
Plan Overview

A Data Management Plan created using DMPonline

Title: Functionalized porous organic cages for adsorption and photodegradation of per- and polyfluoroalkyl substances (PFAS)

Creator: Abdul Ghaffar

Principal Investigator: Abdul Ghaffar

Data Manager: Abdul Ghaffar

Affiliation: University of Padua

Funder: European Commission

Template: Horizon Europe Template

ORCID iD: 0000-0003-0592-3456

Project abstract:

Increasing energy consumption, depletion of natural resources, and environmental pollution are nowadays among the biggest economic and social challenges. Per- and polyfluoroalkyl substances (PFAS), also known as forever chemicals, are persistent emerging pollutants not naturally degraded in the environment. PFAS are anthropogenic compounds with harmful health effects, inert and resistant to heat, and nowadays found in water, air, and soil, thus posing a heavy impact on our environment. Adsorption on activated carbon, ion-exchange resins, cyclodextrins, and nanofiltration are the methods currently used or under study for PFAS removal from water. However, critical gaps, such as the adsorbent regeneration, affinity, production of secondary waste, analytical method limitations, and efficient PFAS degradation pathways are major challenges. PhotoClean aims to synthesize novel palladium functionalized, solvent-responsive nanocage adsorbents able to remove PFAS from water. The nanocages will promote rapid PFAS photodegradation, being excited by visible-light to a photoexcited state able to interact with PFAS through a single electron transfer. Depending on the energy of the photoexcited state, PFAS decomposition is expected to be initiated either through oxidative or reductive events and be sustained by the formation of radicals. The new approach proposed by PhotoClean is based on the development of reusable adsorbent cages and the exploitation of visible-light as the energy source to activate PFAS decomposition; it thus constitutes an environmentally sustainable strategy for PFAS removal and degradation. The project will contribute to understand fundamental structure-property relationships of PFAS adsorption on nanoporous organic cages and integrate photodegradation of PFAS with catalytic activity. The action has the potential to revolutionize methods for PFAS removal from water and tackles a variety of scientific and societal challenges of environmental importance.

ID: 188669

Start date: 05-05-2025

End date: 04-05-2027

Last modified: 27-10-2025

Grant number / URL: 101153616 / <https://cordis.europa.eu/project/id/101153616>

Copyright information:

The above plan creator(s) have agreed that others may use as much of the text of this plan as they would like in their own plans, and customise it as necessary. You do not need to credit the creator(s) as the source of the language used, but using any of the plan's text does not imply that the creator(s) endorse, or have any relationship to, your project or proposal

Functionalized porous organic cages for adsorption and photodegradation of per- and polyfluoroalkyl substances (PFAS)

Data Summary

Will you re-use any existing data and what will you re-use it for?

Data Collection and Generation

New data in the **PhotoClean** project will be generated through experimental studies, material characterization, and adsorption-photodegradation performance tests, following standardized laboratory protocols and analytical procedures. Characterization and performance data will be obtained using advanced instrumentation such as HPLC-MS, UV-Vis spectroscopy, SEM, FTIR, and BET. Data acquisition and processing will utilize validated software tools (e.g., OriginPro and instrument-specific software) in accordance with FAIR principles. All experimental parameters, calibration records, and instrument settings will be documented in electronic lab notebooks (ELNs) to ensure full traceability, reproducibility, and data integrity.

Existing literature or publicly available datasets will be reused solely for benchmarking and model validation, ensuring consistency with project objectives. Data provenance will be clearly documented through proper citation of original sources, inclusion of DOIs, and maintenance of version histories.

What types and formats of data will the project generate or re-use?

Types and Formats of Data

The **PhotoClean** project will generate both raw and processed data derived from a range of experimental and analytical activities. These datasets will encompass spectroscopic, microscopic, analytical, and modelled data, each stored in standardized, interoperable formats.

