



Isolation of a novel lipase from a metagenomic library derived from mangrove sediment from the south Brazilian coast

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ABSTRACT. A novel gene coding for a LipA-like lipase with 283 amino acids and a molecular mass of 32 kDa was isolated and characterized from a metagenomic library prepared from mangrove sediment from the south Brazilian coast. LipA was 52% identical to a lipolytic enzyme from an uncultured bacterium and shared only low identities ($\leq 31\%$) with lipases/esterases from cultivable microorganisms. Phylogenetic analysis showed that LipA, together with an orthologous protein from an uncultured bacterium, forms a unique branch within family I of true lipases, thereby constituting a new lipase subfamily. Activity determination using crude extracts of *Escherichia coli* bearing the *lipA* gene revealed that this new enzyme has a preference for esters with short-chain fatty acids ($C \leq 10$) and has maximum activity against *p*-nitrophenyl-caprate (chain length C10, 0.87 U/mg protein). The optimum pH of LipA was 8.0, and the enzyme was active over a temperature range of 20 to 35°C, with optimum activity against *p*-nitrophenyl-butyrate at 35°C and pH 8.0.

Key words: Metagenome; Lipase; Mangrove sediment