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# BIOAQUA Webinars – Report on the Organization and Outcomes of the Second Project Period

*Period covered: First project period (01/11/2024 to 31/10/2025).*

*This document contains no personal data (except for names of speakers); only aggregated participation and event-level information.*

## 1. Introduction and Objectives

This report presents the organization and outcomes of the BIOAQUA webinar series during the second project period. The webinars were designed to advance the Action's objectives by providing targeted training, showcasing relevant scientific developments, and fostering exchange across disciplines and sectors. After consulting BIOAQUA's members, this period it was decided to focus webinars on strengthening our relationships with other COST Actions or gaining knowledge around the main technological trends detected in the technology foresight exercise carried out from P1. This desire delayed activities in relation to the direct organization of webinars (since the technology foresight still took some months during P2), but a very promising action line has been opened for reinforcing the organization of webinars during the 3rd Action's period.

## 2. Planned Calendar and Implementation

The calendar for the second period included:

- The organization of a joint webinar in cooperation with sister COST Action Eurestop:

| Title | Date | Duration (h) | Participants |
|---|---|---|---|
| EURESTOP-BIOAQUA joint webinars 1 (Joint with COST Action EURESTOP) | 15 January 2025 | 2 | 139 |

- The organization of the 1st webinar related to the technology foresight exercise carried out:

| Title | Date | Duration (h) | Participants |
|---|---|---|---|
| BIOAQUA Webinar Bridging Land & Water series – Webinar 1 | 21/10/2025 | 1 | 42 |

- Additionally, an especial webinar was proposed by one Action member around inclusivity issues:

| Title | Date | Duration (h) | Participants |
|---|---|---|---|
| BIOAQUA Webinar Bridging Land & Water series – Webinar 1 | 27/10/2025 | 1,5 | 23 |

Executive descriptions of each of these webinars and information about speakers is included in Annex 1.

Each webinar incorporated a dedicated discussion segment, typically 15–25 minutes, to encourage questions, comments, and experience sharing. This format proved essential for consolidating emerging insights, including practice-oriented takeaways for stakeholders and early-stage researchers. Moderators ensured inclusive participation and documented key points for internal follow-up without retaining any personal data.

## 3. Spotlight 1: Joint BIOAQUA–EURESTOP Webinar

A highlight of the period was the joint webinar organized with COST Action EURESTOP. This session significantly amplified outreach, drawing the highest attendance of the period and enabling cross-Action knowledge sharing. The event was designed to promote complementarities across research and innovation agendas, and it featured extended discussion to consolidate a shared understanding of challenges and opportunities for evidence-based action in aquatic systems.

## 4. Spotlight 2: Webinars series on top S&T trends for the future of aquaculture

This is the first webinar on the topic "Bridging Land & Water: Next-Generation Monitoring and Risk Assessment of Pharmaceuticals, AMR, and Pathogens", one of the key research and innovation trends detected during the foresight exercise. We will try to organise more webinars on this key trend and others identified (see infographic published in this link). These webinars:

- Make us closer to top-level experts in key areas.
- Attract a lot of interest within BIOAQUA's members and beyond (e.g. cooperating COST Actions).

For these reasons, we consider this activity very valuable.

## 5. Spotlight 3: Webinar on inclusivity issues

The concepts related with Equality, Diversity and Inclusion were presented, and lessons learned from past COST Action PRIORITY were shared and explained. This material brought a very interesting discussion, which resulted into a valuable action plan for BIOAQUA's Period 3 to reinforce this perspective towards the future impact of the network. It is not that common that webinars have a direct impact on our minds and work flows, for which this webinar is considered very valuable.

## 6. Impact Assessment

The following quantitative indicators summarize the overall reach and engagement of the webinar series in Period 1:

- Number of webinars organized (including the joint session): 3
- Total cumulative attendance (non-unique): 204
- Average attendance per webinar: 68
- Average duration per webinar: 120 minutes
- Peak attendance in a single session: 139
- All sessions included time for Q&A and knowledge exchange.

