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A review on isolation, identification and purification comparison of lipase production using fungal microorganisms

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Lipases (triacylglycerol acylhydrolases EC 3.1.1.3) are a class of hydrolase which catalyze the hydrolysis of triglycerides to glycerol and free fatty acids over an oil-water interface. This review paper provides an overview regarding the main aspects of microbial lipases production, purification and characterization; the most important lipase-producing microbes are studied as well as the main substrates for microbial growth conditions of oil contaminated soils. Current production techniques batch, fed-batch, and continuous fermentation (small scale) methods are discussed in this review. Purification and characterization studies are discussed. Lipase purification, including conventional techniques such as: (i) Ammonium sulphate fractionation; (ii) ion-exchange; (iii) gel filtration and affinity chromatography; as well as novel techniques such as (iv) reverse micellar system; (v) membrane processes; (vi) immunopurification; (vi) aqueous two-phase system; and (vii) aqueous two-phase floatation were discussed. A summary of the purification schemes for various bacterial and fungal lipases are also provided. The review describes various industrial applications of lipase in pulp and paper, food, detergent, and textile industries. Some important lipase-producing fungal genera include *Aspergillus*, *Penicillium*, *Rhizopus*, *Candida*, etc. Current fermentation process techniques such as batch, fed-batch, and continuous mode of lipase production in submerged and solid-state fermentations are discussed in details. The purification of lipase by hydrophobic interaction chromatography is also discussed.

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