
100  837M    0  837M    0     0  7063k      0 --:--:--  0:02:01 --:--:-- 3570k
100  840M    0  840M    0     0  7034k      0 --:--:--  0:02:02 --:--:-- 3583k
100  844M    0  844M    0     0  7007k      0 --:--:--  0:02:03 --:--:-- 3578k
100  847M    0  847M    0     0  6981k      0 --:--:--  0:02:04 --:--:-- 3570k
100  851M    0  851M    0     0  6955k      0 --:--:--  0:02:05 --:--:-- 3641k
100  855M    0  855M    0     0  6931k      0 --:--:--  0:02:06 --:--:-- 3720k
100  859M    0  859M    0     0  6907k      0 --:--:--  0:02:07 --:--:-- 3813k
100  863M    0  863M    0     0  6885k      0 --:--:--  0:02:08 --:--:-- 3882k
100  866M    0  866M    0     0  6859k      0 --:--:--  0:02:09 --:--:-- 3814k
100  870M    0  870M    0     0  6835k      0 --:--:--  0:02:10 --:--:-- 3801k
100  874M    0  874M    0     0  6813k      0 --:--:--  0:02:11 --:--:-- 3832k
100  877M    0  877M    0     0  6791k      0 --:--:--  0:02:12 --:--:-- 3802k
100  881M    0  881M    0     0  6767k      0 --:--:--  0:02:13 --:--:-- 3730k
100  884M    0  884M    0     0  6743k      0 --:--:--  0:02:14 --:--:-- 3748k
100  888M    0  888M    0     0  6720k      0 --:--:--  0:02:15 --:--:-- 3728k
100  892M    0  892M    0     0  6700k      0 --:--:--  0:02:16 --:--:-- 3731k
100  896M    0  896M    0     0  6682k      0 --:--:--  0:02:17 --:--:-- 3817k
100  896M    0  896M    0     0  6680k      0 --:--:--  0:02:17 --:--:-- 3846k
curl: Saved to filename 'AGORA-master.zip'
ans = 0
```

```
unzip('AGORA-master')
modPath = [pwd filesep 'AGORA-master' filesep 'CurrentVersion' filesep 'AGORA_1_03' fil
```

Define the path to the file with taxonomic information on AGORA.

```
infoFilePath = 'AGORA_infoFile.xlsx';
```

Define the column header which contain the information that should be used to extract a subset.

```
subHeader = 'Phylum';
```

Define the feature for which the subset of reconstructions should be extracted.

```
subFeature = 'Bacteroidetes';
```

Define the folder where the results from the extracted subset should be saved (optional, default folder will be used otherwise).

```
subsetFolder = [pwd filesep 'extractedModels'];
```

Run the extraction of the subset.

```
[extractedSubset,subsetFolder] = extractReconstructionResourceSubset(modPath, infoFileP
```

```
Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.
```

```
Each model.subSystems{x} has been changed to a character array.
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```

```
Each model.subSystems{x} has been changed to a character array.
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Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.
Each model.subSystems{x} has been changed to a character array.
```

Define the folder where the results from the extracted subset will be saved (optional).

```
subsetPropertiesFolder = [pwd filesep 'subsetProperties'];
```

Define a name for the subset (optional).

```
subsetVersion = 'Bacteroidetes';
```

We will now compute the properties of the extracted reconstruction subset. If the subset contains enough reconstructions, tSNE plots, a visual representation of the similarity between the reconstructed strains, are also generated.

```
propertiesFolder = computeModelProperties(subsetFolder, infoFilePath, subsetVersion, 'r
```

```
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
```

Each model.subSystems{x} is a character array, and this format is retained.
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Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1007,1147)
 >> Only 138 reactions of 1147 are solved (~ 12.03%).
 >> 0 reactions out of 138 are minimized (0.00%).
 >> 0 reactions out of 138 are maximized (0.00%).
 >> 138 reactions out of 138 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 138
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:31 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 138. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 138.
 -- End time:     Mon Sep 27 14:54:31 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1072,1251)
 >> Only 155 reactions of 1251 are solved (~ 12.39%).
 >> 0 reactions out of 155 are minimized (0.00%).
 >> 0 reactions out of 155 are maximized (0.00%).
 >> 155 reactions out of 155 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 155
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:35 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 155. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 155.
 -- End time:     Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (860,893)
 >> Only 95 reactions of 893 are solved (~ 10.64%).
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 >> 0 reactions out of 95 are minimized (0.00%).
 >> 0 reactions out of 95 are maximized (0.00%).
 >> 95 reactions out of 95 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 95
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:38 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 95. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 95.
 -- End time:     Mon Sep 27 14:54:38 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (953,1066)
 >> Only 97 reactions of 1066 are solved (~ 9.10%).
 >> 0 reactions out of 97 are minimized (0.00%).
 >> 0 reactions out of 97 are maximized (0.00%).
 >> 97 reactions out of 97 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 97
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:40 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 97. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 97.
 -- End time:     Mon Sep 27 14:54:40 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1091,1222)
 >> Only 108 reactions of 1222 are solved (~ 8.84%).
 >> 0 reactions out of 108 are minimized (0.00%).
 >> 0 reactions out of 108 are maximized (0.00%).
 >> 108 reactions out of 108 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 108
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:31 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 108. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 108.
 -- End time:     Mon Sep 27 14:54:32 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
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Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (983,1100)
 >> Only 105 reactions of 1100 are solved (~ 9.55%).
 >> 0 reactions out of 105 are minimized (0.00%).
 >> 0 reactions out of 105 are maximized (0.00%).
 >> 105 reactions out of 105 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 105
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:35 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 105. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 105.
 -- End time:     Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1105,1261)
 >> Only 107 reactions of 1261 are solved (~ 8.49%).
 >> 0 reactions out of 107 are minimized (0.00%).
 >> 0 reactions out of 107 are maximized (0.00%).
 >> 107 reactions out of 107 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 107
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:38 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 107. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 107.
 -- End time:     Mon Sep 27 14:54:38 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1114,1306)
 >> Only 160 reactions of 1306 are solved (~ 12.25%).
 >> 0 reactions out of 160 are minimized (0.00%).
 >> 0 reactions out of 160 are maximized (0.00%).
 >> 160 reactions out of 160 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 160
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 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:41 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 160. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 160.
 -- End time:     Mon Sep 27 14:54:42 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (996,1101)
 >> Only 104 reactions of 1101 are solved (~ 9.45%).
 >> 0 reactions out of 104 are minimized (0.00%).
 >> 0 reactions out of 104 are maximized (0.00%).
 >> 104 reactions out of 104 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 104
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:31 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 104. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 104.
 -- End time:     Mon Sep 27 14:54:32 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1042,1192)
 >> Only 129 reactions of 1192 are solved (~ 10.82%).
 >> 0 reactions out of 129 are minimized (0.00%).
 >> 0 reactions out of 129 are maximized (0.00%).
 >> 129 reactions out of 129 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 129
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:35 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 129. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 129.
 -- End time:     Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
```

