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Bio-affinity mediated immobilization of lipase onto magnetic cellulose nanospheres for high yield biodiesel in one time addition of methanol

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A B S T R A C T

To synthesis biodiesel from palm oil in one-time addition of methanol and solvent-free medium using CBD fused with C-terminal of lipase from *G.stearothermophilus* (*GSlip*-CBD) was immobilized onto magnetic cellulose nanosphere (MCNS). The immobilized matrix traits were preconceived by FT-IR, TEM and XRD. Perceptible biodiesel yield 98 and 73% was synthesized by *GSlip*-CBD-MCNS in 4 h and *GSlip*-MCNS in 6 h under the optimized conditions of oil: methanol ratio (1:3.5), temperature (55 and 50°C) and enzyme loading (15 U). Intriguingly, the operational stability of *GSlip*-CBD-MCNS was an easily attainable owing to the magnetic properties and could be reused upto 8th and 19th cycles with 94 and 45% of biodiesel yield respectively, compared to *GSlip*-MCNS. Thus *GSlip*-CBD-MCNS could be a potential biocatalyst for higher yield of biodiesel and reusability in one step addition of methanol.

Keywords: *GSlip*-CBD Magnetic cellulose nanosphere Bio-affinity Transesterification Biodiesel

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