- **Spectroscopic and Microscopic Data** (e.g., XPS, FTIR, UV-Vis, SEM) will be stored in instrument-native and image formats such as .spc, .csv, .tiff, and .jpeg.
- **Analytical Data** from adsorption and photodegradation experiments (e.g., LC-MS) will be saved in .csv, .xlsx, and .pdf formats to support reproducibility and compatibility across analytical platforms.
- **Modeling and Kinetic Analysis Data** will be recorded in .xlsx and .txt formats, ensuring easy re-use and interoperability.
- **Supporting Documentation**, including experimental protocols, metadata records, and reports, will be maintained in .pdf and .docx formats for long-term readability and accessibility.
- **Re-used Data** from the literature or open-access repositories will primarily be in .csv, .xlsx, or .txt formats to maintain consistency and compatibility with project-generated datasets.

This structured approach ensures that all data within the **PhotoClean** project are well-documented, interoperable, and aligned with FAIR data principles for long-term accessibility and re-use.

What is the purpose of the data generation or re-use and its relation to the objectives of the project?

Purpose of Data Generation

1. Optimization of Synthesis

- **Alignment with Project Goals:** The **PhotoClean** project aims to develop and optimize a visible light assisted photocatalytic nanocage for the adsorption and photodegradation of PFAS.
- **Data Generation:** Experimental data will be collected to evaluate light absorption, nanocage-photocatalyst interactions, adsorption capacity, and photodegradation efficiency. These datasets will support model validation and guide iterative improvements in PFAS pollutant remediation.

2. PFAS Removal Efficiency

- **Alignment with Project Goals:** Assess and enhance the removal efficiency of PFAS and PFOS related organic contaminants.
- **Data Generation:** Quantitative analysis of contaminant concentrations before and after treatment will be performed using advanced analytical tools (e.g., HPLC-MS/MS), providing direct evidence of removal and degradation efficiency.

Alignment with Project Objectives

1. Efficient and Practical Nanocage Synthesis

- **Goal:** Design and refine a visible light driven photocatalytic nanocage with optimal energy utilization and degradation efficiency.
- **Contribution:** Generated data will guide photodegradation optimization, validate design models, and ensure performance reliability under varying operational conditions.

2. Evidence-Based PFAS and PFOS Pollutant Degradation

- **Goal:** Establish a scientifically validated system for PFAS and PFOS removal and photodegradation.
- **Contribution:** Experimental and analytical data will provide measurable proof of adsorption and photodegradation efficiency, supporting environmental relevance and scalability.

3. Sustainability and Energy Efficiency

- **Goal:** Advance sustainable water treatment technologies by integrating solar energy, material design, and sustainable photodegradation.
- **Contribution:** Data generated and reused within the project will demonstrate the environmental and energetic sustainability of the **PhotoClean** system.

In summary, data generation and reuse in the **PhotoClean** project directly support the optimization of the photocatalytic degradation, verification of pollutant degradation efficiency, and promotion of visible light-powered sustainable water treatment solutions, fully aligned with the project's overarching research objectives.

What is the expected size of the data that you intend to generate or re-use?

Estimated Data Volumes

- **Data Analysis (OriginPro, Excel):**
Expected size: between 1–5 MB per dataset.
- **HPLC and HPLC-MS/MS Data:**
Expected size: between 1–20 MB per sample set, depending on the chromatographic and spectral data density.

- **Documentation and Reports:**

Expected size: approximately 2–10 MB per document or report.

What is the origin/provenance of the data, either generated or re-used?

Detailed Dataset Descriptions and Metadata Documentation

1. Organic Synthesis

- **Synthesis (Powerpoint):** Metadata will include detailed information on the chemical reaction process, and key design parameters. Specific settings, temperature, and revision notes will be recorded to ensure full traceability of the reaction conditions.
- **Data Analysis (OriginPro, Excel):** Documentation will describe methods for data acquisition and analysis, including software versions for OriginPro and Excel. Analytical parameters, data preprocessing procedures, and calculation methods will be explicitly detailed to ensure reproducibility.