```
 >> Size of stoichiometric matrix: (1061,1186)
 >> Only 116 reactions of 1186 are solved (~ 9.78%).
 >> 0 reactions out of 116 are minimized (0.00%).
 >> 0 reactions out of 116 are maximized (0.00%).
 >> 116 reactions out of 116 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 116
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:38 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 116. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 116.
 -- End time:     Mon Sep 27 14:54:38 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (973,1085)
 >> Only 105 reactions of 1085 are solved (~ 9.68%).
 >> 0 reactions out of 105 are minimized (0.00%).
 >> 0 reactions out of 105 are maximized (0.00%).
 >> 105 reactions out of 105 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 105
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:40 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 105. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 105.
 -- End time:     Mon Sep 27 14:54:41 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (804,858)
 >> Only 91 reactions of 858 are solved (~ 10.61%).
 >> 0 reactions out of 91 are minimized (0.00%).
 >> 0 reactions out of 91 are maximized (0.00%).
 >> 91 reactions out of 91 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 91
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:31 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 91. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 91.
 -- End time:     Mon Sep 27 14:54:31 2021
Each model.subSystems{x} is a character array, and this format is retained.
```

```
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1000,1111)
 >> Only 113 reactions of 1111 are solved (~ 10.17%).
 >> 0 reactions out of 113 are minimized (0.00%).
 >> 0 reactions out of 113 are maximized (0.00%).
 >> 113 reactions out of 113 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 113
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:35 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 113. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 113.
 -- End time:     Mon Sep 27 14:54:35 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1088,1227)
 >> Only 109 reactions of 1227 are solved (~ 8.88%).
 >> 0 reactions out of 109 are minimized (0.00%).
 >> 0 reactions out of 109 are maximized (0.00%).
 >> 109 reactions out of 109 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 109
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:39 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 109. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 109.
 -- End time:     Mon Sep 27 14:54:39 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1040,1185)
 >> Only 130 reactions of 1185 are solved (~ 10.97%).
 >> 0 reactions out of 130 are minimized (0.00%).
 >> 0 reactions out of 130 are maximized (0.00%).
 >> 130 reactions out of 130 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.
```

```
 >> The number of reactions retrieved is 130
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:41 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 130. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 130.
 -- End time:     Mon Sep 27 14:54:41 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1117,1255)
 >> Only 109 reactions of 1255 are solved (~ 8.69%).
 >> 0 reactions out of 109 are minimized (0.00%).
 >> 0 reactions out of 109 are maximized (0.00%).
 >> 109 reactions out of 109 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 109
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:47 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 109. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 109.
 -- End time:     Mon Sep 27 14:54:47 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1092,1264)
 >> Only 142 reactions of 1264 are solved (~ 11.23%).
 >> 0 reactions out of 142 are minimized (0.00%).
 >> 0 reactions out of 142 are maximized (0.00%).
 >> 142 reactions out of 142 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 142
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:50 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 142. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 142.
 -- End time:     Mon Sep 27 14:54:50 2021
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1112,1294)
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```
 >> Only 145 reactions of 1294 are solved (~ 11.21%).
 >> 0 reactions out of 145 are minimized (0.00%).
 >> 0 reactions out of 145 are maximized (0.00%).
 >> 145 reactions out of 145 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 145
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:48 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 145. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 145.
 -- End time:     Mon Sep 27 14:54:49 2021
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1122,1313)
 >> Only 152 reactions of 1313 are solved (~ 11.58%).
 >> 0 reactions out of 152 are minimized (0.00%).
 >> 0 reactions out of 152 are maximized (0.00%).
 >> 152 reactions out of 152 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 152
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:48 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 152. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 152.
 -- End time:     Mon Sep 27 14:54:49 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1087,1240)
 >> Only 138 reactions of 1240 are solved (~ 11.13%).
 >> 0 reactions out of 138 are minimized (0.00%).
 >> 0 reactions out of 138 are maximized (0.00%).
 >> 138 reactions out of 138 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 138
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:48 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 138. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 138.
 -- End time:     Mon Sep 27 14:54:48 2021
Each model.subSystems{x} is a character array, and this format is retained.
```

```
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1059,1213)
 >> Only 118 reactions of 1213 are solved (~ 9.73%).
 >> 0 reactions out of 118 are minimized (0.00%).
 >> 0 reactions out of 118 are maximized (0.00%).
 >> 118 reactions out of 118 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 118
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:51 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 118. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 118.
 -- End time:     Mon Sep 27 14:54:51 2021
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1128,1268)
 >> Only 118 reactions of 1268 are solved (~ 9.31%).
 >> 0 reactions out of 118 are minimized (0.00%).
 >> 0 reactions out of 118 are maximized (0.00%).
 >> 118 reactions out of 118 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 118
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:51 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 118. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 118.
 -- End time:     Mon Sep 27 14:54:51 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1089,1217)
 >> Only 107 reactions of 1217 are solved (~ 8.79%).
 >> 0 reactions out of 107 are minimized (0.00%).
 >> 0 reactions out of 107 are maximized (0.00%).
 >> 107 reactions out of 107 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 107
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```
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:53 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 107. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 107.
 -- End time:     Mon Sep 27 14:54:53 2021
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1097,1239)
 >> Only 123 reactions of 1239 are solved (~ 9.93%).
 >> 0 reactions out of 123 are minimized (0.00%).
 >> 0 reactions out of 123 are maximized (0.00%).
 >> 123 reactions out of 123 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 123
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:54:52 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 123. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 123.
 -- End time:     Mon Sep 27 14:54:52 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (964,1042)
 >> Only 113 reactions of 1042 are solved (~ 10.84%).
 >> 0 reactions out of 113 are minimized (0.00%).
 >> 0 reactions out of 113 are maximized (0.00%).
 >> 113 reactions out of 113 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 113
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:57:14 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 113. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 113.
 -- End time:     Mon Sep 27 14:57:15 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (981,1058)
 >> Only 92 reactions of 1058 are solved (~ 8.70%).
```

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 >> 0 reactions out of 92 are minimized (0.00%).
 >> 0 reactions out of 92 are maximized (0.00%).
 >> 92 reactions out of 92 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 92
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:57:15 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 92. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 92.
 -- End time:     Mon Sep 27 14:57:15 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (934,988)
 >> Only 111 reactions of 988 are solved (~ 11.23%).
 >> 0 reactions out of 111 are minimized (0.00%).
 >> 0 reactions out of 111 are maximized (0.00%).
 >> 111 reactions out of 111 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 111
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:57:14 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 111. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 111.
 -- End time:     Mon Sep 27 14:57:14 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (1001,1109)
 >> Only 110 reactions of 1109 are solved (~ 9.92%).
 >> 0 reactions out of 110 are minimized (0.00%).
 >> 0 reactions out of 110 are maximized (0.00%).
 >> 110 reactions out of 110 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 110
 >> Log files will be stored at /Users/almut.heinken/Documents/Code/cobratoolbox/src/analysis/FVA/fastFVA/
 -- Start time:     Mon Sep 27 14:57:16 2021
 >> #Task.ID = 1; logfile: cplexint_logfile_1.log
        -- Minimization (iRound = 0). Number of reactions: 110. - printLevel 1
        -- Maximization (iRound = 1). Number of reactions: 110.
 -- End time:     Mon Sep 27 14:57:16 2021
Each model.subSystems{x} is a character array, and this format is retained.
 > The version of CPLEX is 129.
 > The version of CPLEX is 129.
```

