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Editorial

# Short Editorial Demand for Freshwater

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Demand for freshwater is steadily increasing as a result of economic and industrial development and an ever growing global population. Increase of water consumption, as well as the problem of watercourse contamination due to the discharge of municipal and industrial wastewaters alongside the effects of climate change, has severely affected availability of water resources. At present, > 80% of the wastewater generated worldwide is discharged into the environment with inadequate treatment or without any treatment at all, leading to a slow degradation of the water resources.

Food industry wastewater has high concentration of organic matter, nitrogen, phosphorus, minerals and several chemicals compounds. However, conventional wastewater treatment plants (WWTPs) are not designed and optimized for effective treatment and removal of such contaminants from food industry wastewater. In addition, WWTPs are costly and energy-intensive processes. In this context, phytoremediation has recently emerged as a cost-effective and environmentally friendly alternative to remove contaminants from wastewaters, guaranteeing remarkable advantages, such as production of cleaner water with dissolved high oxygen concentrations.

In the phytoremediation process, microalgae are grown on wastewater using simple nutrients (such as nitrogen and phosphorus), sunlight as the energy source and $CO_2$ as a carbon source. Nevertheless, the principal bottleneck in the phytoremediation process is the harvesting, which must ensure an efficient separation and low energy consumption. Thus, selection of the appropriate microalgal-strain and determination of the optimal harvesting conditions in the specific wastewater to treat are critical.

Therefore, it is important to select highly productive robust microalgae strains with high growth rate and environmental tolerance. Strains such as *Oscillatoria, Scenedesmus, Chlorella* and *Nitzchia* have been ranked as the most pollution-tolerant microalgae in wastewater treatment systems.

Results demonstrated removal efficiency above 85% for nitrogen and phosphorus, 99% for *Escherichia coli* and 98% for chemical oxygen demand (COD) after 4 days of cultivation. This technology application in the context of the circular economy (CE) reduces the environmental impact and adds value to biomass which can be used in bio-energy processes and as animal feed.

The challenge now is the determination of the optimal conditions for harvesting, ensuring efficient separation and low energy consumption.