PID: [redacted] - Predicting the digestibility of nutrients and minerals in pelleted aquafeed diets by in-vitro model of cultivated shrimp gut (Litopenaeus vannamei).

Owner: [redacted]

Moderator:

Submitted: 17-Apr-2025 18:06 CEST

Proposal Status: Submitted

VID: 70486 – Technical Evaluation

AQUASERV

Food & feed quality and safety at UNINA – Food & feed quality and safety

UNINA

Project acronym

ShrimpSim

Keywords

nutrition, sustainability, seafood, aquaculture, digestibility, shrimp

Scientific field of the project

Feed trials

Is your project related to freshwater or marine environments?

Marine,brackish

Have you contacted the Access Manager of the facility you are applying to?

Yes

Lead Applicant Details

Name of the lead applicant

[redacted]

Email address of lead applicant

[redacted]

Nationality of the lead applicant

United Kingdom

Gender of lead applicant

Male

Highest education of lead applicant

Level 5 (Post-School)

Career stage of lead applicant

Mid-career researcher

Research field of lead applicant

Life sciences & biotech

Name of home institution/organisation

[redacted]

Country of home institution/organisation

United Kingdom

Organisation type of lead applicant's home organisation

UNI (University)

Lead applicant CV

Curriculum vitae_JLH_17.04.2025.pdf Open File

Short profile of lead applicant

[redacted] is Research Director at SalmoSim, which uses in-vitro models of Atlantic Salmon GI tracts to test feed ingredients, additives, and pharmaceuticals. He designs novel digestion systems, performs nutrient and enzyme assays, and has experience with the husbandry of salmon, shrimp, medaka, and stickleback. He also runs small-scale feeding trials and will manage mobile mesocosms housing Atlantic Salmon for gill disease treatment and prevention research. In his spare time, he enjoys fishkeeping, water sports, gardening, learning French and hosting a language exchange club.

Relevant publications of lead applicant

Deploying anIn VitroGut Model to Assay the Impact of the Mannan-Oligosaccharide Prebiotic Bio-Mos on the Atlantic Salmon (Salmo salar) Gut Microbiome

American Society for Microbiology *Raminta Kazlauskaite, Bachar Cheaib, Joseph Humble, Chloe Heys, Umer Zeeshan Ijaz, Stephanie Connelly, William T. Sloan, Julie Russell, Laura Martinez-Rubio, John Sweetman, Alex Kitts, Philip McGinnity, Philip Lyons, Martin S. Llewellyn,*

DOI: 10.1128/spectrum.01953-21, View Publication

Understanding the transfer and persistence of antimicrobial resistance in aquaculture using a model teleost gut system

Springer Science and Business Media LLC *Alexandru S. Barcan, Joseph L. Humble, Sandeep Kasaragod, Mohammad Saiful Islam Sajib, Rares A. Barcan, Philip McGinnity, Timothy J. Welch, Brendan Robertson, Emanuel Vamanu, Antonella Bacigalupo, Martin S. Llewellyn, Francisca Samsing,*

DOI: 10.1186/s42523-025-00377-0, View Publication

Is the lead applicant a remote user?

No

Do you have co-applicants?

Yes, one co-applicant (I will provide the information below)

Co-Applicant Details (If Applicable)

Name of co-applicant

[redacted]

Email of co-applicant

[redacted]

Nationality of co-applicant

British

Gender of co-applicant

Male

Highest education of co-applicant

Level 8 (Doctorate)

Career stage of co-applicant

Senior researcher

Research field of co-applicant

Life sciences & Biotech

Name of co-applicant's home institution

University of Glasgow

Country of co-applicant's home institution/organisation

United Kingdom

Organisation type of co-applicant's home organisation

UNI (University)

Co-applicant CV

[redacted] Open File

Short profile of co-applicant

[redacted] is a Professor at the University of Glasgow whose research focuses on aquatic animal health and nutrition. His work originally centred on the role of the gut microbiome in nutrient assimilation, and has since expanded to include broader aspects of host-microbe-environment interactions. He leads several large multidisciplinary projects in aquaculture and parasitology, aiming to improve fish welfare, sustainability, and disease management. His research combines molecular, ecological, and epidemiological approaches.