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Warning: The most recent cplexFVA binaries are only tested for CPLEX version 128. However, you have instal
> In fastFVA>checkFastFVAbin (line 778)
  In fastFVA (line 130)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
 >> Solving Model.S. (uncoupled)
 >> The number of arguments is: input: 6, output 4.
 >> Size of stoichiometric matrix: (970,1036)
 >> Only 101 reactions of 1036 are solved (~ 9.75%).
 >> 0 reactions out of 101 are minimized (0.00%).
 >> 0 reactions out of 101 are maximized (0.00%).
 >> 101 reactions out of 101 are minimized and maximized (100.00%).

 WARNING: The Sequential Version might take a long time.

 >> The number of reactions retrieved is 101
 >> Log files ...
Warning: Directory already exists.
ans =

     1


ans =

     2


ans =

     3


ans =

     4

Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
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> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Each model.subSystems{x} is a character array, and this format is retained.
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 59)
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  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 50)
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> In changeRxnBounds (line 59)
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> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 59)
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  In remoteParallelFunction (line 46)
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  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10m3oundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
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  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
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Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
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Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpalm2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpentdec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpentdec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ethd(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ethd(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ppd_R(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ppd_R(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ppd_S(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12ppd_S(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
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> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 50)
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> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
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> In changeRxnBounds (line 50)
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Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mtundec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10mundecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3hddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11m3oddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mddcaACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_11mtddec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3htridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12m3otridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mtridecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_12mttritec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13dpg(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3hmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13m3omyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mmyrsACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_13mtmrs2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3hpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14m3opentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mpentdecACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpalm2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpentdec2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_14mtpentdec2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1itdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1itdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odec11eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odec11eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_10fthf5glu(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 59)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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Warning: Reaction EX_1ihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1itdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1itdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odec11eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odec11eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3hpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15m3opalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mpalmACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_15mtpalm2eACP(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1aipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ddecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdec9eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_1hdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihpdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ihpdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ipdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1ipdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1itdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1itdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odec11eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odec11eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1odecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1pyr5c(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1pyr5c(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1tdec7eg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
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  In remoteParallelFunction (line 46)
Warning: Reaction EX_1tdec7eg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1tdecg3p(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_1tdecg3p(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_23dhdp(e) not in model
> In changeRxnBounds (line 50)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_23dhdp(e) not in model
> In changeRxnBounds (line 59)
  In parallel_function>make_general_channel/channel_general (line 837)
  In remoteParallelFunction (line 46)
Warning: Reaction EX_25aics(e) not in mode...
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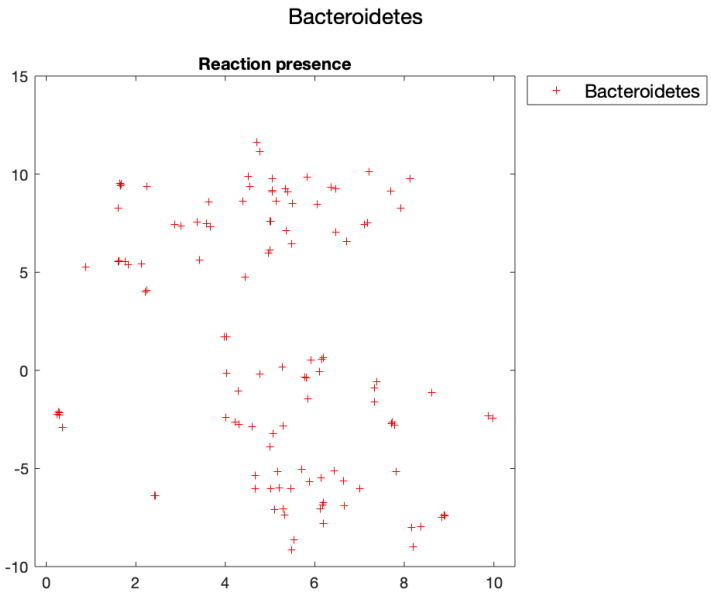

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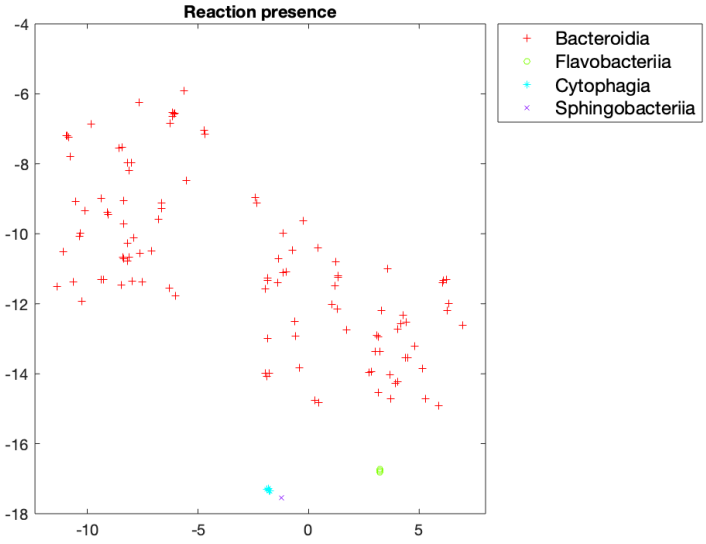

