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Shedding light on lipase stability in natural deep eutectic solvents

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Abstract

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This study presents the potential role of natural deep eutectic solvents (NADESs) in a lipase-catalyzed hydrolysis reaction as both a co-solvent in an aqueous solution and as a main solvent. Ammonium salts such as choline chloride (ChCl) were paired with different hydrogen bond donors such as glycerol and malonic acid and sugars (glucose, fructose and sucrose). The hydrolysis of p-nitrophenyl palmitate by six different lipases: lipase from porcine pancreas (PR), lipase from Candida rugosa (CR), Amano lipase PS, from Burkholderia cepacia (AM), lipase from Rhizopus niveus (RN), lipase acrylic resin from Candida antartica (ARC), lipase B Candida antartica immobilized on Immobead 150, recombinant from Aspergillus oryzae (CALB), were tested in five NADESs. The results showed that NADES3 prepared from ChCl/sucrose was the most promising solvent as it enhanced the activities of both CALB and lipase from porcine pancreas to 355 % and 345 %. The kinetics investigation confirmed the higher catalytic efficiency (k_{cat}/K_m) of lipases in the 40 % of (NADES3) and compared with the aqueous form. The trend achieved by NADES may be a promising approach for applications and further perspectives as genuinely green industrial solvents.

SciVal Topic Prominence

Topic: Eutectics | Choline | Electroplating

Prominence percentile: 99.800

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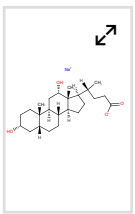
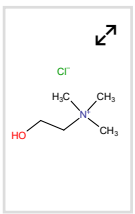
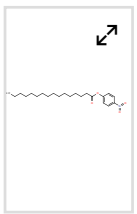
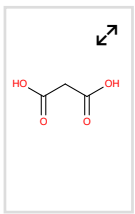
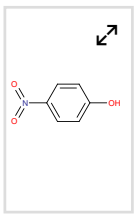

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Author keywords

Biotechnology | Biotransformation | Choline chloride | Ionic liquids | Lipase B Candida Antartica | P-nitrophenyl palmitate

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