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Isolation and Cloning of New Lipase Gene for Industrial Applications

The global market for industrial enzymes was estimated ~ $4.2 billion in 2014, and expected to reach nearly 6.2$ billion in 2020. Lipase has been one of the most important industrial enzyme which catalyzes the hydrolysis of lipids, and is used in many biotechnological applications. Lipases have been isolated from many species of plants, animals, and microorganisms (MO). However, microbial enzymes are often more useful than enzymes derived from plants or animals because of their great variety of catalytic activities, their high yields, ease of genetic manipulation, and rapid growth of MO on inexpensive media. Microbial enzymes are also more stable and their production is more convenient and safer. They are used in various industries such as dairy/food, detergents, pharmaceutical, cosmetic and biodiesel industries, synthesis of fine chemicals, and agrochemicals. Moreover, they can be used in environment management. Therefore, the main objective of the present work is to isolate new microbial lipase-producers from oil-contaminated areas under extreme conditions from the Egyptian soil. Isolate showing the highest lipolytic activity on Rhodamine B agar plates was identified as Serratia marcescens using MALDI-TOF with high score (2.1), then molecularly confirmed using 16s rRNA technique. The amplified 16s rRNA gene was sequenced and compared with NCBI 16S ribosomal RNA database which confirmed that the selected isolate belongs to Family Enterobacteriaceae, species Serratia marcescens with 99% identity, and 0.0 E value. Among Serratia species, S. marcescens have the trait to produce extracellular lipase. The lipA gene from the identified S. marcescens will be cloned into the E. coli using pVIK112 expression vector. The expression of the cloned lipA gene and its characterization as well as the enzymatic activity will be further studied.

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