عنوان مقاله:

Central Composite Face-Entered Design (CCFD) for the Biodegradation of phenanthrene by Mixed Culture Consortia in Batch Bioreactor

محل انتشار:

هفتمین کنگره بین المللی مهندسی عمران (سال: 1385)

تعداد صفحات اصل مقاله: 9

نویسندگان:

G.D.Najafpour - *Department of Chemical Engineering , University of Mazandaran, Babol, Iran*

W.S.Long - *School of Chemical Engineering, University Sains Malaysia, Engineering Campus, ۱۴۳۰۰ Nibong Tebal, Seberang Perai Selectan, Penang, Malaysia*

A.H.Kamaruddin - *School of Chemical Engineering, University Sains Malaysia, Engineering Campus, ۱۴۳۰۰ Nibong Tebal, Seberang Perai Selectan, Penang, Malaysia*

H.S.Nasrollahzadeh - *School of Chemical Engineering, University Sains Malaysia, Engineering Campus, ۱۴۳۰۰ Nibong Tebal, Seberang Perai Selectan, Penang, Malaysia*

خلاصه مقاله:

Biodegradation of Phenethrene (PHE) was studied in aqueous phase to demonstrate the potential of the mixed culture in degradation of high concentration of PHE. The experiments were conducted to monitor biodegradation of phenanthrene for duration of 6 days. Biodegradation of PHE was successfully achieved in low and middle concentration using specific isolated mixed culture. The PHE biodegradation was carried out in batch bioreactor with response surface methodology (RSM) based on central composite face entered design (CCFD) . Associate full factorial Central Composite Design of experiments was used to construct response surface with the removal of PHE degradation and the specific growth rate responses. The initial phenanthrene concentration (X1) and the reaction time (X2) were used as design factors. The experimental results were shown that experimental data fitted with the proposed polynomial model. Analysis of variance showed a high coefficient of determination value in the range of 0.936-0.999 . The maximum biodegradation of PHE in terms of the removal of PHE (Y1) was found to be 0.98 mg/mg (degraded PHE/initial PHE) . The maximum extent of biodegradation relative to initial PHE concentration and biomass (Y2) was 0.08 mg/mg/mg (degraded PHE/initial PHE/biomass) . This maximum biodegradation correspond to the factors combination of middle level of PHE content (X1=43.01mg/L) and the highest level of reaction time (X2=103.53 hours) The optimum specific growth rate (Y3) was found be 0.0081 h-1.A98% removal efficiency of PHE biodegradation was achieved . Polynomial model was found useful to predict PHE degradation under the .experimental studied. It was observed that optimum biodegradation of PHE can be successful predicted by RSM

کلمات کلیدی:

Biodegradation , phenanthrene , mixed culture , response surface methodology ; central composite design

لینک ثابت مقاله در پایگاه سیویلیکا: