Understanding the effect of genotype and environmental stresses on the starch granule size distribution in wheat in relation to starch techno-functional properties

A Data Management Plan created using DMPonline.be

Creators: Eline Van Wayenbergh, n.n. n.n.

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Principal Investigator: n.n. n.n.

Grant number / URL: PDMT2/23/063

ID: 206211

Start date: 01-04-2024

End date: 30-09-2024

Project abstract:

Wheat is one of the leading cereal crops for our global food production. It seems however that climate change is causing changes in the properties of its major component, starch, which exhibits a bimodal granule distribution. Changes in this distribution can pose major challenges in cereal-based processes. Gaining fundamental insights into the effect of environmental conditions on the granule properties, size distribution and development, and relating this to wheat techno-functional properties is thus crucial, and is the main goal of this project. This will be achieved by developing an analytical toolbox to investigate starch granule properties, mapping the global variation in the granule size distribution, and investigating the impact of growth conditions on the bimodal starch distribution and the resulting starch techno-functional properties. The obtained results will shed light on the possible impact of the changes in starch granule properties on cereal-based processes. This will allow breeders to carefully select wheat varieties with desired granule size distributions.

Last modified: 15-04-2024

Understanding the effect of genotype and environmental stresses on the starch granule size distribution in wheat in relation to starch techno-functional properties

---

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	
Lab notes		New	Physical but will be digitalized in excel files	Textual/Numerical	.xlsx	<100GB	1 note book
Microscopy	Microscopic images and image analysis performed on them	New	Digital	Images	.tif	<100GB	
Wheat samples	Wheat samples from field trials at UC Davis (USA) and Transfarm (Belgium) and wheat samples obtained from CIMMYT	New	Physical	Physical			30 buckets stored in the grain cellar
DPSI	Raw and processed data of dynamic particle size imaging	New	Digital	Experimental	.xlsx	<100GB	
DSC	Raw and processed data of differential scanning calorimetry	New	Digital	Experimental	.xlsx	<100GB	
RVA	Raw and processed data of rapid visco analysis	New	Digital	Experimental	.xlsx	<100GB	
HPLC	Raw and processed data of HPLC analysis for determination of AM/AP	New	Digital	Experimental	.xlsx	<100GB	
Characterisation wheat kernel	1000-kernel weight, protein, ash, starch		Digital	Experimental	.xlsx	<100GB	
Starch purity	Starch content determined using total starch assay		Digital	Experimental	.xlsx	<100GB	
Water binding	Water binding and carbohydrate leaching		Digital	Experimental	.xlsx	<100GB	

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:

NA

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

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).

Data files will be named using a standardized system including the date of the experiment and technique or method used. The first sheet in Microsoft Excel or CSV files will be used to summarize the set-up of the experiment and to provide enough information to understand the raw and processed data. Data folders containing raw and processed data files, image or modeling files will have a 'read-me' document in Word or TXT format with a clear description of what the data/models represent and how they were generated, providing a description of the materials, the experimental or modelling methodology design, setup and parameters, and data meaning, such that a secondary analyst experienced with the methods can use the data accurately and effectively.

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

Data will be deposited in the KU Leuven Research Data Repository. Hence the metadata standard DataCite will be used.

Data Storage & Back-up during the Research Project

Where will the data be stored?

- Shared network drive (J-drive)

During the project the data will be stored on a shared network drive. After the project has finished, data will be moved to a large volume storage.

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 who are involved in the project will have access to the folder where the data is stored.

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

The cost for data storage on a shared network drive of KU Leuven will be € 503,66 per TB per year. This cost 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

All digital data will be preserved for 10 years.
Wheat samples will be discarded after 5 years due to limited physical storage capacity and possible shelf life issues.

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

- Large Volume Storage (longterm for large volumes)

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

After the project has ended, data will be moved to a large volume storage with an annual cost of €104,42 per TB. This cost 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.

- 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 for data sharing are expected.

Responsibilities

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

Eline Van Wayenbergh (Applicant)

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

Data storage: Eline Van Wayenbergh (Applicant)
Backup: automatic daily back-ups are managed by the ICTS service of KU Leuven

Who will manage data preservation and sharing?

Data preservation during the project and data sharing: Eline Van Wayenbergh (Applicant)
Data preservation when the project has ended: Christophe Courtin (Promotor)

Who will update and implement this DMP?

Eline Van Wayenbergh (Applicant)