
Unravelling and improving the structure of emulsified meat analogues

A Data Management Plan created using DMPonline.be

Creators: Diede Bogaerts, Ilse Fraeye

Affiliation: KU Leuven (KUL)

Template: KU Leuven BOF-IOF

Principal Investigator: Ilse Fraeye, Diede Bogaerts

Grant number / URL: C24E/22/021

ID: 191741

Start date: 01-10-2022

End date: 30-09-2026

Project abstract:

In Western countries, the consumption of meat and meat products is decreasing due to health, environmental and/or ethical issues, while consumption and production of meat analogues increases. Meat analogues are generally plant-based foods which aim to mimic the sensorial characteristics of meat products. This project focuses on emulsified meat analogues. One of the challenges in their production is to mimic the textural properties of emulsified meat products. Hardly any knowledge is available on the structural architecture of emulsified meat analogues. Therefore, the goal of this project is to improve the structural properties of emulsified meat analogues through an enhanced mechanistic insight into the role of proteins, fats and polysaccharides in their structural architecture.

Last modified: 06-01-2023

Unravelling and improving the structure of emulsified meat analogues

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 S oftware O ther (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Nitrogen Content	Determined through Kjeldahl analysis	N	D	N	.csv	<1GB	
Rheological Parameters	Determined through small deformation rheology	N	D	N	.csv	<1GB	
Texture Parameters	Determined through texture analysis (compression)	N	D	N	.csv	<1GB	
Minimal Gelling Concentration	Determined experimentally by heating various concentrations of protein isolates	N	D	N	.csv .jpg	<1GB	
Emulsion Properties	Determined through pendant drop tensiometry and spectrophotometry	N	D	N	.csv	<1GB	
Water and oil binding properties	Determined through centrifugation and gravimetry	N	D	N	.csv	<1GB	
Fat composition	Determined through chromatography (GC-FID and LC-MS)	N	D	N	software-dependent	<1GB	
Mathematical modelling	Predicted using relevant software	N	D	N	.Rdata	<1GB	
CLSM imaging	Microscopic images of model systems, processed using ImageJ software	N	D	I	.jpg	<100GB	
Sensorial properties of emulsified meat analogue model systems	Determined by use of trained expert panel	N	D	N	.csv	<1GB	
Statistical data processing	Data analysis using R	N	D	N	.Rdata	<1GB	

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.

- Yes

The overall knowledge generated through this project will facilitate bilateral projects with companies. For example, the application potential of company-specific ingredients in meat analogues can be investigated. This is not related to a specific dataset, rather to the overall expertise gain.

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.

- Yes

For a specific protein isolate sample, the supplier has requested through the use of a non-disclosure agreement to keep specific sample-related information (supplier, product number) hidden from publication.

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).

All acquired data will be written down in a physical lab diary prior to copying the data to a digital file. Both the written and digital file contain: date experiment, sample information (name, supplier, batch info, date of expiration, storing conditions, number), measured values (such as mass of all relevant samples and lab equipment, experimental conditions), environmental factors (where relevant: temperature, humidity), timing and all other parameters relevant to the specific experiment being performed.

Data is transferred to a digital form as soon as possible after completion of the experiment. Data (mostly measured values, but may also include pictures) are stored in an appropriate excel file which has a dedicated tab for every experiment and includes a complete description of the sample under investigation, the experimental conditions and any relevant comments with regards to the experiment. In the case of images (.jpg files), the image is stored in a separate folder and clearly identified with an appropriate title, which will be referred to in the corresponding excel file.

All the above mentioned digital files (excel) are stored on a dedicated Microsoft Teams folder where they are only accessible to the 2 PhD students involved in this C2 project (Diede Bogaerts and Yongming Zhang), dr. Olivier Goemaere (copromotor of the PhDs) and Prof. Ilse Fraeye (promotor of the C2 project and the corresponding PhDs).

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.

- No

Metadata created:

- sample ID (product, supplier, product number, batch number, expiration date, date packaged, storage conditions, initials of person handling product)
- research data (standard operating procedure applied, date of experiment, experimental conditions, measured values, additional remarks and notes, environmental conditions where applicable)

Data Storage & Back-up during the Research Project

Where will the data be stored?

- OneDrive (KU Leuven)
- Other (specify below)

The respective PhD students will store preliminary, unfinished and unprocessed data on their personal Onedrive, provided by KU Leuven.

All processed, final data will be copied to a private channel of the Microsoft Teams team of the research group (provided by KU Leuven) that is dedicated to this C2 project and that is accessible by the 2 PhD students involved (Diede Bogaerts and Yongming Zhang), dr. Olivier Goemaere (copromotor of the PhDs) and Prof. Ilse Fraeye (promotor of the C2 project and the corresponding PhDs).

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?

The data are stored on Onedrive and in a private channel of the Microsoft Teams team of the research group. The latter channel is only accessible to the 2 PhD students involved (Diede Bogaerts and Yongming Zhang), dr. Olivier Goemaere (copromotor of the PhDs) and Prof. Ilse Fraeye (promotor of the C2 project and the corresponding PhDs). Both Onedrive and Teams are only accessible using the KU Leuven credentials of the respective coworkers (and require using the authenticator app on ones personal phone).

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

Both Onedrive and Microsoft Teams, provided by KU Leuven, are free.

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

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

- Large Volume Storage (longterm for large volumes)
- Other (specify below)

Physical notebooks will be archived at the applicant's research group for a minimum of 10 years.

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

The annual cost of the archive server amounts to 10 euro per 100 GB. Therefore the cost related to storage of the data from this project will be limited. This cost will be covered by the promotor's 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.**

- No (closed access)

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

For a specific protein isolate sample, the supplier has requested through the use of a non-disclosure agreement to keep specific sample-related information (supplier, product number) hidden from publication.

Where will the data be made available?

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

- Other (specify below)

NA

When will the data be made available?

- Other (specify below)

NA

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

NA

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.

- No

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

NA

Responsibilities

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

The 2 PhD students involved (Diede Bogaerts and Yongming Zhang)

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

The 2 PhD students involved (Diede Bogaerts and Yongming Zhang)

Who will manage data preservation and sharing?

Prof. Ilse Fraeye

Who will update and implement this DMP?

The 2 PhD students involved (Diede Bogaerts and Yongming Zhang)