Rekayasa komposit fotokatalis dan biofilm untuk degradasi fenol pada limbah industri batik = Photocatalyst and biofilm composite design for phenol degradation in batik waste

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Abstrak

[ABSTRAK
Komposit batu apung-TiO2 dan komposit batu apung-biofilm digunakan untuk mengeliminasi fenol dalam fotobioreaktor. Komposit dikarakterisasi dengan FTIR dan SEM. Hasil karakterisasi menunjukkan bahwa komposit batu apung-biofilm terbentuk dengan baik menggunakan metode aerasi sedangkan komposit batu apung-TiO2 dapat disintesis dengan metode dip coating. Berdasarkan hasil uji, diperoleh kesimpulan bahwa biofilm yang dibentuk dari konsorsium bakteri memiliki kinerja degradasi yang lebih baik dibandingkan dengan Acinetobacter sp., tetapi tidak lebih baik bila dibandingkan dengan fotodegradasi dan biodegradasi tunggal. Treatment pencucian dan penjemuran sinar matahari merupakan teknik regenerasi yang sesuai untuk mengaktifkan kembali komposit batu apung ?TiO2 yang telah digunakan sedangkan penambahan nutrisi dan inkubasi kembali selama 24 jam tidak meningkatkan kinerja degradasi komposit ? biofilm.
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ABSTRACT
Pumice-TiO2 composite and pumice-biofilm composite were used for phenol removal in photobioreactor. The composites were characterized by FTIR and SEM. It shown that the best method to synthesize pumice-biofilm composite is aeration while pumice-TiO2 composite could be synthesized by dip coating. Based of phenol removal experiments result, biofilm from bacteria consortium could remove phenol better than Acinetobacter sp., but worse than single photodegradation or single biodegradation. Washing and drying treatment by using sunlight was an appropriate regeneration technique for pumice-TiO2 composite reactivation whereas nutrition enhancing and reincubating for 24 hours could not improve the degradation performance of pumice-biofilm composite., Pumice-TiO2 composite and pumice-biofilm composite were used for phenol removal in photobioreactor. The composites were characterized by FTIR and SEM. It shown that the best method to synthesize pumice-biofilm composite is aeration while pumice-TiO2 composite could be synthesized by dip coating. Based of phenol removal experiments result, biofilm from bacteria consortium could remove phenol better than Acinetobacter sp., but worse than single photodegradation or single biodegradation. Washing and drying treatment by using sunlight was an appropriate regeneration technique for pumice-TiO2 composite reactivation whereas nutrition enhancing and reincubating for 24 hours could not improve the degradation performance of pumice-biofilm composite.]