Relevant publications of co-applicant

Understanding the transfer and persistence of antimicrobial resistance in aquaculture using a model teleost gut system
Springer Science and Business Media LLC *Alexandru S. Barcan, Joseph L. Humble, Sandeep Kasaragod, Mohammad Saiful Islam Sajib, Rares A. Barcan, Philip McGinnity, Timothy J. Welch, Brendan Robertson, Emanuel Vamanu, Antonella Bacigalupo, Martin S. Llewellyn, Francisca Samsing,*

DOI: 10.1186/s42523-025-00377-0, View Publication

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American Society for Microbiology *Raminta Kazlauskaite, Bachar Cheaib, Joseph Humble, Chloe Heys, Umer Zeeshan Ijaz, Stephanie Connelly, William T. Sloan, Julie Russell, Laura Martinez-Rubio, John Sweetman, Alex Kitts, Philip McGinnity, Philip Lyons, Martin S. Llewellyn,*

DOI: 10.1128/spectrum.01953-21, View Publication

SalmoSim: the development of a three-compartment in vitro simulator of the Atlantic salmon GI tract and associated microbial communities
Springer Science and Business Media LLC *Raminta Kazlauskaite, Bachar Cheaib, Chloe Heys, Umer Zeeshan Ijaz, Stephanie Connelly, William Sloan, Julie Russel, Laura Rubio, John Sweetman, Alex Kitts, Philip McGinnity, Philip Lyons, Martin Llewellyn,*

DOI: 10.1186/s40168-021-01134-6, View Publication

The biogeography of the atlantic salmon (Salmo salar) gut microbiome
Oxford University Press (OUP) *Martin S Llewellyn, Philip McGinnity, Melanie Dionne, Justine Letourneau, Florian Thonier, Gary R Carvalho, Simon Creer, Nicolas Derome,*

DOI: 10.1038/ismej.2015.189, View Publication

Teleost microbiomes: the state of the art in their characterization, manipulation and importance in aquaculture and fisheries
Frontiers Media SA *Martin S. Llewellyn, SÃ©bastien Boutin, Seyed Hossein Hoseinifar, Nicolas Derome,*

DOI: 10.3389/fmicb.2014.00207, View Publication

Is the co-applicant a remote user?

No

Additional applicants

Please list the names of other researchers directly involved in the project, their organisation name and country

CV of all additional applicants

No file uploaded

Requested facilities

Number of units of access requested from facility

1

Requested start date for access to facility

01-10-2025

Expected end date for access to facility

30-11-2025

Is remote access required?

No

Have you or your research group previously carried out collaborative research with staff of the proposed facility?

No

Have any members of your research group previously accessed this facility?

No

Total duration of planned visit(s) by lead applicant (days at the facility)

Three weeks (15 working days).

Duration of planned visits by co-applicant (days at facility)

none

If you are planning a complex schedule of visits with more than two trips, please explain it in detail here

Financial Support

Financial support and funding availability

This project was funded by revenue from the SalmoSim project at the University of Glasgow .

Scientific Proposal

Proposal summary

Indigestible nutrients excreted by farmed animals are a waste of resources and pollute the aquatic environment. Feeds undergo animal testing to determine their digestibility, with numerous trials making it a long, costly and morally ambiguous process.
ShrimpSim has been designed to combat this challenge as an in-vitro model of shrimp gastrointestinal tract, aiming to predict digestibility of nutrients (proteins, fats, minerals) in aquaculture feeds. Time needed for shrimp feed testing can be reduced from several months to a few weeks. We aim to compare 4 different shrimp diets for their digestibility of minerals (focus on Ca, P, Mg, Se, I, Zn and Fe) with TQ-ICP-MS and a detailed fatty acid profile with GC-MS. Proteins have already been analyzed with significant differences between diets. The 4 diets are provided by Pontus Aqua, an aquaculture consultancy. In-vitro values will be compared with in-vivo values to evaluate the accuracy of ShrimpSim in predicting in-vivo digestibility.

