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UTILIZATION OF OLIVE OIL AS A POTENTIAL OXYGEN-VECTOR IN STIRRED BIOREACTORS

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Abstract

A new approach to environmental protection management is the aerobic microbial digestion of food industry wastewaters by using those waters as substrate, while the pollutants contained work also as oxygen-vectors. In biotechnology, oxygen mass transfer is a key parameter involved in the design and operation of mixing–sparging bioreactors and it can be analyzed by means of the oxygen mass transfer coefficient (k_La). The influence of a second liquid phase with higher oxygen affinity (in this study - olive oil) on k_La in a submerged aerated 4L stirred bioreactor was studied. Furthermore, the influence of the following parameters on the oxygen transfer rate was evaluated: the volumetric fraction of the organic phase, the apparent viscosity of the aqueous phase, the rotational speed of the impeller and the aeration flow rate. This study shows that olive oil can be used as an oxygen-vector for viscous media (apparent viscosity higher than 60 cP), for all studied conditions.

Key words: olive oil, oxygen mass transfer, oxygen-vector, stirred bioreactor, wastewater treatment

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