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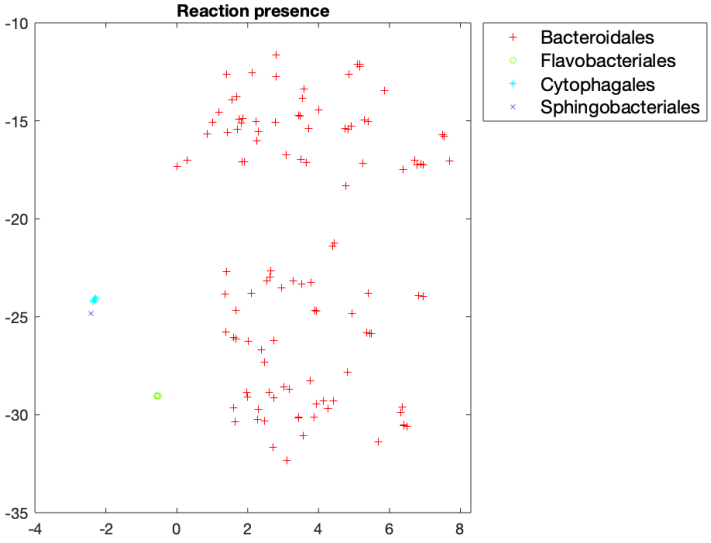

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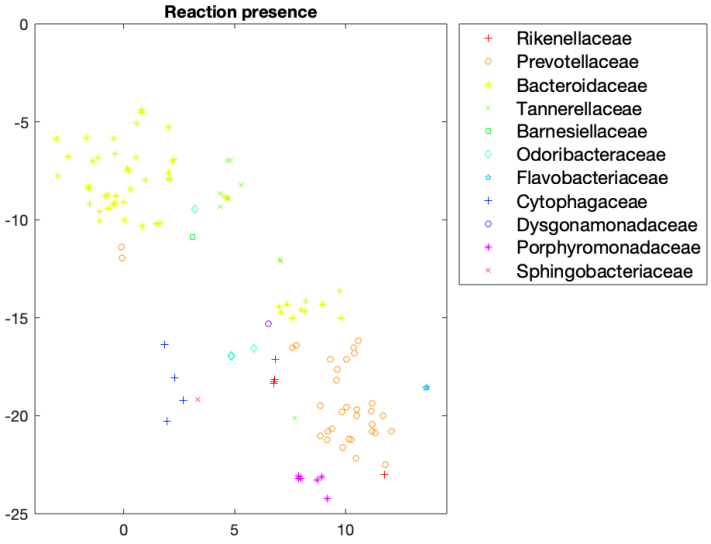

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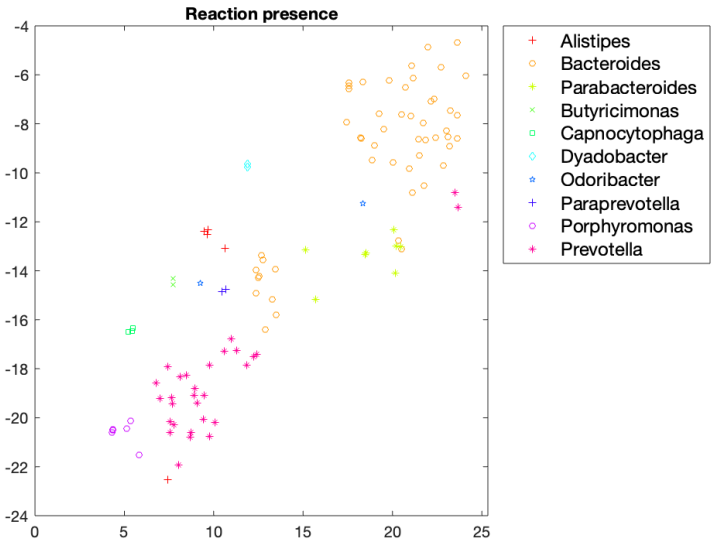

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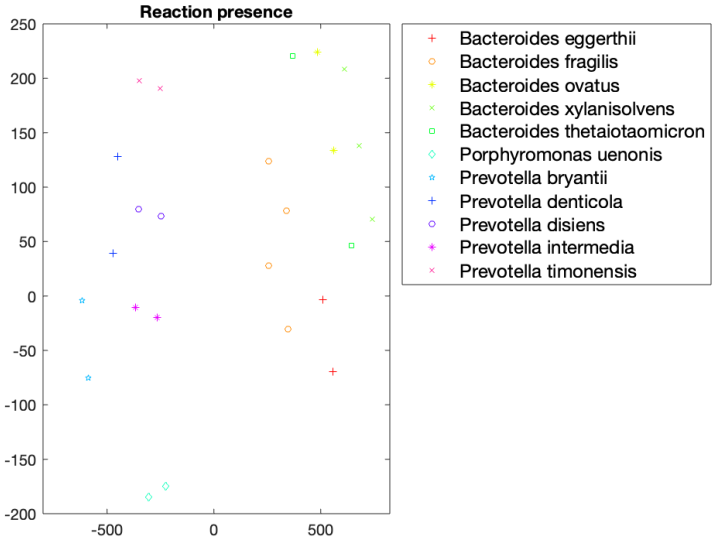

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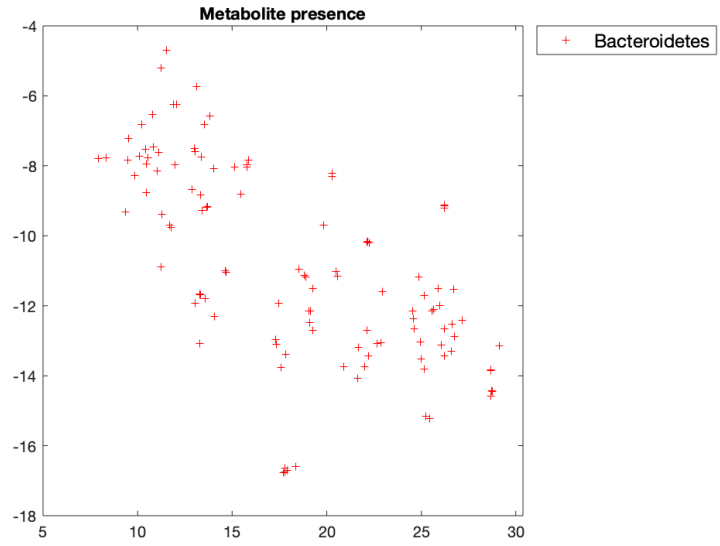

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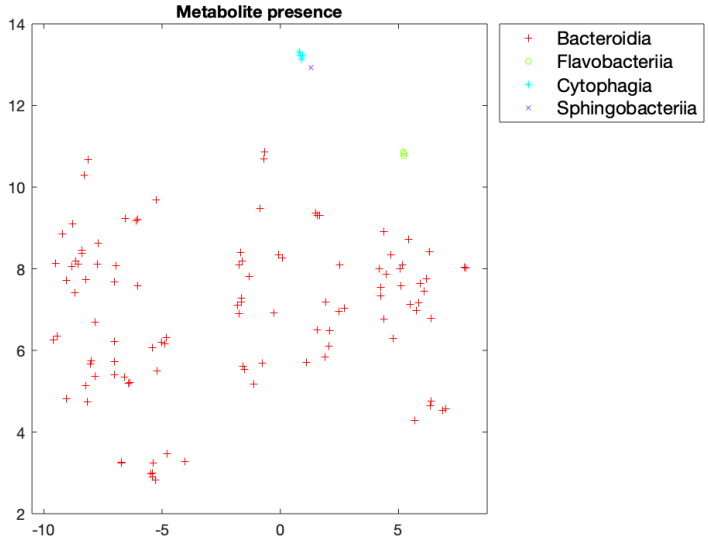

