

Production of acylglycerol catalysed by rice bran lipase in a packed bed reactor

ABSTRACT

A 20 litre packed bed reactor (PBR) with heating and water removal system was designed and fabricated for the esterification of palm oil fatty acid distillate (PFAD) catalyzed by immobilized rice bran lipase (RBL). The PBR was designed based on the characteristics of immobilised RBL and the optimized esterification conditions obtained from method scouting performed in shaken flask. The optimal ratios of immobilised RBL and water removal agent (silica gel) to PFAD for the shaken flask esterification process were 5:1 and 1:2, respectively. The intensified esterification reaction of PBR was operated by circulating the reaction mixture (PFAD and glycerol) in hexane through a packed bed column filled with immobilised RBL. The water generated from esterification reaction was absorbed by silica gel filled in the water removal vessel. The maximum degree of esterification achieved in this developed PBR was 61%. The reaction time required to achieve the maximum degree of esterification was 25% faster than that in the shaken flask.

Keyword: Acylglycerol; Esterification; Packed bed reactor; PFAD; Rice bran lipase