TREATMENT OF SOYBEAN WASTEWATER BY USING AN AEROBIC UPFLOW REACTOR

SURAYA BINTI ZULLKIFLEE

UNIVERSITI TEKNOLOGI MALAYSIA
ABSTRACT

Soybean wastewater which comes from food industry contains a high strength of wastewater. The medium content of organic matter in the soybean wastewater is well suited for biological treatment especially an aerobic treatment. A study was carried out to investigate the effectiveness and performance of an aerobic upflow reactor in treating soybean wastewater and to study the characteristics of soybean wastewater before and after treatment. The wastewater content is analysed in terms of chemical oxygen demand (COD), biological oxygen demand (BOD₅), pH, turbidity, total suspended solid (TSS), salinity and colour. A laboratory scale of an aerobic upflow reactor was fed with a soybean wastewater. The soybean wastewater which has a 1318 chemical oxygen demand (COD) influent was fed into an aerobic upflow reactor. After the treatment, the COD value has reduced to 314 mg/litre. The percentage of COD, BOD and TSS removal is 76.18%, 76.63% and 94% respectively. The reactor was operated with a great stability once it had developed a matured microorganism population. It was necessary to add phosphate buffer solution with pH equal to 7 to maintain the buffer capacity of the system. A P5 medium with bacteria cultured was also added to decolourise the colour of soybean wastewater. After the treatment, the colour has changed and decolourised. The soybean wastewater which is in acidic condition with pH equal to 2.50 has achieved a neutral condition with pH equal to 7 after the treatment.
ABSTRAK

Air sisa kacang soya yang berasal dari industri makanan mengandungi kekuatan air sisa yang tinggi. Kandungan organik yang sederhana dari air sisa kacang soya adalah amat sesuai untuk rawatan biologi terutamanya untuk rawatan aerobik. Satu kajian telah dijalankan untuk menyiasat keberkesanan dan prestasi reaktor aerobik yang beraliran ke atas dalam merawat air sisa kacang soya dan mengkaji ciri-ciri air sisa kacang soya sebelum dan selepas rawatan. Kandungan air sisa yang telah dijalankan dianalisis dari segi COD, BOD$_5$, pH, kekeruhan, jumlah pepejal terampai, kemasinan dan warna. Dalam skala makmal, reaktor aerobik dimasukkan dengan air sisa kacang soya. Air sisa kacang soya yang telah dimasukkan mengandungi nilai COD sebanyak 1318 mg/L. Selepas rawatan, nilai COD telah berkurang kepada 314 mg/L. Peratusan penyingkiran nilai COD, BOD$_5$ dan jumlah pepejal terampai adalah 76.18%, 76.63% dan 94%. Reaktor yang dikendalikan telah beroperasi dengan kestabilan yang sangat baik setelah membentuk populasi mikroorganisma yang matang. Cecair fosfat dengan pH 7 perlu ditambah untuk memastikan sistem tersebut mempunyai sistem pemampan yang baik. Media P5 dengan bakteria yang telah membesar juga ditambah berfungsi untuk menurunkan warna sisa air kacang soya. Selepas rawatan, warna sisa air kacang soya telah berubah. Air sisa kacang saya yang mempunyai pH bersamaan dengan 2.50 iaitu berasid telah mencapai pH neutral iaitu 7.0 selepas rawatan.
REFERENCES


Christopher A. McSorley, Donald R. Wagnitz, Shuici Sasaki and Betty Olson. (2004). Improvement in Treatment Efficiency of a Soybean Fermentation Wastewater Treatment Plant by the Addition of a Enzyme-Surfactant Mixture.

Fang Dong, Quan-Bao Zhao, Jin-Bao Zhao, Guo-Ping Sheng, Yong Tang, Zhong-Hua Tong, Han-Qing Yu, Yu-You Li and Hideki Harada. (2009). Monitoring the Restart-Up of an Upflow Anaerobic Sludge Blanket (UASB) Reactor for the Treatment of a Soybean Processing Wastewater. *Journal from Science Direct*.