2. Analysis of PFAS and PFOS in Water Samples and Analytical Tools

- **HPLC and HPLC-MS/MS Data:** Metadata will capture instrument specifications, calibration methods, chromatographic conditions, mass spectrometry parameters, and sample preparation protocols used in contaminant analysis. Data processing workflows, including peak integration and background correction, will also be described.

4. Documentation and Reporting

Metadata will describe the creation, revision, and version history of all project-related documents and reports. Contributors, software tools, timestamps, and modification logs will be included to ensure comprehensive documentation and accountability.

To whom might your data be useful ('data utility'), outside your project?

Data Utility Beyond the PhotoClean Project

The datasets and research outputs generated through the **PhotoClean** project will provide long-term value and applicability across multiple sectors beyond the project's scope:

- **Environmental Researchers:** Offering insights into adsorption and photodegradation mechanisms relevant to water treatment and pollutant remediation through contribution to the design of solar-driven photocatalytic treatment systems.
- **Water Treatment Industry:** Supporting the development of innovative, energy-efficient, and environmentally friendly technologies for advanced oxidation and contaminant removal.
- **Government and Regulatory Bodies:** Informing evidence-based decisions and policies related to water quality standards and emerging pollutant management.
- **Technology Developers:** Guiding advancements in photocatalytic materials and sustainable environmental technologies.
- **Academic Institutions:** Serving as high-quality educational and research material for students, educators, and scientists.
- **Global Health and Environmental Organizations:** Providing relevant data for promoting sustainable and safe water treatment solutions.
- **General Public:** Offering accessible summaries to raise awareness about sustainable technologies for clean water.

All datasets will be deposited in the UNIPD Research Data Repository, which provides secure data management, including encryption and access control for sensitive or proprietary information. Access restrictions and data-sharing agreements will be applied when necessary to ensure ethical and responsible data use. Where applicable, anonymization and controlled access mechanisms will be implemented to minimize restrictions while maintaining compliance with privacy and intellectual property requirements.

FAIR data

2.1. Making data findable, including provisions for metadata: Will data be identified by a persistent identifier?

Yes, in line with the **PhotoClean** project's commitment to ensure data findability, each dataset will be assigned a persistent identifier, such as a Digital Object Identifier (DOI) or another globally recognized unique identifier. These identifiers will guarantee that datasets can be uniquely, permanently, and reliably referenced over time. This approach enhances discoverability, traceability, and proper attribution, fully aligning with the FAIR data principles and supporting accurate citation and long-term data accessibility.

2.1. Making data findable, including provisions for metadata: Will rich metadata be provided to allow discovery? What metadata will be created? What disciplinary or general standards will be followed? In case metadata standards do not exist in your discipline, please outline what type of metadata will be created and how.

Metadata Creation and Standards

Yes, rich metadata will be provided to ensure the discoverability, transparency, and reusability of all datasets generated within the **PhotoClean** project. The metadata will include detailed information describing the content, context, methodology, and relevance of each dataset, enabling users to accurately interpret and assess the data.

1. Material Synthesis:

Metadata will document project phase, material type, and relevant technical specifications. Where applicable, disciplinary standards for chemical reactions will be considered for structural and descriptive consistency.

2. Analytical Characterization and PFAS Degradation Studies:

Metadata will capture instrument type, analytical technique, data type, collection date, and experimental methodology. For environmental data, standards such as ASTM E2147-01 may be referenced to ensure methodological traceability and reproducibility.

3. Adsorption, Photocatalysis, and Performance Evaluations:

Metadata will include analysis type, measurement conditions, data format, and details of the experimental procedures used for adsorption and photodegradation tests. Where applicable, community guidelines such as MIXS (Minimum Information about any (x) Sequence) may be adapted for structured environmental and chemical data documentation.

