# The 18th Congress of the International Union of Microbiological Societies (IUMS 2024)

Florence, Italy

# The 18th Congress of the International Union of Microbiological Societies (IUMS 2024), Florence, Italy

**ISBN**
978-2-8325-5119-6

**DOI**
10.3389/978-2-8325-5119-6

**Citation**
PCO - Kenes Group

October 23–25, 2024, Florence, Italy

# SHIFT 03-019 / #1067
# Fecal contamination, antibiotic resistance and organic micropollutants in full-scale constructed wetlands in northern portugal rural areas
## Posters on boards - shift 03: Antimicrobials and antimicrobial resistance

**Author**
Ana Margarida Ribeiro Teixeira – Universidade Católica Portuguesa (UCP), CBQF - Centro de Biotecnologia e Química Fina - Laboratório Associado,, Escola Superior De Biotecnologia, Rua De Diogo Botelho 1327, Porto, Portugal
Diana Matos – Águas do Norte, S.A., Porto, Portugal
Norberta Coelho – Águas do Norte, S.A., Porto, Portugal
Lahiruni M. Halwatura – University at Buffalo, The State University of New York (SUNY), Buffalo, Department Of Chemistry, New York (SUNY), United States of America
Liezel Mari Abaya – University at Buffalo, The State University of New York (SUNY), Buffalo, Department Of Chemistry, New York (SUNY), United States of America
Ivone Vaz-Moreira – Universidade Católica Portuguesa (UCP), CBQF - Centro de Biotecnologia e Química Fina - Laboratório Associado,, Escola Superior De Biotecnologia, Rua De Diogo Botelho 1327, Porto, Portugal

Paula M. L. Castro – Universidade Católica Portuguesa (UCP), CBQF - Centro de Biotecnologia e Química Fina - Laboratório Associado,, Escola Superior De Biotecnologia, Rua De Diogo Botelho 1327, Porto, Portugal
Diana S. Aga – University at Buffalo, The State University of New York (SUNY), Buffalo, Department Of Chemistry, New York (SUNY), United States of America
Célia M. Manaia – Universidade Católica Portuguesa (UCP), CBQF - Centro de Biotecnologia e Química Fina - Laboratório Associado,, Escola Superior De Biotecnologia, Rua De Diogo Botelho 1327, Porto, Portugal

**Citation**
Teixeira, A.M.R., Matos, D., Coelho, N., Halwatura, L.M., Abaya, L.M., Vaz-Moreira, I., Castro, P.M.L., Aga, D.S., Manaia, C.M. Fecal contamination, antibiotic resistance and organic micropollutants in full-scale constructed wetlands in northern portugal rural areas.

## Background and Aims

Constructed wetlands (CWs) are recognized as a promising alternative or complement to traditional wastewater treatments. Their cost-effectiveness and seamless integration into natural landscapes, fostering wildlife habitats, are notable advantages. This study aimed to assess the efficacy of three horizontal subsurface flow CWs with *Phragmites australis* for reducing fecal contamination, antibiotic resistance, and organic micropollutants (OMPs).

## Methods

Influent, effluent, and sediments samples (n=36) collected throughout 2023 were examined for cultivable *Escherichia coli* and total coliforms, 10 biomarkers for anthropogenic contamination and 16S rRNA gene by qPCR, 119 OMPs by LC-HRMS, and 16S rRNA-based bacterial community analysis.

## Results

The reduction in fecal contamination (log-units) was of <4.8 for *E. coli*, <4.0 for total coliforms, and <3.6 for genetic biomarkers. Target OMPs showed variable removal rates, with different substances persisting after treatment (e.g. acetaminophen, fenofibric acid, irbesartan, oxazepam). The bacterial community was dominated by *Pseudomonadota* (>40%), and treatment

led to the reduction of *Bacillota* and *Actinomycetota* and increase of the "*Halobacterota*" and *Verrumicrobiota* relative abundance.

**Conclusions**

The results reveal that the growth of macrophytes and climatic conditions, particularly temperature, influenced the treatment effectiveness, improved during summer. However, the capacity of the plants to uptake bacteria/genes from wastewater has been suggested and its meaning in pathogens ecology is being investigated. **Acknowledgements:** AMT acknowledges FCT PhD grant UI/BD/151388/2021 and FSE (Fundo Social Europeu), ARQUIMEDES doctoral cooperation protocol Águas do Norte & UCP, and AWARE project grant Nº101084245.