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CHARACTERIZATION OF SULFATE REDUCING BACTERIA IN YEAST INDUSTRY WASTE BY MICROCALORIMETRY AND PCR AMPLIFICATION

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Sulfate-reducing bacteria (SRB) were isolated from anaerobic sludge of yeast factory wastewater treatment plant by cultivation on Postgate C medium. Microcalorimetry was used to monitor the anaerobic digestion processes and to measure the growth rates of sulfate reducing bacteria. The maximum growth rates determined by microcalorimetry and ATP analysis were different - \( \mu_{\text{max}}(\text{DO}20)=0.165 \pm 0.008 \text{ h}^{-1} \) and \( \mu_{\text{max}}(\text{N}_{\text{2}})=0.207 \pm 0.013 \text{ h}^{-1} \) [1]. Experiments on the cultivation of SRB from yeast industry waste-water treatment plant in batch culture showed that during the first 20 h the concentration of sulfate decreased from 78.3 mM down to 62.2 mM while the increase of sulfide production was negligible. Perceptible amount of sulfide (7.82 mM) appeared on the 33.5 h of fermentation together with a peak on the power-time curve and a considerable increase in the cell count (1.2x - 10^9). First steps of sulfate metabolism (activation of sulfate by ATP sulfurylase, production of H2) are accompanied by endothermic heat effects, therefore the values of thermal power remain moderate until the evolution of sulfide starts. The influence of green microalgae, Chlorococccum sp Bioreact 100 on the growth characteristics of microorganisms, isolated from anaerobic sludge was also studied.

One SRB strain was identified by sequencing of PCR-amplified 16S rRNA gene. Two sets of primers were used for PCR amplification, both specific for domain Bacteria but giving different gene fragments. PCR-products were purified with JetQuick kit according to the manufacturer instructions. Analysis of DNA sequences and homology search were completed with the BLAST server using the BLAST algorithm for the comparison of a nucleotide query sequence against a nucleotide sequence database (blastn).