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Isolation, Molecular Identification and Optimization Studies of Lipase-Producing Bacteria

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ABSTRACT

Microbial lipases are important enzymes in biotransformation due to versatility in applications, ease of mass production, non-dependence on environmental conditions, high activity, stability, molecular modifications and year-round production, thus, preferred over animal or plant sources. This study aimed at lipase biosynthesis from microorganisms, molecular identification and optimisation studies of lipase-producing bacteria. Microorganisms were isolated from beef, avocado, oats, and oil-contaminated soil using spread plate technique. Selected organisms were screened for lipase production using modified tween agar base medium while enzyme activity was analysed using titration method. Molecular identification of producing organism was done using standard methods while the effect of different optimisation parameters was studied on growth and enzyme activity, using spectrophotometry (600nm) and titration methods, respectively. 17 bacterial colonies were selected as lipase producers with clear zones on modified tween agar base medium, ranging from 3 mm to 29 mm in diameter. Enzyme activities ranged between 0.1 U/mL to 0.58 U/mL, with the highest from isolate M17. The amplified nucleotide sequences of M17, classified and identified using the highest percentage similarity with organism of the nearest homology, revealed the organism as Pseudomonas aeruginosa. The identified organism showed optimal growth at 37oC with pH 6, using peptone nitrogen source, Tween 80 surfactant and Mg2+ as best growth stimulator. However, maximum enzyme activity was at 37oC with pH 8, using yeast extract nitrogen source and Mg2+. Corn oil enhanced better lipase activity that other surfactants.

Keywords: Biosynthesis, Lipase, Enzyme Assay, Optimisation, Pseudomonas aeruginosa

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