O-10 - EXTRACTION AND CHARACTERIZATION OF EXTRACELLULAR POLYMERIC SUBSTANCES FROM AEROBIC GRANULAR SLUDGE FROM A FULL-SCALE SEQUENCING BATCH REACTOR IN PORTUGAL

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Background

Aerobic granular sludge (AGS) is a recently developed technology for wastewater treatment. This system is able to manage higher amounts of wastewater and requires less surface area than conventional systems. The granules consist of microorganisms embedded in a self-produced extracellular polymeric substances (EPS) matrix. EPS are high molecular weight polymers, which can be metabolic products of microorganisms (e.g. proteins, polysaccharides, humic substances, nucleic acids) or be due to cell lyses. Accumulation on the cells surface of such EPS forms a protective barrier for the cells from the external environment.

This work focus on the extraction and quantification of EPS from AGS from a large scale bioreactor in Portugal, during approximately 4 months. Given the environmental and chemical differences that these granules are subjected to one of the goals was to assess variability in the EPS production and characterize the granules morphology and composition in a large scale environment.

Method

EPS was extracted from AGS as described by Felz *et al.*[1] using the sodium carbonate method. EPS biochemical characterization was made using colorimetric methods to access the proteins [2], polysaccharides [3] and humic acids [4], and a fluorometric method to access the DNA content using a Qubit fluorometer. Quantitative image analysis was used to evaluate the size and several morphological parameters (e.g. roundness, robustness, compactness, and others) of the granules [5,6].

Results & Conclusions

Variations in the EPS composition were observed throughout the experience. Such variations can be due to chemical differences in the influent water and the fact that the loads can vary throughout the year. Consequently, the EPS production and composition in the granules was affected. Morphological parameters, namely roundness, compactness and robustness of the biomass are indicative factors of a stable granular biomass during the monitoring period.

In summary, despite the fact that EPS composition changed in response to external stimuli, the granules showed morphological stability throughout the analysis.

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