Beyond quantitative reach, the webinars supported capacity building among Action members and partners, increased the visibility of BIOAQUA, and strengthened links with complementary initiatives such as COST Action EURESTOP. Materials and insights are being integrated into future training plans and dissemination activities.

## 7. Conclusions and Next Steps

The webinars organized in P2 met the expected objectives for the second project period and, above all, opened very promising horizons for activity towards the 2nd half of the Action. In the next period, BIOAQUA will continue with the webinar series related to the technology foresight exercise, prioritizing topics of high community demand, and expanding international collaborations. A continued emphasis on interactive formats will maintain robust knowledge exchange while respecting data protection and privacy standards.

## 8. Annex: Summary of webinars and speakers

Dear members of COST Actions EURESTOP (CA21145) and BIOAQUA (CA22160),

Given that our COST Actions share common scientific interests, it is our great pleasure to invite you to attend the **joint webinar organized on the TEAMS platform on Jan 15th, 2025 at 11:30-13:00 CET time**. Participation is online only, and it is free for all EURESTOP and BIOAQUA members. Please also accept the formal invitation online that you will receive trough eCOST.

For connecting to the webinar, please use the following link: https://teams.microsoft.com/l/meetup-join/19%3ameeting_MmFhNjc2OTktYjkzYy00NmZjLWE4MjItZDYwYTA5MmQ1NjYz%40thread.v2/0?context=%7b%22Tid%22%3a%22c7362074-48c2-4bf2-8696-a7408162571e%22%2c%22Oid%22%3a%22bf47d354-8314-4278-aad3-1f5243d98bdf%22%7d

The program of the webinar is as follows, while abstracts are listed in the next pages:

11:30 – 11:40 Welcome by Action Chairs (Mattia Mori and Eva García Muntión)

11:40 – 12:00 **Simona Bartkova (EE)** – *The Wonderful World of Droplets: Diving into the Possibilities of Droplet-Based Microfluidics for Antimicrobial Resistance and Microplastic Pollution Research*

12:00 – 12:20 **Abidelfatah M. Nasser (IL)** – *Stream contamination with emerging pathogens and antibiotic resistance from point and none-point pollution sources*

12:20 – 12:40 **Amparo Faustino (PT)** – *Can Photodynamic Inactivation Control Microbes and Mitigate Resistance in Water?*

12:40 – 12:55 Q&A session

12:55 – 13:00 Closing remarks

We sincerely hope to receive a large participation in this webinar, as well as that further joint initiatives could be organized within the framework of the EURESTOP and BIOAQUA COST Actions.

Looking forward to meeting you virtually at the webinar!

Eva García Muntión (BIOAQUA Chari)

Mattia Mori (EURESTOP Chair)

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# The Wonderful World of Droplets: Diving into the Possibilities of Droplet-Based Microfluidics for Antimicrobial Resistance and Microplastic Pollution Research

**Simona Bartkova**

Tallinn University of Technology, Tallin Estonia

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Abstract text

This talk will introduce droplet-based microfluidics and its potential applications for Eurostop and Bioaqua researchers. It will also delve into my group's recent work on antimicrobial resistance (AMR) and microplastic (MP) pollution interactions. AMR is intensified by bacterial behaviors like aggregation and biofilm formation, which can develop on MPs that are ubiquitous particles in our world, including aquaculture systems. Studying these interactions is challenging due to the microscopic scale of MPs and the complexity of bacterial aggregation. To overcome these challenges, we developed a droplet-based microfluidics approach using water-in-oil droplets to encapsulate materials in nanoliter volumes. This high-throughput method enables detailed investigation of bacterial interactions with antibiotics and MPs. Our pipeline integrates droplet-based minimal inhibitory concentration assays with accessible image analysis tools, providing thousands of parallel replicates per sample for robust and efficient data generation.