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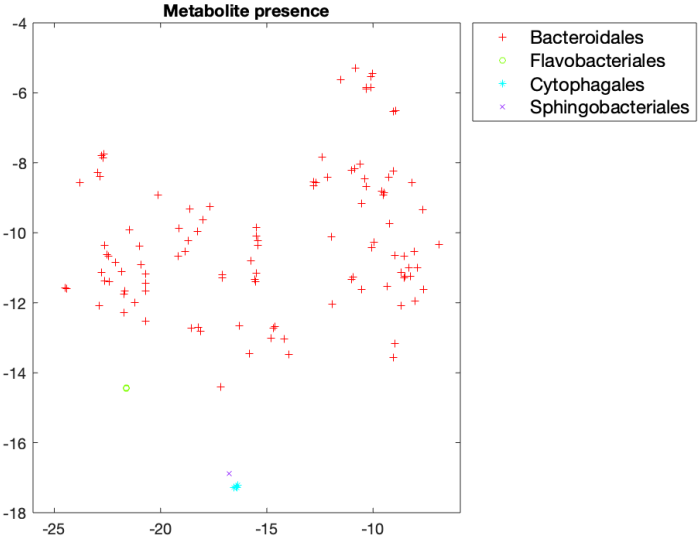

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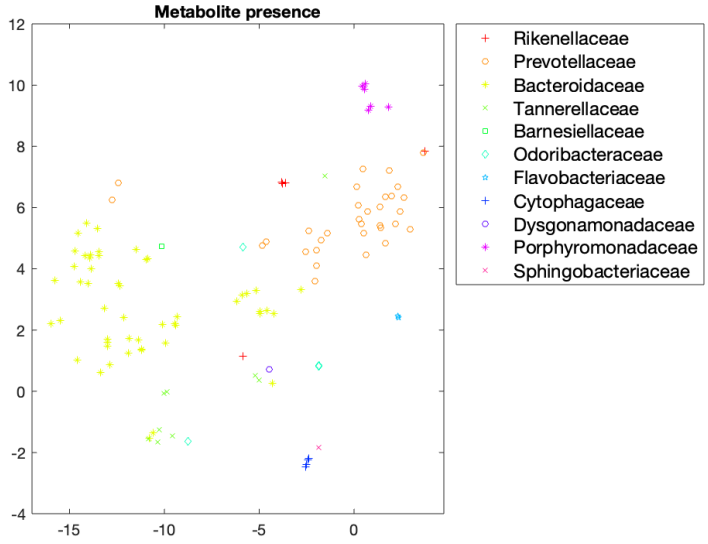

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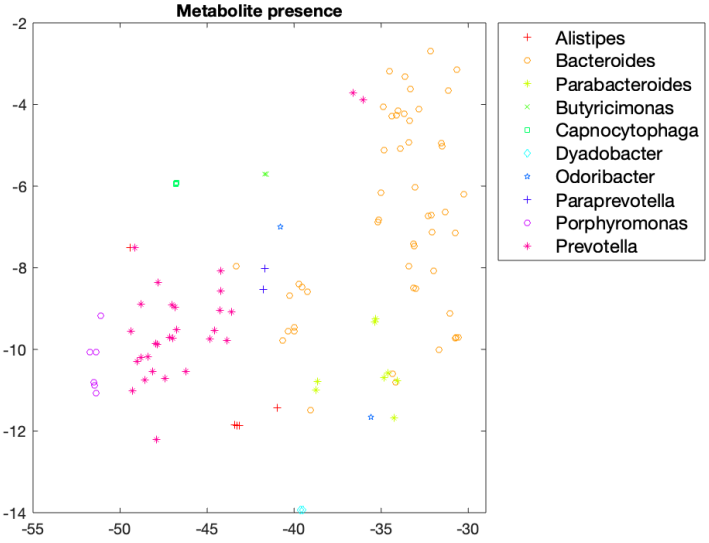

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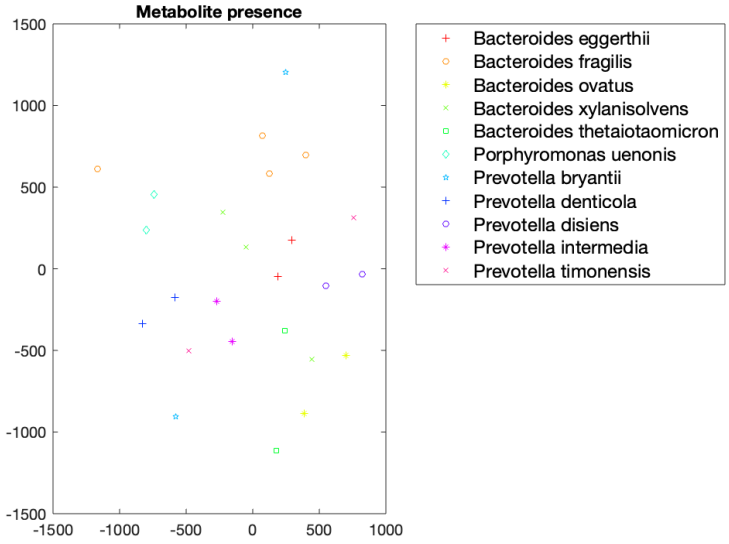

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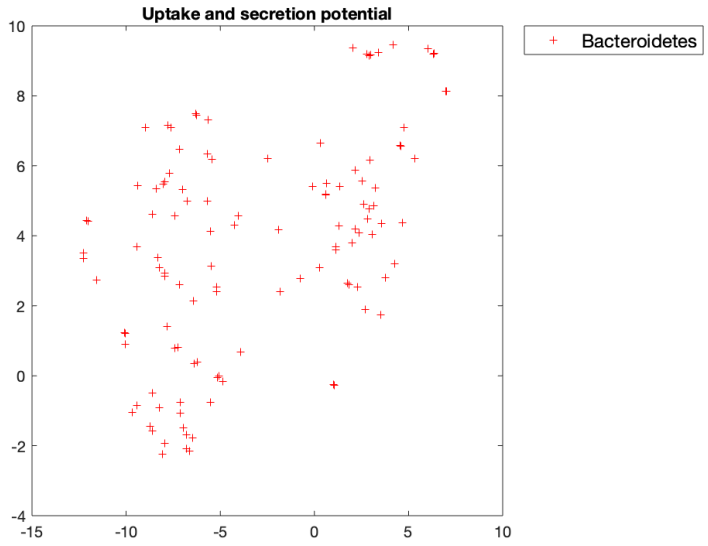

