



Marine thraustochytrids a potential source for lipase: Challenges in industrial applications

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Marine microorganisms still belong to untapped natural resources and can harness a rich source of lipase enzymes with the potential industrial applications. Thraustochytrids are heterotrophic fungus like protists that can dissolve organic matters via enzymes. It has been less explored so far. Lipase is one of the most widely used enzymes, crucial to many biotechnological and industrial processes, including the food, paper, and oleochemical industries, as well as in applications related to pharmaceuticals. However, its application is relatively expensive and challenging due to its instability and aqueous solubility. Immobilization is a commonly employed strategy to enhance lipase activity, and it has proven to be a successful approach. In comparison to free lipase, immobilized lipase on nanomaterials (NMs) has demonstrated superior properties, including greater pH and temperature stability, a longer stable duration, and the ability to be recycled. However, under specific circumstances, protein loading is comparatively decreased and lipase immobilization on NMs might also occasionally result in activity loss. The overall performance of immobilized lipase is influenced by the NMs types and properties. This review addresses thraustochytrids potential for lipase production, emerging extraction techniques employing nanomaterials, and the significance of various techniques for lipase immobilization. The immobilized lipases' potential for several applications has also been taken into account.

Keywords: Immobilized lipase, Nanomaterials; Extraction; Lipase activity