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Microbial Communities as growth engines for Greece

Book of Abstracts

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Hydrolytic potential of microbiota treating orange juice processing waste in a methanogenic bioreactor

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Orange juice industries represent a valuable sector of the Greek economy, accounting for 1.5% of orange juice production worldwide. This processing sector generates significant amounts of wastes, which are composed of various polymeric soluble and insoluble carbohydrates, such as pectin, cellulose and hemicellulose, which exceeds 40% of orange's d.w. Moreover, orange juice processing wastewaters are characterized by high organic load, considering these residues amenable for anaerobic digestion. However, the slowly hydrolyzed biomolecules, i.e. lignocellulosic substrates, resist biodegradation, reducing energy recovery gain during anaerobic digestion process. In this work, orange juice processing wastewater was digested in an anaerobic digestion system at mesophilic conditions and the hydrolytic potential of microbiota in the methanogenic reactor was investigated through the determination of both intracellular and extracellular polygalacturonase, endo-1,4- β -D-glucanase, exo-1,4- β -D-glucanase, β -1,4-D-glucosidase, endo-1,4- β -xylanase and 1,4- β -xylosidase activities. In particular endoglucanase, exoglucanase, β -xylosidase and β -glucosidase activities were limited, whereas reasonable β -endoxyylanase activities were determined. It is concluded that induction of xylanases was favored due to the high hemicellulose content of such waste and the slow hydrolysis of β -glycosidic bond.

Keywords: orange juice processing wastewater; anaerobic digestion; cellulases; xylanases; pectinases

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