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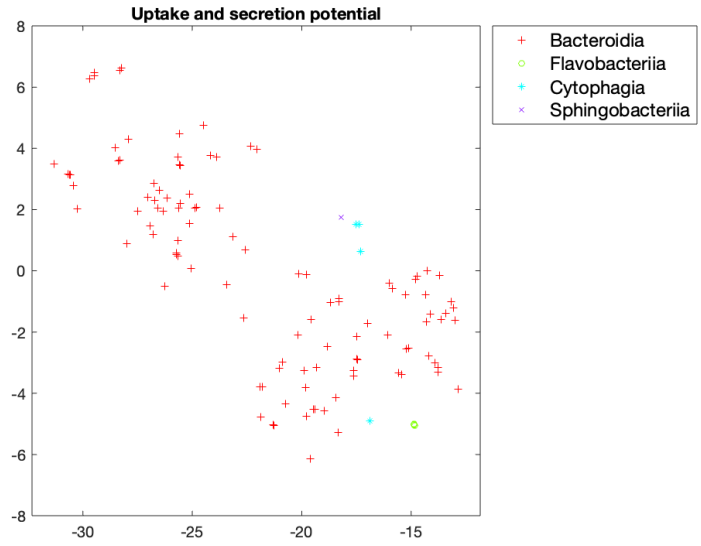

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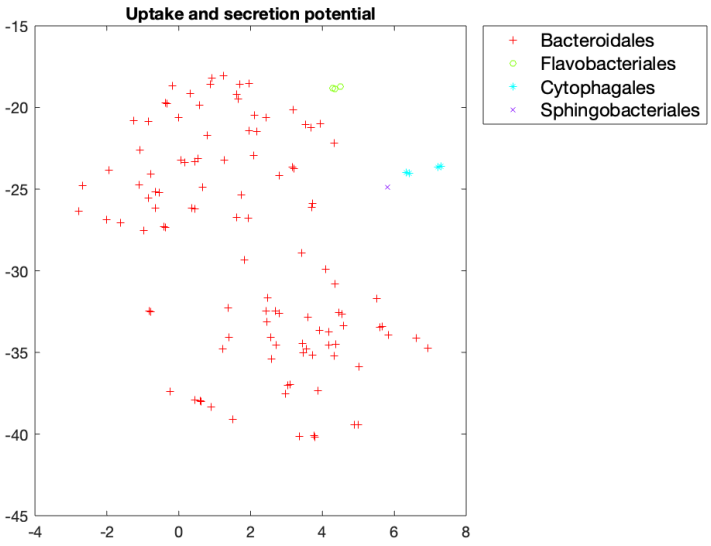

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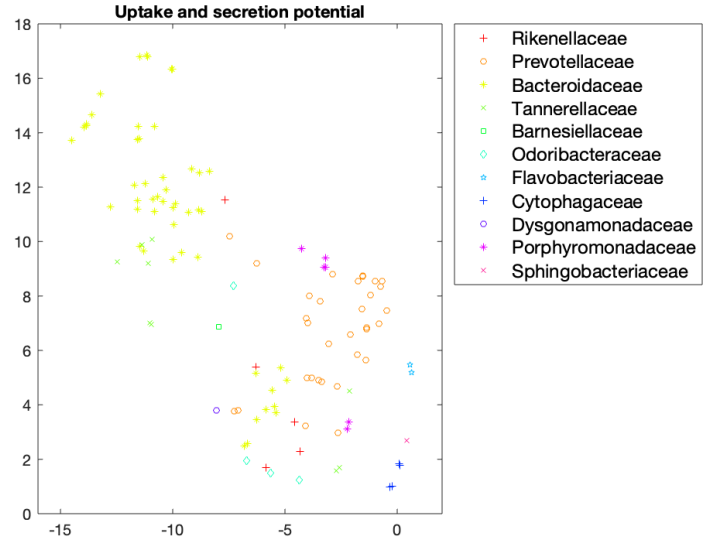

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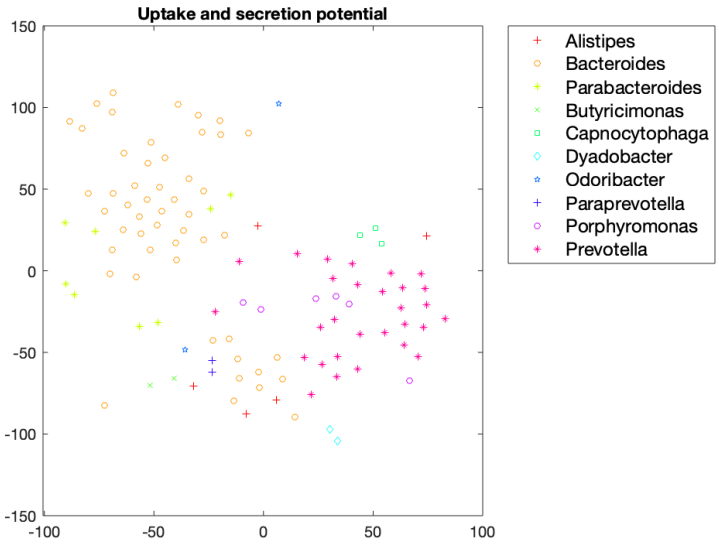

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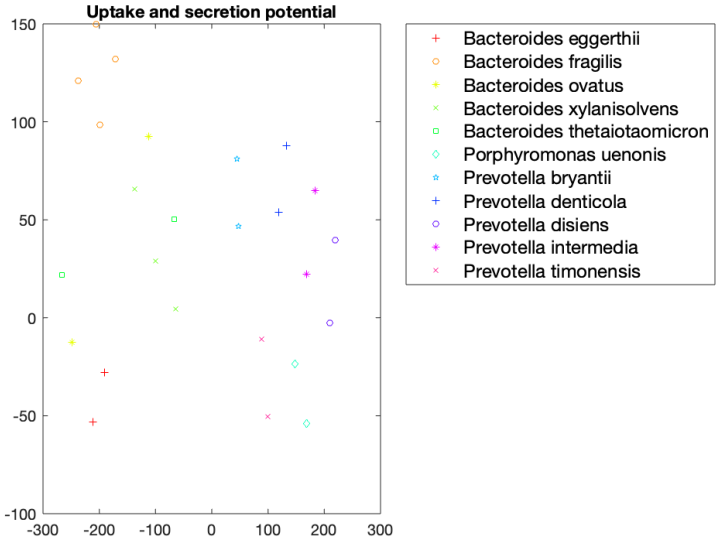

