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# Study and Valorisation of Wastewaters Generated in the Production of Bacterial Nanocellulose

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## Abstract

The use of low-cost residues from the agro-food industries in the formulation of fermentation culture media is often claimed to represent a strategy to reduce the production cost Bacterial NanoCellulose (BNC). However, the impact of such culture media, e.g. made of molasse and corn steep liquor, on the organic load of the wastewaters generated in this process has never been assessed.

This work aims to characterize the wastewaters resulting from the fermentation of BNC using different culture media, under static culture, as well as their biochemical methane potential (BMP) and anaerobic biodegradability. Anaerobic digestion (AD) is one of the most promising treatments for industrial wastewaters with high organic loads since, beyond removal of the organic matter, it generates energy in form of biogas. Two wastewaters streams were analysed: i) the one collected from the culture medium after fermentation (WaF); ii) the one that, in addition to the previous, includes the BNC washing wastewaters (WaW). The performance of an upflow anaerobic sludge blanket reactor (UASB) for the treatment of the later (WaW) was also evaluated.

The BMP, expressed in volume of methane produced per amount of volatile solids (VS) of waste (L·kg-1), of WaF was (387 ± 14) L·kg-1 and WaW reached (354 ± 4) L·kg-1, corresponding to a metanization percentage (PM) of (86.9 ± 3.1) % and (79.5 ± 0.9) %, respectively. After the biodegradability tests, chemical oxygen demand (COD) of WaF and WaW was reduced by (89.2 ± 0.4) % and (88.7 ± 1.5) %, respectively. With an organic loading rate of [(6.5 ± 0.1) g·L-1·d-1] of WaW and a hydraulic retention time of 3.33 days, Upflow Anaerobic Sludge Blanket (UASB) reactor operation allowed for a COD removal of 58 %.

**Keywords:** Bacterial cellulose; Low cost substrate; wastewater

**Selected References:**

1. Dourado, F.; Fontão, A.; Leal, M.; Rodrigues, A.C.; Gama, M., Process Modeling and Techno-Economic Evaluation of an Industrial Bacterial NanoCellulose Fermentation Process, in Bacterial Nanocellulose - From Biotechnology to Bio-Economy. 2016, Elsevier: Amsterdam. p. 199-214