In cases where established disciplinary standards are not directly applicable, a customized project-specific metadata schema will be developed, aligned with recognized data management best practices.

Core metadata elements will include:

- **Publication Date:** Date the dataset becomes publicly available.
- **Title:** Concise representation of dataset content.
- **Authors (with Contact Information):** Contributors and points of contact.
- **Description:** Summary of dataset purpose, scope, and methodology.
- **Version:** Dataset iteration to support tracking and updates.
- **Language:** Language used in documentation.
- **Keywords:** Descriptive terms to enhance discoverability.
- **Grant Acknowledgment:** Reference to EU funding and project identifiers.
- **Related Publications:** Links or citations to associated research outputs.
- **Protocols and Lab Notes:** Relevant experimental procedures and contextual documentation.

This structured approach ensures that metadata produced under the **PhotoClean** project remains comprehensive, standardized, and compliant with FAIR data principles, supporting interoperability and re-use within the broader environmental and materials science communities.

2.1. Making data findable, including provisions for metadata: Will search keywords be provided in the metadata to optimize the possibility for discovery and then potential re-use?

Search Keywords and Metadata

Search keywords will be included in the metadata for each dataset generated within the **PhotoClean** project. Incorporating well-defined keywords enhances discoverability and facilitates potential re-use of the data. These keywords will be carefully selected to represent the essential concepts, methodologies, materials, and key parameters of each dataset. This practice is consistent with the FAIR data principles, particularly the goal of improving findability and maximizing the scientific value and impact of the data within the research community.

Name Conventions

Raw Data:

Format: DDMMYY_[experiment]_[technique]_A.*

Example: 15102025_PhotoClean_FTIR_001.raw

Processed Results:

Format: DDMMYY_[experiment]_[technique]_bbb_analysis_ccc.*

Example: 16102025_PhotoClean_FTIR_001_analysis_001.xlsx

Symbols Explanation:

- **DDMMYY:** Date of the experiment (e.g., 180523 for May 23, 2018).
- **[experiment]:** Short title for the experimental series (e.g., PhotoClean).
- **[technique]:** Identifier for the analytical or characterization method (e.g., FTIR, SEM, UV-Vis).
- **A:** Sequential number for individual measurements (e.g., 001, 002).
- **B:** Sequential number for analysis iterations (e.g., 001, 002).
- **C:** Descriptor for specific processed results (e.g., fitting, quantification, degradation).

Examples:

- **Raw Data:** 17102025_PhotoClean_FTIR_001.raw
- **Processed Results:** 18102025_PhotoClean_FTIR_001_analysis_001.xlsx

These name conventions establish a clear and systematic structure that captures essential information, including the experiment title, analytical technique, and unique identifiers for each measurement and analysis.

2.1. Making data findable, including provisions for metadata: Will metadata be offered in such a way that it can be harvested and indexed?

Metadata will follow the same protocols and naming conventions as the underlying data.

2.2. Making data accessible - Repository: Will the data be deposited in a trusted repository?

Yes, the data generated within the **PhotoClean** project will be deposited in a trusted repository, specifically the UNIPD Research Data Repository. This repository provides a reliable and secure platform for long-term data preservation and complies with established best practices for data storage, management, and open accessibility.

2.2. Making data accessible - Repository: Have you explored appropriate arrangements with the identified repository where your data will be deposited?

The UNIPD Research Data repository provides a comprehensive step-by-step guide with detailed function descriptions and deposit assistance. The guidance covers:

- Login and User Work Area
- New Deposit (including upload, metadata entry, subject classification, and final submission)
- Revision Area (management of datasets under review)
- Update (modifying or adding information to existing deposits)

2.2. Making data accessible - Repository: Does the repository ensure that the data is assigned an identifier? Will the repository resolve the identifier to a digital object?

DOI Assignment and Citation: Upon submission and acceptance of the dataset in the UNIPD Research Data Repository, a Digital Object Identifier (DOI) will be assigned. This persistent identifier will be permanently linked to the dataset, ensuring traceability and enabling accurate citation.