Scientific background

Aquaculture is a rapidly expanding contributor to global food security, with production rising from 34 million tonnes (Mt) in 1997 to 112 Mt in 2017 [1]. Marine aquaculture now accounts for 75% of global consumable volume [2], driven largely by species such as salmon and shrimp [1]. While early concerns focused on reliance on wild-caught fish for feed, advances in feed technology have improved sustainability and reduced reliance on wild catch [1].
To assess dietary impacts on the salmon gut microbiome, Professor [redacted] developed SalmoSim, an in vitro model simulating salmon digestion. It has been used to evaluate plant-based feed replacements [3] and additives such as mannan oligosaccharides on microbial communities [4]. Insights from SalmoSim informed the development of ShrimpSim, a parallel model for shrimp aquaculture.
Shrimp, particularly Litopenaeus vannamei, is a major aquaculture species, accounting for 70% of global shrimp production and 11.96% of total aquaculture output in 2020 [5]. While farming eases pressure on wild stocks, sustainability depends on cost-effective, balanced feeds. To reduce reliance on wild fish, fish meals are increasingly being replaced by plant-based ingredients. Globally, the mean fish meal content of shrimp feeds declined from 28% in 1995 to 18% in 2007 [6]. Plant-based ingredients are promising due to cost and availability [1], but present nutritional challenges. Soybean meal, for example, often contains antinutritional factors like phytic acid and lectins, which impair digestion, reduce feed efficiency, and induce immune responses. The insoluble fibers and indigestible carbohydrates in plant-based diets can limit nutrient uptake [5] . These challenges highlight the need for efficient feed evaluation[7].
Animal-derived alternatives like meat and bone meal can replace 80% of dietary fish meal, while blood and feather meal are limited to 30% without impeding growth [5]. Insect meals are also promising; defatted insect meal can replace up to 60% of fish meal in L. vannamei diets [8]. However, full-fat meals, high in saturated fats, are limited to 25% [9]. Regardless of source, nitrogen-rich shrimp waste can trigger bacterial blooms and ammonia spikes, reducing welfare and productivity [10]. Balancing fatty acids and trace nutrients in low fish meal diets warrants attention.
Shrimp require specific nutrients for growth and health. Polyunsaturated fatty acids (PUFAs), such as omega-3s (EPA and DHA), are often essential, as crustaceans cannot synthesise them efficiently. In L. vannamei shrimp, fatty acid type influences digestion and nutrient use. Marine lipids, high in unsaturated fatty acids, are more digestible and improve growth, immunity, and reproduction. A PUFA level of 0.86% per dry weight is considered optimal, while saturated fats are less digestible and may impair health.
Phosphorus is also vital for growth, though its digestibility varies. Liu et al replaced 30% of the base diet with experimental meals, phosphate digestibility from 52.1 (blood meal) to 79.9% (fish meal), and lipid digestibility from 2.1–92.5% [11]. Environmental factors also influence dietary needs. For instance, 6% lipid diets supported optimal growth at 30 ppt salinity, while 8% was best at 2 ppt; a protein content of 44% was considered optimal [12].
In summary, shrimp feeds vary widely in bioavailability and digestibility. However, feed trials are time-consuming, costly, and risk compromising animal welfare with unbalanced diets. Therefore, there is a need for robust in vitro models like ShrimpSim to predict digestibility and support the development of more sustainable, efficient shrimp feeds.

References

A 20-year retrospective review of global aquaculture
Springer Science and Business Media LLC *Rosamond L. Naylor, Ronald W. Hardy, Alejandro H. Buschmann, Simon R. Bush, Ling Cao, Dane H. Klinger, David C. Little, Jane Lubchenco, Sandra E. Shumway, Max Troell,*

DOI: 10.1038/s41586-021-03308-6, View Publication

Misunderstandings, myths and mantras in aquaculture: Its contribution to world food supplies has been systematically over reported
Elsevier BV *Peter Edwards, Wenbo Zhang, Ben Belton, David C. Little,*

DOI: 10.1016/j.marpol.2019.103547, View Publication

Development of a three-compartmentin vitrosimulator of the Atlantic Salmon GI tract and associated microbial communities: SalmoSim
Cold Spring Harbor Laboratory *R. Kazlauskaite, B. Cheaib, C. Heys, U. Ijaz, S. Connelly, W.T. Sloan, J. Russell, L. Martinez-Rubio, J. Sweetman, A. Kitts, P. McGinnity, P. Lyons, M. Llewellyn,*