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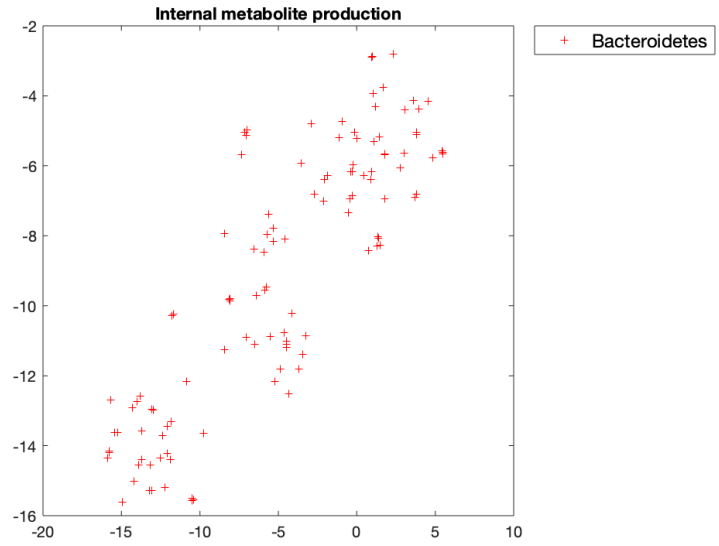

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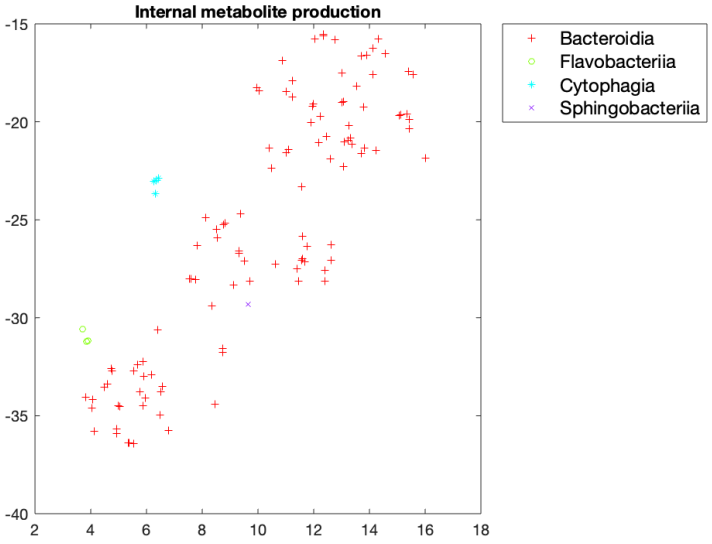

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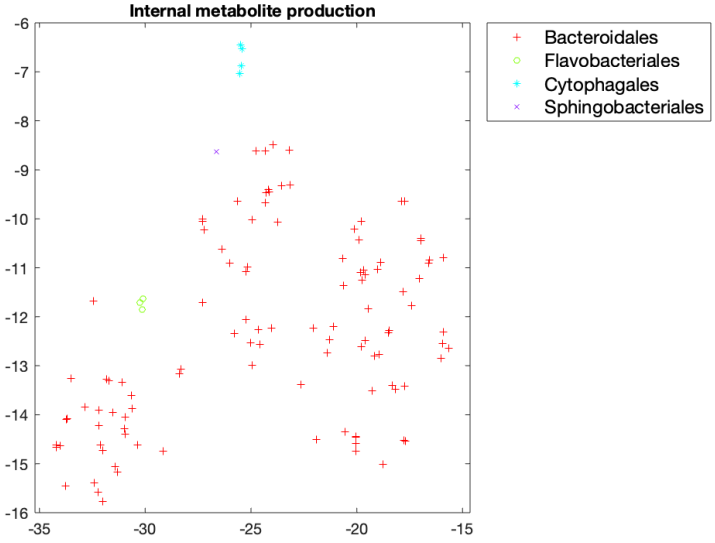

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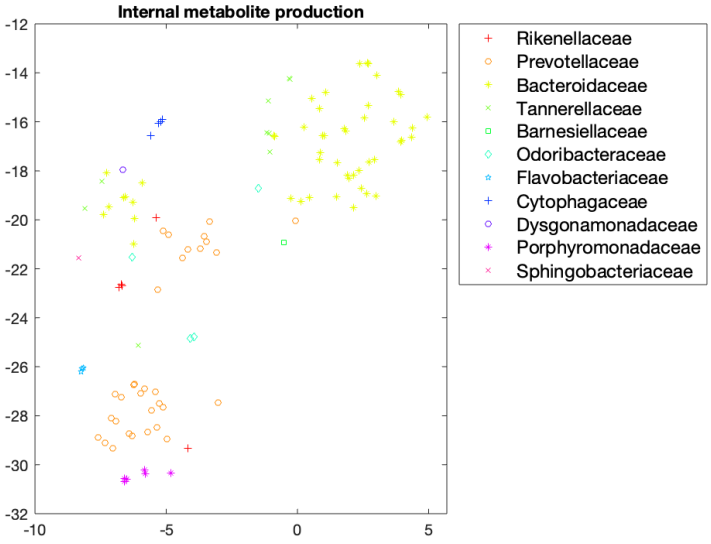

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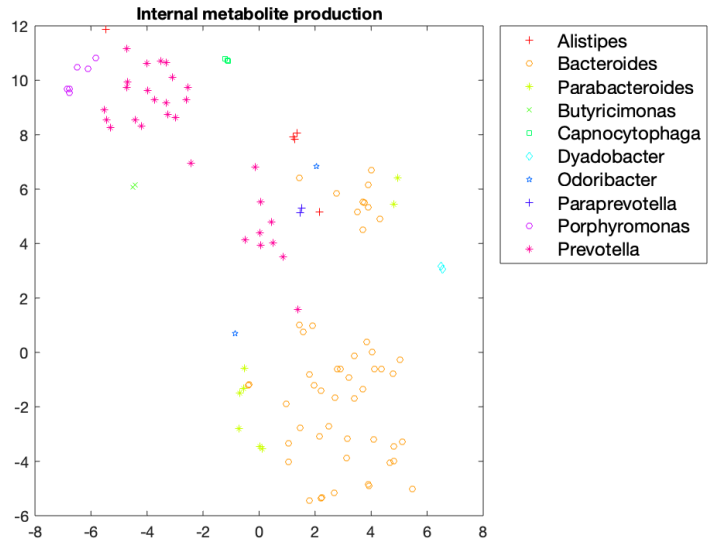

