

Ammonium Phosphate as a Sole Nutritional Supplement for the Fermentative Production of 2,3-Butanediol from Sugar Cane Juice

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Klebsiella pneumoniae, 2,3-Butanediol, Production Medium

The production of 2,3-butanediol by *Klebsiella pneumoniae* from sugar cane juice supplemented with different salts was studied. This microorganism is able to degrade sucrose present in sugar cane juice containing ammonium phosphate as the sole nutritional supplement. With a sugar cane juice-based medium containing ~180 g sucrose / l and 8.0 g (NH₄)₂HPO₄ / l, over 70 g 2,3-butanediol plus acetoin / l were formed. This result is comparable to that achieved with a sugar cane juice-based medium containing several nutrients, although the kinetic profiles of these runs presented significant differences. With the ammonium phosphate-enriched medium, cell growth was initially favoured by both the strong oxygen supply and the higher water activity due to the lower concentration of nutrients. After 14 h, the limitation in some nutrients led to the interruption of cell growth, and decreasing rates for product formation and substrate consumption were observed. During the stationary phase of this run, sucrose was preferentially converted to product, and the substrate was completely depleted after 35 h of the process. With the complete medium, the substrate was totally consumed after 36 h of run. In this case, the higher initial concentration of nutrients reduced the overall process rate but sustained the cell growth for 27 h. Conversion yields of 0.40 g product / g sucrose and productivities close to 2.0 g / l·h were obtained under both conditions.