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# CHITINERY - Towards a novel sustainable chitin refinery process for insect and other arthropodal biomass

A Data Management Plan created using DMPonline.be

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**Template:** KU Leuven BOF-IOF

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**Project Administrator:** n.n. n.n.

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## Project abstract:

Chitin has been generally accepted as an extraordinary renewable biomass. Its applications and those of its derivatives are numerous, ranging from aerogel production to building blocks for the chemical industry. Its purification from arthropodal sources, however, has serious flaws, being the requirement of large amounts of hazardous chemicals and chitin quality deterioration just two of them. We have, however, invented a sustainable and cutting-edge refinery process delivering high-purity chitin from black soldier fly (BSF) larvae (*Hermetia illucens*). This process will be optimised and scaled up for the isolation of high-quality BSF chitin. Furthermore, its scope and limitations will be explored, including the use of other solvents and feedstocks like crustacean waste. The chitin produced by this process can be used in high-end applications requiring high-purity chitin. A detailed characterization will allow to select the most appropriate applications.

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## 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: <b>N</b> (ew data) or <b>E</b> (xisting data)	Indicate: <b>D</b> (igital) or <b>P</b> (hysical)	Indicate: <b>A</b> udiovisual <b>I</b> images <b>S</b> ound <b>N</b> umerical <b>T</b> extual <b>M</b> odel <b>S</b> oftware <b>O</b> ther (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA	
Biomass	Samples of various biomass (insects, crustaceans, ...) before and after biorefinery	N	P				30 kg
Analytical data	Chemical analyses of samples	N	D	N	.csv; .xls	< 100 GB	
Experimental results	Interpreted data	N	D	N	.csv; .xls	< 10 GB	
Observational data	Digitised version of observations during experiments	N	D	T/N	.csv; .xls	< 1 GB	
Images	SEM images, photos	N	D	I	.tiff; .jpg	< 100 GB	
Reports	Presentation and discussion of results	N	D	T/N	.doc; .pdf	< 1 GB	
Papers	Final publications will be stored	N	D	T/N	.doc; .pdf	< 1 GB	

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:

Not applicable for this project.

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

No ethical issues are applicable during the present project.

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

No personal data will be processed during the present project.

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

Data generated during the project will be used to strengthen our patent application (EP23157990.5). More specifically, analytical data of the obtained products will be used for this purpose as well as the observational data. In addition, the possibilities of licensing our patent to interested parties will be explored as well. To this end, the reports generated during the project will be essential.

For this purpose of valorisation, we are collaborating with Dr. Ivo De Baere and Dr. Ivo Roelants of LRD.

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

No 3rd party agreements exist at this moment which could restrict exploitation of the data.

**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.**

- Yes

Data that will be generated will be part of our patent application. As such, we will manage our IP rights during the project. For this purpose, we have contact with Dr. Ivo De Baere and Dr. Ivo Roelants of LRD.

## 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).**

The necessary documentation like standard operating procedures will be digitally documented for every executed experiment, which will be placed together in a folder with the actual data files. These folders themselves will be arranged/sorted according to the work packages of the project, each also containing a short description documented in a "read-me" file. Reports and publications are kept together with the above in their respective folders.

**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

Analytical data of obtained products during the project will always be accompanied with a detailed description of how this particular dataset was generated. More particular, files containing calculated results will be given an extra tab containing information on, including but not limited to, type of instrument, procedure used, observations, detailed sample information, etc.

Descriptive metadata will be documented in each file to make it easy to find and reuse the data generated during the project. Working documents and templates for chemical analyses will be implemented as well to ensure a uniform structure.

## Data Storage & Back-up during the Research Project

**Where will the data be stored?**

- Sharepoint online
- Other (specify below)

Digital data like analytical and observational data as well as reports, images, and papers will be stored in a centralized Sharepoint environment of our research group. Only the PI and postdoc working on this project can provide access to this Sharepoint environment.

Physical samples of biomass will either be stored at -20 °C (fresh biomass in the freezer), 4 °C (protein-rich fractions after the biorefinery in the cool cell), or at room temperature (other, stable products) in our stockroom.