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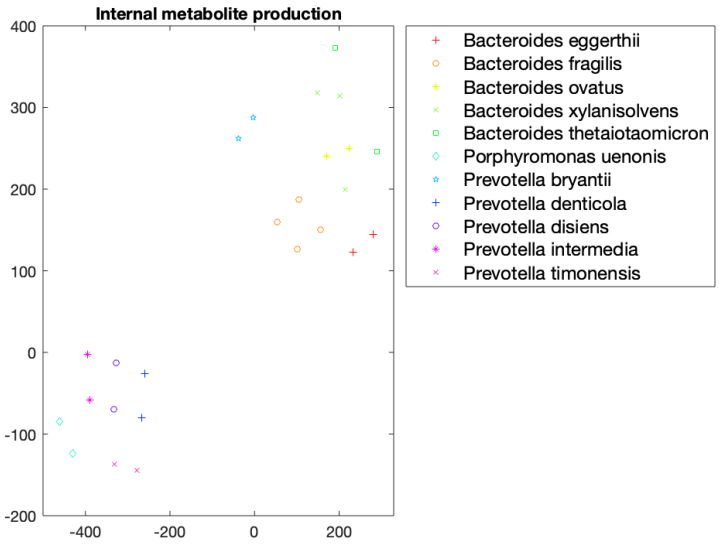

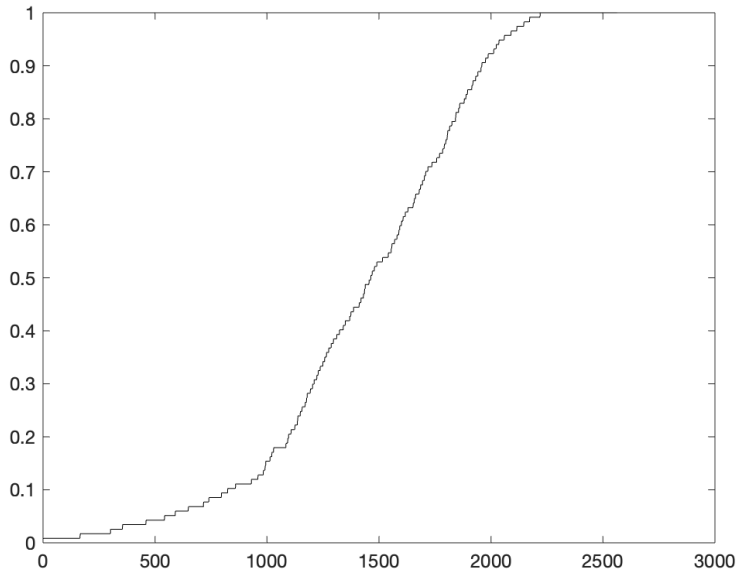

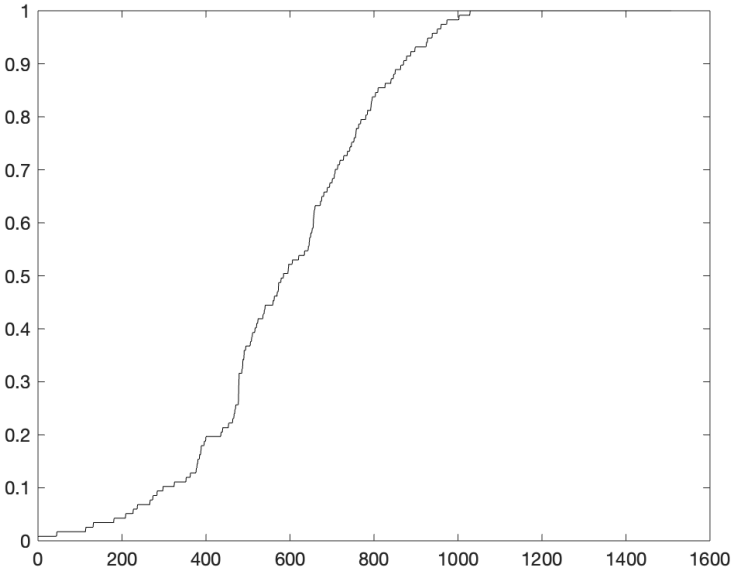
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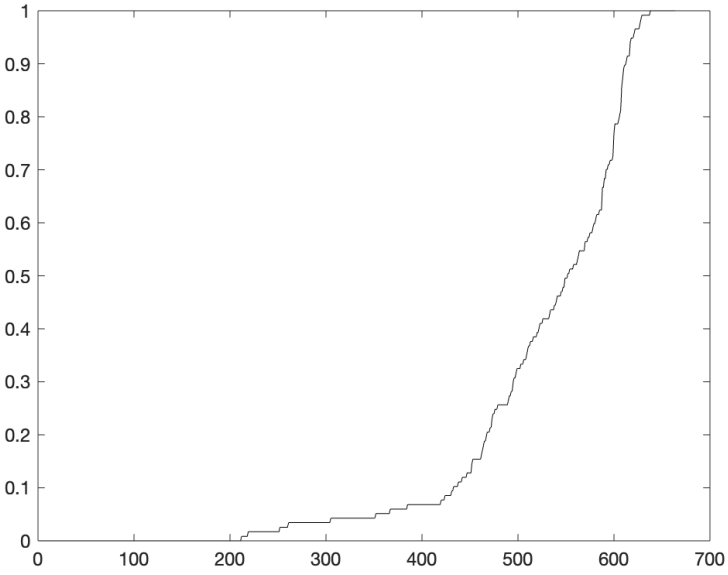
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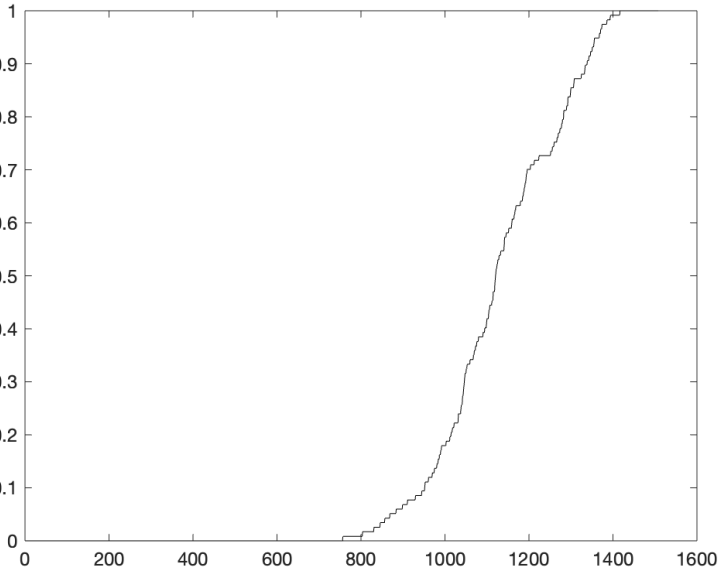

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