Desalination and Water Treatment
www.deswater.com
doi: 10.5004/dwt.2021.27342

228 (2021) 153–164
July

Comparative study between electrocoagulation and adsorption on the *Opuntia ficus indica* powder for industrial dairy wastewater treatment

Rahma Abrane*, Sabir Hazourli, Amina Eulmi

Laboratory of Water Treatment and Valorization of Industrial Wastes, Department of Chemistry, Faculty of Sciences, Badji-Mokhtar University, B.P. 12, Annaba 23000, Algeria, Tel. +213671525982; email: rahmaabrane148@gmail.com (R. Abrane), Tel. +213699287981; email: hazourlisab@yahoo.fr (S. Hazourli), Tel. +213776511362; email: eulmi94@gmail.com (A. Eulmi)

Received 23 November 2020; Accepted 9 April 2021

ABSTRACT

Dairy wastewater constitutes an essentially organic polluting load. Considering the environmental nuisances generated, treatment is essential. In the present study, two treatment techniques recognized for their easy and inexpensive applications have been optimized on real water from a local dairy industry namely electrocoagulation (EC) and adsorption on *Opuntia ficus-indica* powder: OFIP. The application of the cactus species for water treatment is relatively recent, even less for the adsorption process. The characteristic of this biomaterial, with high potential for recovery and available in many countries all year round, lies in the fact that it has considerable adsorbing power on its surface sites. Whether in EC or adsorption on OFIP, the results of monitoring the parameters continuously (chemical oxygen demand (COD), turbidity) and punctual (biochemical oxygen demand (BOD_5), Kjeldahl nitrogen, phosphorus, fat) are satisfactory. All the parameters measured after these treatments have values that meet the local standardization requirements for industrial aqueous residues. For comparison purposes, the EC gives turbidity (99%) and COD (80%) reduction rates higher than those of adsorption on OFIP but an operational cost 10 times more. However, given the advantages and disadvantages of each technique, the choice of the application of one or the other process requires a compromise to be made in relation to the objectives sought.

Keywords: Electrocoagulation; Cacti; Adsorption; Dairy wastewater; Treatment

* Corresponding author.