

## Abstract

An integrated treatment and valorization of Palm Oil Mill Effluent (POME) by *Aspergillus terreus* IMI 282743 immobilized on Luffa sponge was investigated. Effects of POME concentrations and nitrogen supplementation on Chemical Oxygen Demand (COD) reduction, microbial lipase and biomass production were evaluated in batch cultures. A 50% POME promoted the highest lipolytic activities in both immobilized and free cell cultures. In the former, the maximum lipase activity was 5.14 U mL<sup>-1</sup> but in the non-immobilized batch, it was only 2.10 U mL<sup>-1</sup>. Lipase activities were low in the 25 and 100% POME due to overdilution and presence of inhibitory compounds, respectively. The pH was unchanged in the 100% POME but in other cultures, there were significant increase in the pH values. The pH of the 75% POME increased after a 48 h lag but in the 25 and 50% POME, the pH rose from 4-6.43 within a period of 96 h. COD did not change in the 100% POME but in the 75% POME, a 60.7% reduction was achieved. The COD of both the 50 and 25% POME decreased by 45% respectively. The immobilized biomass concentration was highest in the 75% POME (0.83 g L<sup>-1</sup>) but in the 25 and 100% POME, it was 0.27 and 0.63 g L<sup>-1</sup>, respectively. Supplementation of the 50% POME with a mixture of ammonium sulphate and yeast extract increased lipase production to 10.6 U mL<sup>-1</sup>, biomass concentration to 3.7 g L<sup>-1</sup> while the COD decreased by 80%. Lipase production from POME could be economically competitive to present industrial processes and provides additional incentive of treatment that is cheap and sustainable.

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