

## Whole-cell of thermophilic filamentous fungi as biocatalysts for biodiesel fuel production

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Biodiesel is a fatty acid alkyl esters (FAAE) obtained by transesterification reaction of triglycerides. This conversion can be done by chemical, physical or enzymatic path. The Biodiesel production by enzymatic catalysis has long been known as a promising eco-friendly alternative. This work aimed the selection of thermophilic fungi able to produce lipase for transesterification on solid state fermentation (SSF). It was used a mixture 10g of sugar cane bagasse, 2.5 g of soya oil and 25 mL of mineral nutrient solution as a culture medium. Among 34 strains tested *Rhizomucor pusillus*, *Myceliophora* sp M7.7 and *Thermomucor indicae-seudaticae* N31, produced high lipase activity (from 2 to 6 U g<sup>-1</sup>) with esterification ability. These fungi were cultivated on fragments of vegetal sponge (*Luffa cylindrica*), as a carrier material for fungal mycelium immobilization, in submerged fermentation using meat peptone, soya oil and mineral nutrients mixture as culture medium. After myceliation these fragments were used for determination of lipase hydrolytic and esterification activities. It was obtained 365, 303 and 108 U g<sup>-1</sup> for hydrolytic, and 26, 29 and 14 U g<sup>-1</sup> for esterification activities for *R. pusillus*, *Myceliophora* sp M7.7 and *T. indicae-seudaticae* N31, respectively. Yields in esterification using oleic acid were 80, 70 and 50% respectively. Also, *R. pusillus* and *T. indicae-seudaticae* were able to produce biodiesel from soy oil with yield of 40 and 10%, respectively. It was concluded that hyphae immobilization might be a promissory approach for biodiesel production by enzyme catalysis.

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