



Biotechnology and
Biological Sciences
Research Council



Engineering and
Physical Sciences
Research Council

EBNet Travel Bursary Support
Sergio Serrano Blanco,
Newcastle University
(TB202318)



International Conference on Wider Uptake of Water Resource Recovery from Wastewater Treatment (ICWRR 2024) 18-21 June 2024 Palermo, Italy

Presentation:

Biomass production and metagenomic analysis on municipal wastewater treatment systems using microalgae and carriers

Sergio Serrano-Blanco, Newcastle University

Rapid urbanisation and increasing industrial activities generates large volumes of wastewater which requires treatment prior to being released back into the environment.

Conventional treatments require heavy energy consumption and produce carbon dioxide. Valorisation of wastewater effluents using microalgal treatments has been receiving attention for the past decades. Wastewater represents an alternative source of nutrients to grow microalgae which provides a solution for wastewater treatment. Nevertheless, microalgal cultures are still challenged by high cost and low productivity. In the present study, a novel approach was incorporated by integrating microalgal wastewater treatment with carrier systems to favour the growth of both attached and suspended cells of *Tetrademus obliquus*.



Dr Serrano Blanco presenting at ICWRR 2024

The study found that *T. obliquus* was able to uptake nutrients from municipal wastewater while the addition of 12.5% fill ratio carrier systems produced higher microalgal cell productivity (1.2×10^6 cells mL^{-1} day^{-1}). Besides, MinION nanopore sequencing was conducted to assess the impact of microalgal and carriers treatment on wastewater bacterial communities. It was found that treating wastewater with microalgae had changed bacterial communities when compared to the ones found in the original wastewater. The microbiome of the biofilms and suspended cultures was also studied.

Interestingly, it was found that attached microbial communities differed to the ones growing suspended within the same cultures. In short, the addition of 12.5% fill carrier ratio increased microalgal productivity while stimulating changes in the algal microbiome.

[Intensified microalgae production and development of microbial communities on suspended carriers and municipal wastewater](#). Serrano-Blanco, S., Zan, R., Harvey, A.P. and Velasquez-Orta, S.B., 2024. *Journal of Environmental Management*, 370, p.122717.



For a video version of the presentation see [?????](#)



Biotechnology and
Biological Sciences
Research Council



Engineering and
Physical Sciences
Research Council

EBNet Travel Bursary Support
Anna Salvian,
University of Surrey
(TB202401)



International Conference on Wider Uptake of Water Resource Recovery from Wastewater Treatment (ICWRR 2024) 18-21 June 2024 Palermo, Italy

Presentation:

Biomass production and metagenomic analysis on municipal wastewater treatment systems using microalgae and carriers

Sergio Serrano-Blanco, Newcastle University

Rapid urbanisation and increasing industrial activities generates large volumes of wastewater which requires treatment prior to being released back into the environment.

Conventional treatments require heavy energy consumption and produce carbon dioxide. Valorisation of wastewater effluents using microalgal treatments has been receiving attention for the past decades. Wastewater represents an alternative source of nutrients to grow microalgae which provides a solution for wastewater treatment. Nevertheless, microalgal cultures are still challenged by high cost and low productivity. In the present study, a novel approach was incorporated by integrating microalgal wastewater treatment with carrier systems to favour the growth of both attached and suspended cells of *Tetradismus obliquus*.



Dr Serrano Blanco presenting at ICWRR 2024

The study found that *T. obliquus* was able to uptake nutrients from municipal wastewater while the addition of 12.5% fill ratio carrier systems produced higher microalgal cell productivity (1.2×10^6 cells $\text{mL}^{-1} \text{day}^{-1}$). Besides, MinION nanopore sequencing was conducted to assess the impact of microalgal and carriers treatment on wastewater bacterial communities. It was found that treating wastewater with microalgae had changed bacterial communities when compared to the ones found in the original wastewater. The microbiome of the biofilms and suspended cultures was also studied.

Interestingly, it was found that attached microbial communities differed to the ones growing suspended within the same cultures. In short, the addition of 12.5% fill carrier ratio increased microalgal productivity while stimulating changes in the algal microbiome.

For a video version of the presentation see [?????](#)

