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WE 4413 CONTINUOUS FERMENTATION OF GLYCEROL: A COMPARATIVE STUDY OF TWO STRAINS OF CLOSTRIDIUM ACETOBUTYLICUM

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***Clostridium acetobutylicum*; glycerol; solvents; continuous culture**

The expected development of the non-alimentary use of agricultural crops for ethanol or bio-diesel production, which yields glycerol as a by-product, has justified the recent interest on this compound as a raw material for biotechnological processes. Glycerol may be an attractive substrate for the acetone-butanol-ethanol fermentation by *Clostridium acetobutylicum*. The high reduction state of glycerol generates an excess of reducing equivalents which must be oxidised. This can be accomplished via the NAD(P)H consuming pathways that lead to the most reduced end products like butanol and ethanol. The fermentation of a glucose and glycerol mixture by *C. acetobutylicum* ATCC 824, on a phosphate limited chemostat, at neutral pH, produces mainly butanol and ethanol (1). However lactic acid is also produced, since this is a direct way of regenerating NAD⁺. In this work *C. acetobutylicum* ATCC 4259, a strain described as a non lactic acid producer (2), was used to ferment glucose and glycerol mixtures in non phosphate limited chemostat. The influence of glucose concentration, in the feed medium, and working pH on the fermentation profiles of *C. acetobutylicum* ATCC 824 and ATCC 4259 was studied. For both strains, increasing glucose concentration in the feed medium improved butanol production and glycerol consumption. The highest butanol production for both strains was observed at pH 6.0. Lactic acid production was observed for strain 4259 at a working pH lower than 6.0, but the concentrations obtained were always 4 times lower than those produced by strain 824.

1) Vasconcelos, I., Girbal, L., Soucaille, P. (1994) *J. Bacteriol.* 176: 1443-50

2) Kim, B. H.; Bellows, P.; Datta, R. and Zeikus, J. G. (1984) *Appl. Environm. Microbiol.* 48:764-70.