Enhanced 1,3-Propandiol production form Glycerol by Klebsiella pneumonia DSM 4799 using Response Surface Methodology

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Optimization of medium compositions for high production of 1,3-propandiol(1,3-PD) by *Klebsiella pneumonia* DSM 4799 was attempted by using Response Surface Methodology (RSM). Plackett-Burman experimental design with eight variables (glycerol, $(NH_4)_2SO_4$, Corn steep powder, $CoCl_2 \cdot 6H_2O$, K_2HPO_4, $MnSO_4 \cdot H_2O$, $MgSO_4 \cdot 7H_2O$, $FeSO_4 \cdot 7H_2O$) was applied to identify variables affecting 1,3-PD production. Among them, glycerol, corn steep powder, and $CoCl_2 \cdot 6H_2O$ were selected as the most significant factors influencing 1,3-PD production by *K. pneumonia* DSM 4799. Subsequently, the optimum combination of the selected factors was investigated by the Box-Behnken experimental design. Results showed that the maximum 1,3-PD production of 15.98 g/L was predicted. The composition of optimal medium for 1,3-PD production by *K. pneumonia* DSM 4799 was determined to be 40.6 g/L of Glycerol, 3.8 g/L of Corn steep powder, 0.02 g/L of $CoCl_2 \cdot 6H_2O$, 2 g/L of $(NH_4)_2SO_4$, 5 g/L of K_2HPO_4, 0.1 g/L of $MgSO_4 \cdot 7H_2O$, 0.01 g/L of $MnSO_4 \cdot H_2O$ and 0.01 g/L of $FeSO_4 \cdot 7H_2O$. The predicted 1,3-PD production by RSM was verified by experiment using the optimal medium.