BPL_CHO_Fedbatch demo

In [1]:
```python
run -i BPL_CHO_fedbatch_explore.py
```

Linux - run FMU pre-comiled JModelica 2.4

Model for bioreactor has been setup. Key commands:
 - par()   - change of parameters and initial values
 - init()   - change initial values only
 - simu()   - simulate and plot
 - newplot()   - make a new plot
 - show()   - show plot from previous simulation
 - disp()   - display parameters and initial values from the last simulati
on
 - describe() - describe culture, broth, parameters, variables with values /
units

Note that both disp() and describe() takes values from the last simulation

Brief information about a command by help(), eg help(simu)
Key system information is listed with the command system_info()

In [2]:
```python
plt.rcParams['figure.figsize'] = [30/2.54, 24/2.54]
```

In [3]:
```python
# Slide 3
newplot('CHO fedbatch cultivation - protein expression', plotType='Textbook_3

# Data from Table 1 and 2 for experiment 3
V_0=0.35
init(V_0=V_0, VXv_0=V_0*0.29, VXd_0=V_0*0.010)
init(VG_0=V_0*17.17, VGn_0=V_0*3.02, VL_0=V_0*1.12, VN_0=V_0*0.29)

# Feeding
Feed=0.1/24
par(G_in=15, Gn_in=9.3)
par(t0=0, F0=0, t1=35, F1=Feed, t2=100, F2=Feed)
par(t3=300, F3=Feed)

# Culture parameters
par(alpha=-1.0, beta=0.01)

# Simulation
simu(200)
#par(t2=100, F2=0.7*Feed, t3=300, F3=0.7*Feed); simu(200)
#par(F2=Feed, F3=Feed)
```
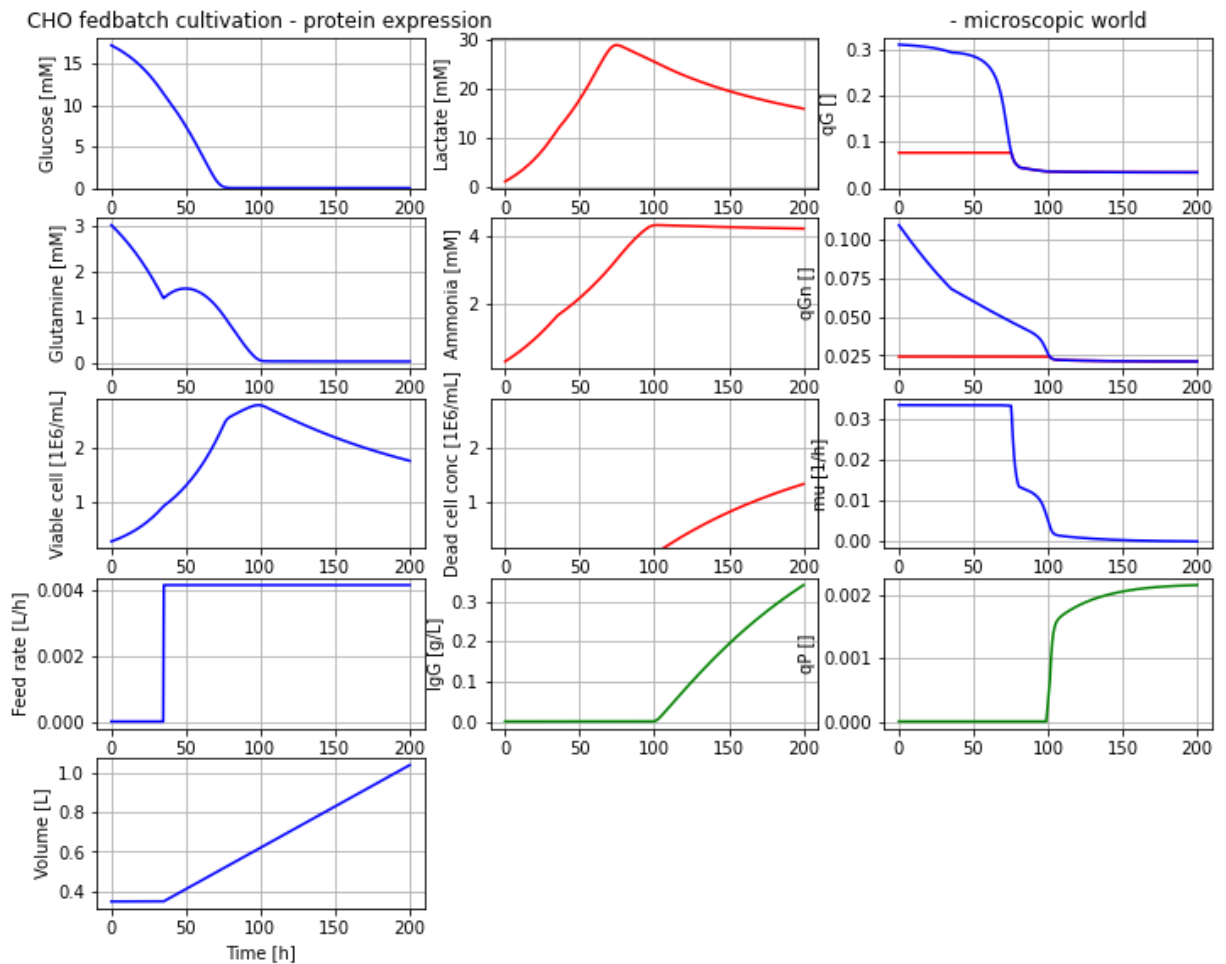
Simulation interval   : 0.0 - 200.00000000000003 seconds.
Elapsed simulation time: 0.028425254000467248 seconds.

CHO fedbatch cultivation - protein expression

- microscopic world

In [4]: `system_info()`

```
System information
-OS: Linux
-Python: 3.8.2
-PyFMI: 2.7.4
-FMU by: JModelica.org
-FMI: 2.0
-Type: FMUModelCS2
-Name: BPL_CHO.Fedbatch
-Generated: 2022-08-29T12:13:26
-MSL: 3.2.2 build 3
-Description: Bioprocess Library version 2.1.0 beta
-Interaction: FMU-explore ver 0.9.2
```

In [ ]: