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STABILITY OF HIGH SOLVENT PRODUCING CONTINUOUS CULTURES OF *CLOSTRIDIUM ACETOBUTYLICUM* ON MIXTURES OF GLUCOSE AND GLYCEROL.

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To maximise the synthesis of solvents in anaerobic fermentations it is essential to control the carbon and reducing energy flow patterns. This can be achievied by a suitable choice of feedstock mixtures. Using mixtures of different proportions of glucose and a more reduced chemical, like glycerol, it is possible to manipulate the overall degree of reduction of the carbon source and, therefore, to change quantitatively the metabolic flow of available reduced nucleotides.
Co-fermentation of glucose and glycerol in continuous cultures of *Clostridium acetobutylicum* ATCC 824, on a phosphate-limited synthetic medium, with a dilution rate of 0.05 h^{-1} and maintained at pH 6.5, results in the synthesis of butanol and ethanol as the major fermentation products. Phosphate limitation seems to be essential to avoid strain degenerescence and to maintain solvent production stability, although it slows down the organism metabolism. Optimal solvents yields are obtained when the molar ratio glycerol/ glucose in the feed medium is 1.96. In these conditons cultures are glucose limited but not carbon limited.
To increase glycerol degradation higher amounts of glucose must be co-metabolized, which allows the synthesis of reduced products, consuming the excess of NADH formed in glycerol degradation.
Experiments were performed in the same operating conditions, but without phosphate limitation (phosphate concentration higher than 0.74 mM) and with molar ratios glycerol/ glucose lower than 1.96. Results showed that culture stability and solvent production could be maintained in these cultures. Higher glycerol consumption leads to higher butanol production, although some of the reducing energy is lost in the production of lactic and butyric acids. Conditions which allow to minimise such lost were investigated.