**How will the data be backed up?**

- Other (specify below)

A back-up is provided via automatic version management of the files in Sharepoint, maintaining up to 500 major versions.

**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

At this moment, no issues are foreseen regarding the storage and backup capacity during the project. The available capacity of 5 TB of data storage greatly suffices for the expected data output of this project (around 200 GB).

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

Only authorized persons like the PI, leading postdoc and researchers on the project will be granted access to our Sharepoint folder. If required, sensitive folders can be password protected by the PI. Though since the patent application, which this project is aimed at strengthening, has already been filed; it is expected that extra security will not be required.

Access to the folder can only be granted by the project coordinator to safeguard the data.

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

All costs associated to data storage and backup will be carried by the central ICTS.

## **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...).**

- Certain data cannot be kept for 10 years (explain below)

All digital data will be archived for a minimum of 10 years after project completion, in line with the KU Leuven policy.

As physical data (e.g., biomass samples) will be stored in freezers, fridges, stockroom; preservation thereof for 10 years may not be possible. In any case, physical samples will be preserved for at least 1 year after the project has ended. After this year, each sample type will be scrutinised and assessed whether it is feasible/worthwhile to keep for a longer time. For example, protein extracts kept in the fridge may lose their functionality or degrade/spoil over time, making it not worthwhile to preserve this sample type for a prolonged duration.

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

- Other (specify below)

Upon project completion, all generated data will be curated and transferred to a designated Sharepoint folder for long-term storage called "IP&P Database". Only the PI and postdocs will have access to this folder, while only the PI is able to modify user access rights.

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

The costs associated with data preservation are carried by the central ICTS.

## **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 embargoed data (temporary restriction)

As the data generated during the project is connected to a patent application, only authorized personnel like the PI, postdocs, and researchers active on the project will have access to the data. Following the patent application and upon being published, the data will be made available to the broader audience by publications in scientific papers. Up until then, the data will be kept in-house only.

Data that may be important for future project applications will, however, not be made available.

Physical data (biomass and product samples) will be allowed to use in other projects or for project applications upon approval of the project coordinator.

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

Physical data like biomass samples will be made available to members of our research group, after approval by the PI and leading postdoc on the project. After the patent has been published, the data will be made available through peer-reviewed scientific publications.

In-house researchers may be granted access to the data upon approval of the project coordinator or PI.

**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

As the generated data is connected to a patent application, sharing it will only be possible after careful consideration by the PI and project coordinator together with our contacts at LRD (Dr. Ivo De Baere, Dr. Ivo Roelants).

**Where will the data be made available?**

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

- Other (specify below)

Physical data like biomass samples can be shared within our research group or through MTA with interested companies. For this purpose, we will contact LRD for preparing the necessary NDA and MTA documents.

Data will be made available in peer-reviewed scientific publications upon publication of the patent which the data is associated with.

**When will the data be made available?**

- Other (specify below)

After the patent has been published, only then will data be made available through peer-reviewed scientific publications. Data that are important for future applications (C3, SBO) will not be made available.

**Which data usage licenses are you going to provide?**

If none, please explain why.

- Other (specify below)

No data usage licenses will be required as the data will not be deposited in a repository.

**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

Upon publication of the data in peer-reviewed publications, the data will be given a PID, being the DOI of the article.

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

Lab budget will be used to cover the cost for publishing the data in scientific publications. Higher costs will be implied if it is decided to publish the data in open access, to make them freely available for all researchers and even a broader audience.

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

PhD and postdoctoral researchers working on the project (Evelynn Vervoort, Ruben Smets)  
PI (Mik Van Der Borght)

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

The postdoctoral researcher (Dr. Ing. Ruben Smets - ruben.smets@kuleuven.be) working on the project as well as the PI (Prof. Dr. Mik Van Der Borght - mik.vanderborght@kuleuven.be)

**Who will manage data preservation and sharing?**

The PI (Prof. Dr. Mik Van Der Borght - mik.vanderborght@kuleuven.be)

**Who will update and implement this DMP?**

The postdoctoral researcher (Dr. Ing. Ruben Smets - ruben.smets@kuleuven.be) working on the project as well as the PI (Prof. Dr. Mik Van Der Borght - mik.vanderborght@kuleuven.be)