# Stream contamination with emerging pathogens and antibiotic resistance from point and none-point pollution sources

**Abidelfatah M. Nasser**

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Surface waters, rivers, streams and lakes are subject to domestic wastewater contamination through the discharge of inadequately treated wastewater from point and none point pollution sources. The influence of wastewater treatment plant on the microbial quality and the antibiotic resistance on the Yarkon stream study was evaluated. The results demonstrate that the level of microbial contaminates in the upstream waters was low. A reduction of 2 logs was recorded for all studied microbial parameters by the secondary biological treatment. The level of fecal coliform, ESBL-*E. coli* and somatic coliphages was not reduced in the two downstream sites moreover, the levels of ARGs were higher in the downstream sites than those observed in the secondary effluent. The high levels of study contaminants in the outfall site of the Yarkon stream indicate that none point pollution is discharged into the stream. The results of the study indicate that high levels of microbial contaminants and ARGs are discharged to the Mediterranean Sea, which may pose public health and environmental risks.

# Can Photodynamic Inactivation Control Microbes and Mitigate Resistance in Water?

Maria Bartolomeu[b], Carlos J. P. Monteiro[a], Adelaide Almeida[b] & **M. Amparo F. Faustino[a]**

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Photodynamic inactivation (PDI) is a versatile and sustainable approach to microbial control, taking advantage of reactive oxygen species (ROS) generated by light-activated molecules known as photosensitizers. This method has shown promise in inactivating resistant microbes and disinfecting water. By targeting multiple cellular components, PDI reduces the likelihood of resistance developing, offering an effective alternative to conventional disinfection methods with similar efficacy against resistant and non-resistant strains[1-4]. This communication explores the application of PDI in various contexts, highlighting its effectiveness in improving water quality and supporting sustainable water management practices.

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# BIOAQUA webinar series “Bridging Land and Water: Next-Generation Monitoring and Risk Assessment of Pharmaceuticals, AMR, and Pathogens”

## Webinar 21/10/2025 – 10:00 CET

## Presentation of speakers and topics

### Helena Guasch, from CEAB-CSIC

Tenured scientist at CEAB since August 2018, she spent more than 15 years at the University of Girona teaching in the Department of Environmental Sciences and conducting research at the Institute of Aquatic Ecology. She began her research career studying primary production in Mediterranean headwater rivers, a topic that she expanded by addressing the effects of human activity on fluvial ecology. In this context, her research group has been looking for biological indicators of different types of impact and exposure to pollutants: molecular biomarkers of stress, bioindicators and ecosystem functions, among others. They evaluate the ecological effects of pollution in experimental laboratory-scale studies using microcosms, in artificial rivers, in field experiments, and in observational studies conducted at the river basin scale. In terms of the development of new study methodologies, they have specialized in ecotoxicomics as a tool to improve our understanding of the reciprocal relationships between human alterations and the role played by microbial communities in improving water quality and ecosystem health. Recently, the focus of their research has opened up its scope a little more considering the principles of sustainable development. They include economic and social aspects to address new challenges in conservation ecology. The main objective of the research she is currently leading is the creation and validation of protocols for the reduction of plastic pollution in mountain ecosystems and the knowledge of the links between microbial communities and the "pasticosphere". She is also very interested in understanding the causes, and mitigating the effects of nutrient pollution in Mediterranean rivers, an old environmental problem, but one of great relevance in the context of global change.

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She participates in Pharm-ERA project, and MSCA Doctoral Network project from Horizon Europe that brings together academics, public and private stakeholders, and EU policymakers to address the urgent issue of the contamination of global soil and aquatic ecosystems by pharmaceuticals, antimicrobial-resistant microorganisms, and pathogens. With 10 doctoral projects spanning scientific disciplines such as environmental chemistry, ecotoxicology, microbial ecology, molecular biology and modelling, Pharm-ERA seeks to develop innovative solutions and improve monitoring techniques and environmental risk assessment. The ultimate aim is to protect the diversity and functions of microbial life in contaminated ecosystems while ensuring the sustainability of our planet and promoting human and animal health..

Her presentation will focus on the interaction between antibiotic resistance and plastic pollution in the environment.

