UTILIZATION OF BIODIESEL INDUSTRY EFFLUENT FOR XANTHAN PRODUCTION IN LAB-SCALE BIOREACTOR

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ABSTRACT

Xanthan represents microbial polysaccharide with excellent rheological properties, non-toxic nature, biodegradability, and biocompatibility. This biopolymer is widely used in food, biomedical, pharmaceutical, petrochemical, chemical and textile industry. Xanthan production process is generally conducted by aerobic submerged cultivation of *Xanthomonas campestris* strains on the media with glucose or sucrose under optimal conditions. Previous research has confirmed that xanthan also can be successfully biosynthesized on media containing crude glycerol from biodiesel industry by different *Xanthomonas* species, exhibiting promising photocatalytic activity and emulsifying properties. The aim of this study was to examine the course of xanthan biosynthesis by the reference strain *X. campestris* ATCC 13951 in laboratory-scale bioreactor on medium containing crude glycerol from biodiesel production. The bioprocess was monitored by the analysis of cultivation medium samples in predetermined time intervals, and its success was estimated based on the xanthan concentration in the medium, separated biopolymer average molecular weight and degree of nutrients conversion. At the end of bioprocess, cultivation medium contained 12.34 g/L of xanthan with the average molecular weight of $3.04 \cdot 10^5$ g/mol. Within this study, the achieved degree of glycerol, total nitrogen and total phosphorous conversion were 69.40%, 53.27% and 38.96%, respectively.

Keywords: xanthan, laboratory bioreactor, biodiesel industry effluent, crude glycerol

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