The DOI serves as a persistent identifier that provides a direct and permanent link to the dataset for citation purposes.

2.2. Making data accessible - Data:

Will all data be made openly available? If certain datasets cannot be shared (or need to be shared under restricted access conditions), explain why, clearly separating legal and contractual reasons from intentional restrictions. Note that in multi-beneficiary projects it is also possible for specific beneficiaries to keep their data closed if opening their data goes against their legitimate interests or other constraints as per the Grant Agreement.

All data supporting publications—such as journal articles, conference papers, and other scientific outputs—will be made openly available and linked to the original publication through a persistent

identifier (DOI).

However, the material synthesis represents a core innovation of the **PhotoClean** project and may be subject to intellectual property protection, including potential patent applications or proprietary methodologies developed by the project team. Open dissemination of this specific dataset could risk the disclosure of sensitive technical details or compromise the protection of intellectual property rights. Therefore, access to such data may be temporarily restricted until appropriate IP protection measures are secured, in full compliance with Horizon Europe's open science and IP management guidelines.

2.2. Making data accessible - Data:

If an embargo is applied to give time to publish or seek protection of the intellectual property (e.g. patents), specify why and how long this will apply, bearing in mind that research data should be made available as soon as possible.

Intentional restrictions may be applied for limited periods (typically 1–3 years) to allow the **PhotoClean** project team to pursue commercialization opportunities, secure intellectual property rights, or complete publications before releasing detailed design data for open access.

2.2. Making data accessible - Data:

Will the data be accessible through a free and standardized access protocol?

Research findings and datasets generated by the **PhotoClean** project will be published in reputable open-access journals that adhere to standardized publication protocols, ensuring unrestricted access for the scientific community and the public.

A dedicated project webpage will be maintained as a central platform for disseminating information, updates, publications, and data resources. The website will operate under standardized web protocols (HTTP/HTTPS) to guarantee universal and user-friendly access, with content organized to reach both academic and non-specialist audiences.

For long-term preservation and accessibility, all datasets will be deposited in the UNIPD Research Data Repository, which complies with international data-sharing and access standards. This repository provides a secure and reliable infrastructure for data storage, retrieval, and re-use. Each dataset will be assigned a persistent identifier (DOI) to ensure proper citation, traceability, and long-term discoverability.

2.2. Making data accessible - Data:

If there are restrictions on use, how will access be provided to the data, both during and after the end of the project?

Access to restricted data during the project will be carefully managed. Authorized researchers and collaborators will receive specific credentials, permissions, or protocols to securely retrieve and use the data in accordance with project policies.

Following the completion of the project, a controlled access mechanism will be established to allow qualified researchers, institutions, or individuals to request access to restricted datasets. This process may include submitting a formal access request, agreeing to defined terms of use, and review by the project team to verify the requester's legitimacy and compliance with data access restrictions.

2.2. Making data accessible - Data:

How will the identity of the person accessing the data be ascertained?

The identity of individuals accessing **PhotoClean** project data will be verified through secure authentication mechanisms, including unique usernames and password-protected access to the data repository.

2.2. Making data accessible - Data:

Is there a need for a data access committee (e.g. to evaluate/approve access requests to personal/sensitive data)?

Not applicable.

2.2. Making data accessible - Metadata:

Will metadata be made openly available and licenced under a public domain dedication CC0, as per the Grant Agreement? If not, please clarify why. Will metadata contain information to enable the user to access the data?

As the project adheres to Open Science principles, all metadata will be made openly accessible and licensed under permissive terms in accordance with FAIR and Grant Agreement requirements. In cases where metadata cannot be made openly available, the specific reasons—such as legal, ethical, or contractual constraints—will be clearly documented and justified within the Data Management Plan.

2.2. Making data accessible - Metadata:

How long will the data remain available and findable? Will metadata be guaranteed to remain available after data is no longer available?

The data generated by the **PhotoClean** project will remain available throughout the project's duration, in full alignment with the policies of the selected repository. Persistent identifiers (e.g., DOIs) will be assigned to ensure the long-term discoverability and traceability of all datasets. Metadata will be retained and made accessible even after the underlying data are no longer available, thereby preserving the scholarly record and enabling future citation and understanding. Any modifications to data availability or metadata status will be transparently communicated to maintain compliance with the Grant Agreement and to support ongoing accessibility and discoverability.

2.2. Making data accessible - Metadata:

Will documentation or reference about any software be needed to access or read the data be included? Will it be possible to include the relevant software (e.g. in open source code)?

Yes, documentation or references for any software required to access or interpret the data generated by the **PhotoClean** project will be included in the Data Management Plan. This documentation will provide details on software tools, versions, configurations, and any specific requirements necessary for data use. Whenever possible, the project will include or reference relevant open-source software to

promote transparency and reusability. The Data Management Plan will also specify the repository or location where the software and associated documentation can be accessed, ensuring that users have all necessary tools to effectively work with the project's data.

2.3. Making data interoperable:

What data and metadata vocabularies, standards, formats or methodologies will you follow to make your data interoperable to allow data exchange and re-use within and across disciplines? Will you follow community-endorsed interoperability best practices? Which ones?

Where proprietary formats are not open or interoperable, data will be exported to interoperable and widely accessible formats such as PDF or TXT.

2.3. Making data interoperable:

In case it is unavoidable that you use uncommon or generate project specific ontologies or vocabularies, will you provide mappings to more commonly used ontologies? Will you openly publish the generated ontologies or vocabularies to allow reusing, refining or extending them?

This aspect is not relevant to the technical datasets produced under this project.

2.3. Making data interoperable:

Will your data include qualified references [\[1\]](#) to other data (e.g. other data from your project, or datasets from previous research)?

[\[1\]](https://www.go-fair.org/fair-principles/i3-metadata-include-qualified-references-metadata/) A qualified reference is a cross-reference that explains its intent. For example, *X is regulator of Y* is a much more qualified reference than *X is associated with Y*, or *X see also Y*. The goal therefore is to create as many meaningful links as possible between (meta)data resources to enrich the contextual knowledge about the data. (Source: <https://www.go-fair.org/fair-principles/i3-metadata-include-qualified-references-metadata/>)

Yes, the data generated within the **PhotoClean** project will include qualified references to other datasets, including those produced within the project itself as well as relevant datasets from previous research.

2.4. Increase data re-use:

How will you provide documentation needed to validate data analysis and facilitate data re-use (e.g. readme files with information on methodology, codebooks, data cleaning, analyses, variable definitions, units of measurement, etc.)?

The project will provide comprehensive documentation, including README files, codebooks, and detailed methodologies, to facilitate data validation and re-use. Clear explanations of variable definitions, measurement units, and data cleaning procedures will ensure transparency and reproducibility, enabling other researchers to interpret and effectively utilize the datasets. Version

control systems and accessibility measures will be implemented to maintain data integrity and traceability throughout the project lifecycle.

2.4. Increase data re-use:

Will your data be made freely available in the public domain to permit the widest re-use possible? Will your data be licensed using standard reuse licenses, in line with the obligations set out in the Grant Agreement?

The **PhotoClean** project is committed to make all data freely available in the public domain to promote the widest possible re-use. Data will be licensed under the standard Creative Commons Attribution (CC BY) license, in full alignment with the obligations outlined in the Grant Agreement.

2.4. Increase data re-use:

Will the data produced in the project be useable by third parties, in particular after the end of the project?

The data will be made openly available upon acceptance of any related publication. No embargo period is foreseen.

2.4. Increase data re-use:

Will the provenance of the data be thoroughly documented using the appropriate standards?

