

## TRADITIONAL GREEK PUDDING DESSERT WASTEWATER BIOTREATMENT USING ATTACHED GROWTH AEROBIC REACTORS

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### ABSTRACT

Food industry is amongst the most pollutant industries, so there is a great need their wastewater to be processed. Biological degradation is one of the most promising methods of organic matter removal from such wastewaters. The main objective of this study is the treatment of the traditional Greek Pudding Dessert production line's wastewater (PDW – Pudding Dessert Wastewater) of a confectionery industry using a biological filter.

Experiments in attached growth pilot-scale biofilter were carried out under SBR operating mode with recirculation, using indigenous microorganisms originating from PDW. PDW is a highly polluting effluent containing high d-COD values (20,000-50,000 mg/L) and large amounts of fats and oils. Therefore, there is a need for proper treatment of PDW before being released into the environment. Experiments were performed using a wide range of feed concentrations (1000, 2500, 5500, 7500, 10,500 mg d-COD/L) and two different recirculation rates (0.5 and 1 L/min, corresponding to 226 m<sup>3</sup>/(m<sup>2</sup> d) and 113 m<sup>3</sup>/(m<sup>2</sup> d), respectively), to investigate the optimum operating conditions of the system.

High percentage removals of d-COD (75-92%), orthophosphates (61.7-99%) and sugars (89-99%) were achieved, for all the experiments performed. However, the maximum degradation rate of the organic load was achieved for the feed concentration of 5500 mg/L. Specifically, values of 244.8 and 221.3 mg d-COD/(L/h) were achieved for the recirculation rates of 0.5 and 1L/min, respectively. It should be mentioned that the operating cycle time in the packed pilot-scale filter for the feed concentration of 5500 mg/L was not exceeded 20 hours, for both recirculation rates tested.

This is a first attempt to transform scientific knowledge to technology and produce a pilot-scale prototype of a biological filter for PDW degradation. The use of mixed indigenous microorganisms from PDW provides a certain advantage and ensures durability under various operating conditions, while attached growth reactor under SBR operating mode with recirculation proved to be a very effective operating mode since it ensured high removal rates.

**KEY WORDS:** pudding dessert wastewater, biological degradation, indigenous microorganisms, attached-growth reactor