

FERMENTATION CHARACTERISTICS OF A THERMOTOLERANT YEAST STRAIN

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Finding the optimal conditions for the ethanol fermentation is important to improve the ethanol production efficiency. This report presents the effects of pH, temperature, agitation, inoculum size and the method of inoculum development on ethanol fermentation of a thermotolerant yeast strain. The yeast cells were grown in sterile PYN medium, which consisted of (g l^{-1}) peptone, 3.5; yeast extract, 3.0; KH_2PO_4 , 2.0; $(\text{NH}_4)_2\text{SO}_4$, 1.0 and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, 1.0 with glucose 100. The fermentation at 36 and 40°C showed complete utilization of glucose and produced 40g l^{-1} alcohol at 24h. Optimum temperature for growth was 36°C, however 98% viability (number of viable cells /total cells x 100) was observed at 36 and 40°C. At 45 and 50°C, alcohol, residual sugar and viability were 20 & 10g l^{-1} , 50 & 70g l^{-1} and 85 & 60% respectively. The fermentation profiles with different pH value revealed that pH 4.5 and 5.0 were most suitable for growth and fermentation. The inoculum size of 10^7 cells ml^{-1} showed 6.8% increase in alcohol production than 10^8 cells ml^{-1} . However the alcohol production rates were 1.46 and $1.83\text{ g.h}^{-1}\text{ l}^{-1}$ with 10^7 and 10^8 cells ml^{-1} respectively. The ethanol produced with 10^4 , 10^5 and 10^6 cells ml^{-1} were 48, 47.5 and 47.3g l^{-1} at 48h fermentation respectively. The method of inoculum preparation suggested that, if the inoculum is prepared in the same type of the medium, the fermentation proceeds rapidly. Agitation of the medium has improved the rate of ethanol production and viability of cells.