DOI: 10.1101/2020.10.06.327858, View Publication

Deploying anIn VitroGut Model to Assay the Impact of the Mannan-Oligosaccharide Prebiotic Bio-Mos on the Atlantic Salmon (Salmo salar) Gut Microbiome
American Society for Microbiology *Raminta Kazlauskaite, Bachar Cheaib, Joseph Humble, Chloe Heys, Umer Zeeshan Ijaz, Stephanie Connelly, William T. Sloan, Julie Russell, Laura Martinez-Rubio, John Sweetman, Alex Kitts, Philip McGinnity, Philip Lyons, Martin S. Llewellyn,*

DOI: 10.1128/spectrum.01953-21, View Publication

Retrospect of fish meal substitution in Pacific white shrimp (Litopenaeus vannamei) feed: Alternatives, limitations and future prospects
Wiley *Yongkang Chen, Anisa Mitra, Samad Rahimnejad, Shuyan Chi, Vikas Kumar, Beiping Tan, Jin Niu, Shiwei Xie,*

DOI: 10.1111/raq.12843, View Publication

Feeding aquaculture in an era of finite resources
Proceedings of the National Academy of Sciences *Rosamond L. Naylor, Ronald W. Hardy, Dominique P. Bureau, Alice Chiu, Matthew Elliott, Anthony P. Farrell, Ian Forster, Delbert M. Gatlin, Rebecca J. Goldburg, Katheline Hua, Peter D. Nichols,*

DOI: 10.1073/pnas.0905235106, View Publication

A feed is only as good as its ingredients ? a review of ingredient evaluation strategies for aquaculture feeds
Hindawi Limited *B.D. GLENCROSS, M. BOOTH, G.L. ALLAN,*

DOI: 10.1111/j.1365-2095.2007.00450.x, View Publication

Evaluation of defatted Hermetia illucens larvae meal for Litopenaeus vannamei : effects on growth performance, nutrition retention, antioxidant and immune response, digestive enzyme activity and hepatic morphology
Hindawi Limited *Guoxia Wang, Kai Peng, Junru Hu, Wenyan Mo, Zhenhai Wei, Yanhua Huang,*

DOI: 10.1111/anu.13240, View Publication

Evaluation of black soldier fly (Hermetia illucens) larvae meal as partial or total replacement of marine fish meal in practical diets for Pacific white shrimp (Litopenaeus vannamei)
Elsevier BV *Vaun C. Cummins, Steven D. Rawles, Kenneth R. Thompson, Alejandro Velasquez, Yuka Kobayashi, Janelle Hager, Carl D. Webster,*

DOI: 10.1016/j.aquaculture.2017.02.022, View Publication

Recent advances in Shrimp aquaculture wastewater management
Elsevier BV *Benedict Terkula Iber, Nor Azman Kasan,*

DOI: 10.1016/j.heliyon.2021.e08283, View Publication

Study aim and objectives

We aim to test the performance of our in-vitro system to predict digestibility of lipids, fatty acids and elements of nutritional importance (focus on Ca, P, Mg, Se, I, Zn and Fe).
We will quantify nutrients in feeds both before and after ShrimpSim digestibility assay for each of the 4 diets. This will be compared with in-vivo digestibility values (provided by Pontus Aqua). The accuracy of ShrimpSim in predicting the digestibility nutrients in diets composed of northern European-grown ingredients will be evaluated with regression analysis. The slope of the curve and intercept will be used to calibrate our interpretation of ShrimpSim digestibility data f aiming to predict in-vivo digestibility values for diets using ShrimpSim digestibility data.
We will also quantify concentration of lipids, fatty acids and elements in the absorbed fraction, which is analogous to shrimp circulatory fluid, to ascertain bioavailability of diet nutrients in the context of analyses of the complete diets.

Additional material: Graphical abstracts, plots, tables, summaries or other supporting documents that help explain the project (optional - multiple files possible)

Aquaserv additional material.pdf — Open File

Which European policies are relevant to this proposal? (See help text for a list.) Please elaborate on how your project complies with these policies or priorities.

