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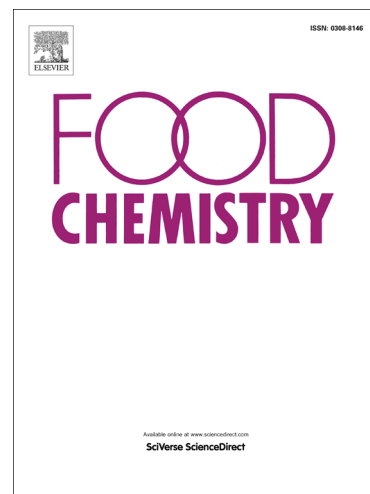
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# Synthesis and characterization of lactose fatty acid ester biosurfactants using free and immobilized lipases in organic solvents

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## ABSTRACT

In this work, lactose fatty acid esters were enzymatically synthesized from fatty acids and lactose using *Candida antarctica* B lipase (CALB) in organic solvents. Products were purified using a solvent extraction method and analyzed using ATR-FTIR and surface-active properties measurements. Results showed that hexanes and acetonitrile provide the highest conversions for both free and immobilized lipases, up to 77% and 93% respectively. The conversion rate of esterification is solvent-dependent for free lipase; the conversion rate of immobilized lipase still shows solvent dependency, but to a lesser degree. Surface tension, interfacial tension, critical micelle concentration (CMC), and contact angles were also measured for all of the samples, showing the potentials of these sugar esters as naturally derived surfactants for the food industry.

*Keywords:* Lactose fatty acid esters, biosurfactant, lipase, CALB, surface active properties.

Chemical compounds studied in this article:

D-lactose monohydrate (PubChem CID: 62223); lauric acid (PubChem CID: 3893); octanoic acid (PubChem CID: 379); palmitic acid (PubChem CID: 985); lactose monolaurate (PubChem CID: 129727653).

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