J Food Process Technol 2018, Volume 9
DOI: 10.4172/2157-7110-C8-099

Food emulsifiers made through esterification catalysed by immobilised lipases

Nabil Miled
Higher Institute of Biotechnology - University of Sfax, Tunisia

Enzymes are harmless biological biocatalysts increasingly used in order to enhance reaction rates. Immobilization of enzymes allows them to be recycled and used in many catalysis runs. Lipases are enzymes widely spread in the living organisms and were successfully used in the production of flavor esters and emulsifiers used in food industry. Monoacylglycerols are the most widely used emulsifier in food industries. Monoolein was produced by direct esterification of oleic acid with glycerol using immobilized microbial lipase (*Staphylococcus simulans* lipase). The best monoolein yield was achieved with $CaCO_3$ as support in a solvent free system. Response surface methodology based on three-level, three-variable central composite rotatable designs was employed to optimize three reaction variables: the amount of lipase, the initial added water and the oleic acid to glycerol molar ratio. Under optimum conditions, a synthesis yield of 70.6% of monoolein was achieved. A bird pancreatic lipase (from turkey) was immobilized on celite and used to produce fatty acids, diacylglycerols and monoacylglycerols by hydrolysis of palm olein in a solvent free system. A high hydrolysis rate (71.85±1.618%) was achieved by using an experimental design technique to optimize process variables. Fatty acids, mono- and diacylglycerols obtained after hydrolysis were purified and their ability to produce oil-in-water emulsion was tested. The monoacylglycerols exhibited the highest emulsifying activity in a wide pH range. The activity was markedly higher under acidic conditions. The production of bio-emulsifiers using renewable sources (such as oil) and biocatalysers (lipase) makes them promising for the development of new ecologically friendly technologies. The enzymatic activity showed, upon immobilization on celite or $CaCO_3$ a remarkable improvement of the enzyme stability for synthesis or hydrolysis reactions.

nmiled@yahoo.com