## Stephane Pesce, from INRAE

Dr. Stéphane Pesce is the leader of the research group “Aquatic Microbial Ecotoxicology” at the French National Research Institute for Agriculture, Food and Environment (INRAE). For more than a decade, he has been studying the structural and functional responses of aquatic benthic microbial communities to toxicant exposures. Investigations are performed on periphytic biofilm, sediment and leaf litter microbial communities, and a special attention is given to the study of microbial adaptation processes following chronic exposure to toxicants (pollution-induced community tolerance, stimulation of biodegradation capacities...) to develop, among others, innovative approaches for water quality bioindication. He is the co-creator of the Emerging International Network on Microbial Ecotoxicology, EcotoxicoMic (https://ecotoxicomic.org/) and is a member of the Directory Board of the Rovaltain Scientific Foundation for research in Health and Environment.

He also participates in Pharm-ERA project.

His presentation will focus on the different factors that promote the spread of antibiotic resistance and pathogens in aquatic environments, with an emphasis on the importance of environmental continuums—such as soil-water interfaces and proximity to anthropogenic discharges—as well as the co-occurrence of chemical pollutants, which together increase the risk of 'hotspots' of contamination by these microbiological pollutants.

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# BIOAQUA Webinar "Embedding DEI in COST Actions: Lessons from PRIORITY and a Roadmap for BIOAQUA"

## 27/10/2025 – 10:00 CET

**Abstract**

The webinar will be presented by **Dr. Simona Bartkova**, a member of the **PRIORITY COST Action (CA20101)**, who will share her positive experience with the **Diversity, Equality, and Inclusion (DEI) group** established within PRIORITY. Drawing from firsthand involvement, Simona will provide practical insights into how a dedicated DEI group can strengthen collaboration, foster inclusiveness, and enhance participation across all levels of a COST Action. The webinar will explore what DEI means in research, why it matters, and how the successful model developed within PRIORITY can inspire similar initiatives and perhaps be implemented within the **BIOAQUA COST Action**.

In this session, the following specifics will be covered:

1. **What is DEI in research?**
    - Definitions and key concepts: diversity (e.g. gender, geography, career stage), equality (fair access, removal of barriers), inclusion (culture, belonging)
    - Common challenges and barriers to DEI in research consortia.
2. **Why DEI matters (especially in COST / collaborative networks)**
    - Benefits to creativity, innovation, participant engagement, equity and fairness
    - Risks of neglecting DEI: exclusion, underrepresentation, loss of talent, reputational and ethical issues
3. **Overview of the PRIORITY COST Action & its DEI group**
    - Introduction to the PRIORITY project (CA20101) and its structure, goals, and research focus

- Establishment of the DEI Group: rationale, governance, membership across countries and career stages
- The DEI strategy: three diversity axes (geographical distribution, career stage, gender)

4. **Key activities & outputs delivered by the PRIORITY DEI Group**

   - Diversity assessment / KPIs — tracking baseline and progress in gender, geography (Inclusiveness Target Countries), career stage distribution
   - Newsletters ("Small Particles, Big Issues: PRIORITYze DEI") to raise awareness, share stories, disseminate tips and resources
   - Workshops / training / educational events to build capacity and awareness
   - Mentoring, networking, and peer support initiatives
   - Communication, dissemination, and internal awareness raising (website, social media, project meetings)

5. **Discussion & Q&A: Implementing a DEI group in BIOAQUA**

   - Guided brainstorming of steps, challenges, and success factors
   - Tailoring the DEI model to BIOAQUA's structure, disciplines, and membership
   - Setting realistic goals, KPIs, and sustaining momentum over time

**Organiser:**

**Simona Barktova**

My major contributions to research are in the fields of microbiology and droplet microfluidics. Droplet technology enables high-throughput experimentation, which our group utilizes for single cell incubation of different organisms in water-oil microdroplets and study their individual responses to antibiotics and other pollutants. I expect to contribute to BioAqua by enabling scientist to do more high throughput studies on aquatic pathogens and aid in possible biosensor developments via microfluidic technology.