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)

https://bioaqua-cost.eu/

https://eurestop.eu/

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

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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

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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?

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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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