

Kledkkaew Rattanaphanyapan 2014: Cultivation and Lipid Production of *Arthrobacter* AK19 by Means of Design of Experiments Under Stress Condition. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Mr. Maythee Saisriyoot, Dr.techn. 128 pages.

Cultivation of *Arthrobacter* AK19 for biomass and lipid production was investigated in term of suitable amount of carbon source (pure glycerol 97 %wt.) with supplementary nutrient (KNO_3 , KH_2PO_4 : K_2HPO_4 , CaCl_2 , NaCl , MgSO_4 , H_3BO_3 , MnCl_2 , $\text{FeSO}_4 \cdot \text{Na}_2\text{MoO}_4$, CoSO_4 , ZnSO_4 and CuSO_4). Results showed that maximum biomass yield (2.0 g/l) was from 54 g/l of pure glycerol with unoptimized nutrients. The Box-Behnken experimental design was used for the optimization of supplementary nutrients. The optimum condition was found to be (g/l) 2.0901 KNO_3 , 68.6 KH_2PO_4 : K_2HPO_4 , 1.32 CaCl_2 , 1.1791 NaCl , 0.0057 MgSO_4 , 0.4136 CoSO_4 : ZnSO_4 , 0.02 MnCl_2 , 0.00029 FeSO_4 , 0.00025 Na_2MoO_4 , 0.00001 H_3BO_3 and 0.000009 CuSO_4 . Furthermore, Sodium chloride and Potassium permanganate were employed as stress agent. The result showed the maximum biomass and lipid yield were 10.11 g/l and 0.69 g lipid/g biomass by using 1.5 g/l of sodium chloride, 10.36 g/l and 0.57 g lipid/g biomass by using 3.2 mg/l of potassium permanganate, respectively.

Student's signature

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