Plan Overview

A Data Management Plan created using DMPonline.be

Title: Understanding the molecular changes in starch during sourdough-type bread-making and their impact on in vitro starch digestion and ex vivo colon fermentation

Creator: Celine Verdonck

Principal Investigator: Celine Verdonck

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Principal Investigator: Celine Verdonck

Project abstract:

Cereal products, like bread, are essential in a sustainable and healthy diet. However, the overconsumption of carbohydrate-rich food products, often made with refined flour, is linked with the rise of diet-related obesity, diabetes and coronary heart diseases. Evidence suggests that lactic acid fermentation reduces the digestibility of starch in cereal-based food products. As such, sourdough bread could be promising in light of reducing the digestible carbohydrate content of bread while increasing its fibre content. Yet, contradictory results of in vivo studies, combined with a lack of insight into the biochemical mechanisms dictating the fate of starch, have led to controversy in the research field. This research project aims for an in-depth analysis of the mechanisms responsible for changes in starch microstructure, from the wheat kernel over digestion to gut fermentation, to understand how sourdough fermentation can improve the nutritional profile of bread products.

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Understanding the molecular changes in starch during sourdough-type bread-making and their impact on in vitro starch digestion and ex vivo colon fermentation

Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume	Physical volume
		Indicate: ***N****(ew data) or* ***E****(xisting data)*	Indicate: **D**(igital) or **P**(hysical)	Indicate: **A**udiovisual **I**mages **S**ound **N**umerical **T**extual **M**odel **SO**ftware Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Notes		N	P&D	Numerical Textual	.xlsx	<100GB	1 note book
Wheat	wholemeal flour	N	P	sample	/	/	10 kg
Starch	powder	N	P	sample	/	/	5 kg
Lactic acid bacteria	LAB for inoculation	E	P	starter culture	/	/	5 vials
HPLC and HPAEC-IPAD	Raw and processed data of HPLC analysis for determination of AM and AP	N	D	Numerical	.xlsx	<100GB	/
Dynamic particle imaging	Raw and processed data of sympatec	N	D	Numerical	.xlsx	<100GB	/
Differential Scanning Calorimetry	Raw and processed data of the DSC	N	D	Images and numerical	.pdf and .xlsx	<100GB	/
water binding	Water binding and carbohydrate leaching	N	D	Numerical	.xlsx	<100G	/
Wide-angle X-ray diffraction	Starch crystallinity	N	D	Numerical	.xlsx	>100GB	/
Specific volume	Volscan results	N	D	Numerical	.xlsx	<100GB	/
crumb texture	Instron results	N	D	Numerical	.xlsx	<100GB	x
Gut microbiome analysis	Results in collaboration with VIB-KU Leuven Center for Microbiology	N	D	Numerical/ Model	tbd	tbd	/

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

N.A.

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- No

The experimental work described in work package 3 (task 3.3) involves ex vivo colon fermentations and includes collecting faecal samples from 6 healthy donors. I will collaborate with Prof. Raes from the VIB-KU Leuven Center for Microbiology. His group has significant expertise in this field and is familiar with the ethical requirements. I confirm having taken note that an ethical clearance is needed for my project and that I will adhere to all applicable regulatory framework, legislation and institutional policies about this issue. I will submit the proposal to the ethics committee (Ethics committee research UZ/KU Leuven) before the start of the year that this work package takes place in (2027).

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, …)? If so, please comment per dataset or data type where appropriate.

- No

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).

Nomenclature of the data files will be standerdised (e.g. YYMMDD_technique_sample). Each data folder will include a word document or Readme.txt file describing the research question
and hypothesis, the description of the materials, the experimental design, the setup and tested parameters, and the data interpretation. This information will also be added to the first sheet of a Microsoft Excel of CSV file, to summarize the set-up of the experiment and to provide information to understand the raw and processed data.

Will a metadata standard be used to make it easier to find and reuse the data?
If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- Yes

The datasets containing the original and processed data will be deposited in a data repository using DataCite (KU Leuven research data repository).

Data Storage & Back-up during the Research Project

Where will the data be stored?

- Shared network drive (J-drive)
- Sharepoint online

During the project, the data will be stored on the shared network drive of KU Leuven (J-drive). Afterwards, the folder including all data will be moved to the large volume storage drive.

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Only authorized persons, involved in the project will have access to the folder where the data is stored. The physical data (lab book) will be securely stored in a locked room. The laboratory and devices are only accessible with badge access.

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

The cost (approximately €580 per year) for data storage on a shared network drive of KU Leuven will be covered by the general budget of the research group.

Data Preservation after the end of the Research Project

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- All data will be preserved for 10 years according to KU Leuven RDM policy

The digital data will be preserved for 10 years. The physical samples will be discarded after their shelf life.

Where will these data be archived (stored and curated for the long-term)?

- Large Volume Storage (longterm for large volumes)
- KU Leuven RDR

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

The costs (approximately €130 per year for the K-drive) will be covered by the general budget of the research group.

Data Sharing and Reuse

Will the data (or part of the data) be made available for reuse after/during the project?
Please explain per dataset or data type which data will be made available.

- Yes, as open data

Experimental data will be published in KU Leuven Research Data Repository (RDR) with access granted upon request.

If access is restricted, please specify who will be able to access the data and under what conditions.

NA

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

Please explain per dataset or data type where appropriate.

- Yes, intellectual property rights
- No

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- KU Leuven RDR (Research Data Repository)

When will the data be made available?

- Upon publication of research results

Which data usage licenses are you going to provide?

If none, please explain why.

- CC-BY 4.0 (data)

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- Yes, a PID will be added upon deposit in a data repository

What are the expected costs for data sharing? How will these costs be covered?

No additional costs are expected.

Responsibilities

Who will manage data documentation and metadata during the research project?

Celine Verdonck (the applicant) will be in charge of data documentation and metadata during the research project.

Who will manage data storage and backup during the research project?

Celine Verdonck (the applicant) will manage data storage. Daily backup during the research project is managed by the ICTS service of KU Leuven.

Who will manage data preservation and sharing?

Celine Verdonck (applicant) will manage data preservation and sharing. When the project has ended, Christophe Courtin (Promotor) will manage data preservation and sharing.

Who will update and implement this DMP?

Celine Verdonck (applicant) will update and implement this DMP.