The project will adhere to established standards and best practices for capturing and documenting data provenance, ensuring full transparency and traceability throughout the data lifecycle.

2.4. Increase data re-use:

Describe all relevant data quality assurance processes.

- Data formats and structure are determined by the equipment and software manufacturers, ensuring compatibility with standardized analytical tools.
- Secure storage procedures are in place to prevent data loss and unauthorized access.
- Raw data are safeguarded by immediate storage after recording, while processed copies are maintained in a separate, secure location to ensure redundancy.
- Unified protocols are implemented to streamline all stages of data handling, including recording, storage, processing, and analysis.
- Regular calibration and maintenance of measurement equipment guarantee accuracy, consistency, and reliability in data acquisition.

2.4. Increase data re-use:

Further to the FAIR principles, DMPs should also address research outputs other than data,

and should carefully consider aspects related to the allocation of resources, data security and ethical aspects.

In alignment with the FAIR principles, the Data Management Plan (DMP) for the **PhotoClean** project extends beyond data management to encompass all research outputs. Particular emphasis will be placed on resource allocation, the implementation of robust data security measures, and the consideration of ethical aspects.

Other research outputs

In addition to the management of data, beneficiaries should also consider and plan for the management of other research outputs that may be generated or re-used throughout their projects. Such outputs can be either digital (e.g. software, workflows, protocols, models, etc.) or physical (e.g. new materials, antibodies, reagents, samples, etc.).

These may include digital assets software and protocols for PFAS analysis, and models (e.g., Langmuir and Freundlich isotherm models, Pseudo-first and second-order kinetic models) predicting adsorption and kinetics efficacy. These elements have already been outlined and discussed in the Data Management Plan.

Beneficiaries should consider which of the questions pertaining to FAIR data above, can apply to the management of other research outputs, and should strive to provide sufficient detail on how their research outputs will be managed and shared, or made available for re-use, in line with the FAIR principles.

The **PhotoClean** project will apply the FAIR principles to all additional research outputs to maximize accessibility and reusability.

Allocation of resources

What will the costs be for making data or other research outputs FAIR in your project (e.g. direct and indirect costs related to storage, archiving, re-use, security, etc.) ?

No specific costs are foreseen for making the project data FAIR.

How will these be covered? Note that costs related to research data/output management are eligible as part of the Horizon Europe grant (if compliant with the Grant Agreement conditions)

Not applicable.

Who will be responsible for data management in your project?

The fellow will be responsible for all aspects of data management.

How will long term preservation be ensured? Discuss the necessary resources to accomplish this (costs and potential value, who decides and how, what data will be kept and for how long)?

As the project is committed to preserve its outcomes in accordance with the FAIR principles, this approach extends to all data underlying each publication. This ensures that the data remain reusable, interoperable, and accessible for cross-disciplinary applications.

Data security

What provisions are or will be in place for data security (including data recovery as well as secure storage/archiving and transfer of sensitive data)?

Original data will be securely stored on a network-attached storage system equipped with robust security controls and automatic backup functionality. No sensitive or personal data are expected to be recorded during the project.

A consistent naming convention will be applied to facilitate efficient data retrieval and recovery. Raw data will be organized within a hierarchical folder structure categorized by year, month, and day, while processed and analyzed results will be systematically grouped into clearly labeled folders corresponding to each experimental series.

Ethics

Are there, or could there be, any ethics or legal issues that can have an impact on data sharing? These can also be discussed in the context of the ethics review. If relevant, include references to ethics deliverables and ethics chapter in the Description of the Action (DoA).

This aspect is not relevant to the nature of the technical datasets generated under this project.

Will informed consent for data sharing and long term preservation be included in questionnaires dealing with personal data?

Yes, any questionnaires involving personal data will include informed consent covering both data sharing and long-term preservation.

Other issues

Do you, or will you, make use of other national/funder/sectorial/departmental procedures for data management? If yes, which ones (please list and briefly describe them)?

No.