CFP seeks to ensure a sustainable source of healthy food for consumers at an affordable price. As sea pollution and global temperature rise, seafood availability is dubious. Our project aims to bridge the gap in seafood availability providing innovative and safe solutions for feed testing, helping in sustainable rearing of marine animals.
European Green Deal: Sustainable Blue Economy, part of EDG, aims to free oceans from pollution. Since testing of aquaculture feeds is time consuming & expensive, they are not tested for pollution, only animal growth. Our project aims to bridge this gap between practicality & sustainability in making sure diets causing least

amount of aquatic pollution are chosen.
Farm to Fork Strategy: By analysing feed made with local materials (carbon footprint of transportation reduced) & judging them for their pollution causing ability, we aim to make aquaculture food system environmentally neutral, which is a key agenda of FFS.

Experimental plan

Four experimental diets have been provided by [redacted] through the [redacted] project, these diets are produced in the UK with local ingredients. Previously, these diets were used in feeding trial conducted at Pontus to calculate the in-vivo digestibility of crude protein, amino acids, total lipid, fatty acids, calcium, phosphate and energy via analysis of nutritional content of both feed and feces, with the aid an inert, indigestible marker which is used as a reference to calculate the digestibility of ingredients (Equation 1).
For ShrimpSim in-vitro digestibility assay, complete diets are ground by mortar and pestle to reach a maximum particle size of 1mm, the ground diet samples are mixed in a proprietary buffer and digested using enzymes extracted from the L. vannamei shrimp gastro-intestinal tract. Small molecular weight molecules are absorbed from the digesting feed using a semi-permeable membrane within our temperature-controlled bioreactors, which dialyse the digesting feed against a buffer analogous to the shrimp's circulatory fluid. In addition, undigested controls are prepared by combining ground feed samples with digestive buffer, yet enzymes and absorption are not applied. Upon completion of the digestive phase of the assay, the digestates (digested and absorption-depleted) and the undigested controls are dried and ground to produce homogenous dried samples which will be subjected to nutritional analysis and compared as follows: with the aid of AQUASERV access, we will quantify the absolute concentration of fatty acids and minerals in our ShrimpSim artificial digestate and undigested controls in order to calculate in-vitro digestibility values (equation 2).
Previously, these four Pontus Research Diets (PRD) were assayed using ShrimpSim and the ShrimpSim digestibility coefficients of crude protein were analysed (Figure 1) alongside the digestibility of crude protein of reference diets (guar and Soy/feather). Additionally, the absolute concentrations of absorbed total amino acids (Figure 2) and absorbed aromatic amino acids (Figure 3) were determined. The two reference diets have known in-vivo crude protein digestibility as ascertained by a small-scale feeding trial with vannamei shrimp conducted at the University of Glasgow; the guar-enriched diet was found to have in-vivo crude protein ADC of 90.9% and a ShrimpSim digestibility of 56.5%, and so is considered a reference high digestibility feed yet the Soya/feather meal diet has in-vivo crude protein ADC of 69.1% and a ShrimpSim crude protein digestibility value of 39.84% and is considered here a reference low digestibility feed.
The accuracy of ShrimpSim in predicting in-vivo digestibility of nutrients from multiple complete diets will be analysed by performing linear regression analysis, where a positive slope value will indicate a predictive relationship between ShrimpSim digestibility values and ADC values observed in real shrimp, and R-squared values will reflect the accuracy of the relationship. In addition, the concentration of fatty acids, lipids and minerals in the absorbed fraction will be quantified in order to assign values to the bioavailability of each nutritional component.

Justification for access request

This project (abbreviated as ShrimpSim) is an R&D project initiated on request by industrial partners in aquaculture. We do have facility to conduct experiments and analyse the proteins, but we lack TQ-ICP-MS and GC-MS for multielement profile and fatty acid profile, respectively. This project will aid us in having a holistic dataset to judge the diets and compare them for their availability and sustainability. An in-vitro shrimp gut model will have a substantial positive impact on the shrimp farming industry and reduce waste and inefficiency. The move towards European-sourced feeds alongside European-situated shrimp farming will support the security of Europe's food supply chains and relieve pressure on European wild marine resources.

