

## USE OF CALCIUM CARBONATE IN BATCHWISE PROCESS FOR LACTIC ACID PRODUCTION BY *LACTOBACILLUS DELBRUECKII*

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The influence of pH on lactic acid production and glucose consumption by *Lactobacillus delbrueckii* and on its growth was studied with two different glucose concentrations in shake-flasks at 42°C and 120 rpm. Continuous control of pH led to increased yields (70%) and rates of lactic acid production (2 gl<sup>-1</sup> h<sup>-1</sup>). However when pH of the medium (containing 50gl<sup>-1</sup> glucose) was not maintained, glucose consumption decreased to 58% and lactic acid production was 40% of the theoretical yield. Both glucose consumption and lactic acid production were increased by 30% and 24% respectively, when the pH was manually adjusted to 6.5 two hourly using 4N NaOH under these conditions OD, a measure of growth increased from 3.1 to 8.2. The maintenance of pH is vital for growth of *Lactobacillus delbrueckii* and for fermentation of lactic acid. When CaCO<sub>3</sub> was used as neutralizing agent, further increase in glucose consumption and lactic acid production by 16% and 8% respectively was observed. But at 150 gl<sup>-1</sup> glucose concentration the manual addition of 4N NaOH two hourly was not effective. The glucose consumption dropped from 84% (50 gl<sup>-1</sup> glucose) to 50% (150 gl<sup>-1</sup> glucose) and the growth of *Lactobacillus delbrueckii* decreased from 8.2 to 4.6 (OD). Higher initial glucose concentration increased the lag phase and decreased the growth rate. Although the cell growth and theoretical yield of lactic acid decreased at 150 gl<sup>-1</sup>, the amount of lactic acid production increased. Addition of CaCO<sub>3</sub> intermittently throughout the experiment gave better yields of lactic acid (90 gl<sup>-1</sup>) rather than adding all at once at the beginning of the experiment (83 gl<sup>-1</sup>). These results indicate that lactic acid could be produced efficiently in batchwise process by adding CaCO<sub>3</sub> without continuous pH adjustment.