LARGE SCALE FERMENTATION OF PALMYRAH MOLASSES BY A NOVEL PROCESS

Balakumar, S., Vasanthy Arasaratnam and Balasubramaniam, K.
Department of Biochemistry, Faculty of Medicine, University of Jaffna.

High gravity molasses (60 Brix) was diluted to 20 Brix with tap water and supplemented with 10.0 g l-1 $(NH_4)_2SO_4$ (Control). In another set up, molasses (60 Brix) was made to 20 Brix with tap water and spent wash (effluent from the distillation column) in 1: 1 ratio and $(NH_4)_2SO_4$ was not added (Test). The spent wash has 1.1g l^{-1} reducing sugar and 0.76 g l^{-1} total amino acids with pH 3.5. Inoculum development was carried out by adding toddy sediment from 5 bottles of toddy (24h old) to 10 l molasses (10 Brix) and stirred continuously. After 18h this was transferred to 100 l fresh medium and stirred and finally 1000 l inoculum was developed. The test and control media in 5000 l fermentation wort were separately inoculated with the inoculum (10%, v/v). Mixing was facilitated by recirculating via pumps. The initial cell density was 2 x 10^7 cells ml^{-1}. After 24 h fermentation 40 g l^{-1} alcohol was produced. At 36 h the fermentation rate started to decrease rapidly and the temperature of the wort was 42°C. At this stage the wort was examined for yeast viability and only 10% viable cells were found. The viable yeast cells were selected. The above wort was left as such for observation and the fermentation has restarted after 48 h. After 72 h (from the commencement of the experiment) 70 g l^{-1} alcohol was produced. The efficiency of alcohol yield was 70%. In another large scale fermentation trial the selected yeast strains were used as inoculum. The molasses (60 Brix) was diluted with spent wash and tap water in 1:1 ratio to 20 Brix . In this trial steady rate of fermentation was observed and at 65h 80 g l^{-1} alcohol was produced with 80% efficiency. At this juncture the need for a thermotolerent yeast strain was realized and attempts were made to isolate a thermoltolerent yeast strain.