

VERY HIGH GRAVITY SUCROSE FERMENTATION BY FUEL-ETHANOL PRODUCING INDUSTRIAL STRAINS: EFFECT OF NITROGEN SUPPLEMENTATION

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The fuel ethanol industry in Brazil has some technological problems that affect its production on a large scale, among those are contamination by undesirable microorganisms, and wine with low ethanol concentration. In this study three industrial strains were inoculated into a based sugar cane juice containing 22% sucrose, 30% and 35% (w/v) and supplemented with nitrogen sources with differing structural complexity, varying from the single ammonium salt (ammonium sulfate) to free amino acids (casamino acids) and peptides (peptone), under aerobic and anaerobic conditions. At 30°C, in shaken cultures, it was found that the efficient sucrose utilization occurred only in media supplemented with a nitrogen source. In general supplementation with peptone was the one that led to more efficient fermentation compared with ammonium sulfate, with higher biomass accumulation and maintenance of cell viability. Studies have shown that in conditions with inoculation of low cell density, nitrogen supplementation was required for almost complete sucrose utilization. In the fermentation of sucrose 35% (w/v), it was achieved a level of 14-15% (v/v) ethanol in nitrogen supplemented cultures, suggesting the possibility of producing wines with higher amounts of ethanol in working conditions approaching the limit of yeast alcohol tolerance. The results shown in this work have industrial relevance since indicate that efficient sugar conversion, with high levels of ethanol production can be obtained from very high gravity sucrose fermentation, depending on finding ideal nutritional and fermentation conditions.

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