

Comparing the production of levan by *Zymomonas mobilis* grown on produced water from oil industry in batch and bioreactor experimental conditions

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The aim of this research is to test the use of produced water (PW) from the oil industry as the base medium for the production of levan by *Zymomonas mobilis*. The PW is generated during the extraction of oil from the rock formation and it can produce a significant environmental impact during disposal. However, this fluid still contain significant amounts of mineral nutrients and organics that can be utilized by specific microorganisms that will produce bioactives of industrial relevance. Levan is an exopolysaccharide (EPS) that can be used for sustaining emulsions and increase fluid viscosity. These properties are important for several industrial activities. Levan *Z mobilis* production was tested using 50% AP (diluted in water) and 100% AP with and without nutrient supplementation in (i) batch culture (1 L) and, latter, (ii) in bioreactors (3.5 L), separately. The batch experiments with 100% PW with nutrient supplementation resulted in the production of 15.4 g/L levan. The similar experiment using the bioreactor generated 10 g/L. The operating variables in the bioreactor included 300 rpm agitation and atm air injected in the system. These may have caused a higher stress condition than the batch culture operated with 120 orbital rpm without air injection. Nonetheless, the tests shown that *Z mobilis* can produce levan at significant amounts using PW from the oil industry. The following up experiments will test inoculum preadaptation and sterilization methods in order to guarantee quality of the product. The produced levan was compared with a standard commercial product and it shows significant chemical and physical similarities. Further experiments will be performed in order to purify the produced levan from salts and organics which were detected in the final product.