Expected outcomes and potential impact

Validation of ShrimpSim will be beneficial as it would allow testing of potential shrimp diets prior to in-vivo feeding trials thus streamlining feed development and preventing shrimp from being fed inappropriate feeds in feeding trials, which can negatively impact animal welfare and is an ethically questionable area in animal feed research.
Feeding trials with L. vannamei shrimp are technically difficult (due to the very small size of the feces) and expensive. Here we develop an in-vitro approach which adheres to the "3Rs" of ethics in animal research for "Reduction, Replacement and Refinement" of experimentation in offer to minimize animal suffering and maximize scientific validity; we offer an in-vitro assay which would minimize the numbers of animals used in feeding trials by prescreening feeds prior to in-vivo testing.
Applying ShrimpSim to test diets sourced and produced in Europe will ensure that ShrimpSim is calibrated using material which will allow sustainable growth of marine shrimp farming in Europe and opens the opportunity to position ShrimpSim as a go-to testing system to prescreen for diets which could be highly useful in the geopolitical context of international trade wars and foreign conflicts.
The validation of ShrimpSim to accurately predict the in-vivo digestibility of lipids, fatty acids and nutritionally relevant elements will provide the shrimp farming industry with a tool to quickly generate actionable data on candidate shrimp feeds and propel the appropriate inclusion of sources of lipids, fatty acids and elements to hasten the path to market. ShrimpSim has a rapid turnaround (1 week to generate digestates for up to four diets) compared to in-vivo trials (approximately 2 months). ShrimpSim is a cost-effective approach to feed testing which enables the rapid development of sustainable, nutritionally relevant and digestible feeds for the shrimp farming industry. ShrimpSim will further enable the replacement of fishmeal and fish oil with sustainable alternatives, thus reducing the fisheries' pressure on forage fish.

Do you expect the research to result in the creation and protection of any IP (Intellectual Property)?

No

Cost estimates

Material, equipment, and consumables needed

This study requires the following equipment:

- Agata Ball mill and associated accessories
- Microbalance
- CHNS analyser
- Deionized water source
- Milli-Q water purification
- Microwave assisted digestor and associated accessories

- Fume hood
- Triple Quadrupole-Inductively Coupled Plasma-Mass Spectrometer (TQ-ICP-MS) equipped with Liquid Chromatography (LC) and associated accessories
- Lipid extractors (Soxhlet) and associated accessories
- Gas Chromatograph Mass Spectrometer (GC-MS) and associated accessories
- 1H-NMR spectrometer and associated accessories

This study will require the following consumables:

- Deep freezers
- Desiccators
- Extra pure Sulphuric acid, Nitric acid and Hydrochloric acid
- Reagents for lipid extraction, trans-esterification and fatty acid profile analysis
- Tubes and other laboratory glassware for mineralization, ICP and GC analyses
- Gases (oxygen, argon, nitrogen, helium, chromatographic air and hydrogen)
- Tuning and Standard solutions for ICP

Resources provided by the applicant

Previous commercial cultivation of L. vannamei shrimp in the UK relied on feeds sourced from America, thus impairing sustainability of European based shrimp farming. Here, we use diets provided by Pontus Group with their InSuRAFeed feasibility study where feeds are produced in Europe using only European sourced ingredients, this project is partly funded by the European Maritime and Fisheries Fund (EMFF) through the Welsh Government. L. vannamei In-vivo feeding trials were conducted to measure the digestibility of crude protein, amino acids, total lipid and fatty acids, calcium and phosphate and energy in these diets (Figure 1, 2 and 3). The University of Glasgow is providing the ShrimpSim digestibility assay, thus the gut-simulating bioreactor-based assay will be performed at the University of Glasgow and the produced samples (digestate and absorbed fractions) will be transported to the University of Naples Federico II.

Total estimated travel and accommodation cost

3000 euros

Do your experiments involve any work on live animals?

No

Ethics assessment

Human embryonic stem cells and human embryos

Does this activity involve Human Embryonic Stem Cells (hESCs)?

No

Does this activity involve the use of human embryos?

No

Humans

Does this activity involve human participants?

No

Does this activity involve interventions (physical also including imaging technology, behavioural treatments, etc.) on the study participants?

No

Does this activity involve conducting a clinical study as defined by the Clinical Trial Regulation (EU 536/2014)? (using pharmaceuticals, biologicals, radiopharmaceuticals, or advanced therapy medicinal products)

No

Human cells/tissues

Does this activity involve the use of human cells or tissues?

No

Are they human embryonic or foetal cells or tissues?

No

Are they available commercially?

No

Are they obtained within this project?

No

Are they obtained from another project, laboratory or institution?

No

Are they obtained from a biobank?

No

Personal data page

Does this activity involve processing of personal data?

No

Does it involve the processing of special categories of personal data (e.g.: genetic, biometric and health data, sexual lifestyle, ethnicity, political opinion, religious or philosophical beliefs)?

No

Does it involve profiling, systematic monitoring of individuals, or processing of special categories of data or intrusive methods of data processing (such as surveillance, geolocation tracking, etc.)?

No

Does this activity involve further processing of previously collected personal data (including use of preexisting data sets or sources, merging existing data sets)?

No

Is it planned to export personal data from the EU to non-EU countries? (If yes: Specify the type of personal data and countries involved)

No

Is it planned to import personal data from non-EU countries into the EU or from a non-EU country to another non-EU country? (If yes: Specify the type of personal data and countries involved)

No

Does this activity involve the processing of personal data related to criminal convictions or offences?

No

Animals

Does this activity involve animals?

No

Are they vertebrates?

No

Are they non-human primates?

No

Are they genetically modified?

No

Are they cloned farm animals?

No

Are they endangered species?

No

Non-EU Countries

Will some of the activities be carried out in non-EU countries?

Yes

In case non-EU countries are involved, do the activities undertaken in these countries raise potential ethics issues? (If yes: Please specify)

No

It is planned to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?

No

Is it planned to import any material (other than data) from non-EU countries into the EU or from a non-EU country to another non-EU country?

No

Is it planned to export any material (other than data) from the EU to non-EU countries?

No

Does this activity involve low- and/or lower middle-income countries? (If yes: Detail the benefit sharing actions planned in the self-assessment)

No

Could the situation in the country put the individuals taking part in the activity at risk?

No

Environment, health, and safety

Does this activity involve the use of substances or processes that may cause harm to the environment, animals or plants? (Note: During the implementation of the activity or further to the use of the results, as a possible impact)

No

Does this activity deal with endangered fauna and/or flora or protected areas?

No

Does this activity involve the use of substances or processes that may cause harm to humans, including those performing the activity? (Note: During the implementation of the activity or further to the use of the results as a possible impact)

No

Artificial Intelligence

Does this activity involve the development, deployment and/or use of Artificial Intelligence? (If yes, detail in the self-assessment below whether that could raise ethical concerns related to human rights and values and detail how this will be addressed.)

No

Other ethics issues

Are there any other ethics issues that should be taken into consideration? (If yes: Please specify)

No

Ethics self assessment

I confirm that I have taken into account all ethics issues above and that, if any ethics issues apply, I will complete the ethics self-assessment below.

I confirm that I have taken into account all ethics issues above and that, if any ethics issues apply, I will complete the ethics self-assessment below.Yes

For the "Yes" answers, please provide an ethics self-assessment outlining: (1) Ethical dimension of the objectives, methodology, and likely impact, and (2) compliance with ethical principles and relevant legislations

Data management and submission declarations

I will submit a Data Management Plan (DMP) for my TA project following the AQUASERV template.

I will submit a Data Management Plan (DMP) for my TA project following the AQUASERV template.Yes

I understand that any refereed publication authored by myself that includes results gathered during my TA visit will be published as Open Access.

I understand that any refereed publication authored by myself that includes results gathered during my TA visit will be published as Open Access.Yes

I understand that I will make the data I collect during my TA available through open access as soon as possible after collection (...) - FOR FULL STATEMENT, PLEASE SEE HELP TEXT!

Yes

I will comply with European and host national ethical standards.

I will comply with European and host national ethical standards.Yes

In submitting this application you confirm you have read and agreed to the terms and conditions for Transnational Access as detailed within the call for access.

In submitting this application you confirm you have read and agreed to the terms and conditions for Transnational Access as detailed within the call for access.Yes

Your collaboration is essential for us to effectively communicate the services offered by AQUASERV. Please choose the option that suits you best:

• I agree to collaborate with the project's communication team to create an appealing digital content (publication or video) about my TA experience in which I will be featured. This content will be published in the communication channels of AQUASERV (website, social media, newsletter, e-mail and print materials). For these purposes, I will not ask for any payment regarding the use of my image.

How did you find out about the AQUASERV Transnational Access Calls?

E-mail

Proposal Team

Principal Investigator

[redacted]

Research Team

[redacted]