BIODIVERSITY OF LIPASE PRODUCING BACTERIA FROM PEAT SWAMP FOREST IN CHANTHABURI PROVINCE, THAILAND

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Abstract : Lipase has been introduced for several industrial applications, especially the bleaching process that performed at higher temperature and under acidic conditions. Lipases isolated from different sources have a wide range of properties depending on their sources. Bacteria isolates were collected from peat swamp in Chanthaburi province's forest such as Rambhai Barni forest, Klong Sukree and Khao Ta Khrao and were screened using tributyrin agar at 37 °C. The 109 isolates of lipase-producing bacteria were isolated and 4 of them (KS7.4, KS7.7, TK8.8 and RP5.2) could produce high activity. The comparison of 16S rDNA sequences and phylogenetic tree analysis revealed that the isolate KS7.4, KS7.7, and TK8.8 were similar to Bacillus sp., whereas RP5.2 was similar to Staphylococcus sp. The maximum activities of crude enzyme using p-NP butyrate (C4) as substrate were observed from KS7.4, KS7.7, TK8.8, and RP5.2 whereas RP5.2 showed high activity *p*-NP palmitate (C16). The optimum pH that provided maximum lipase activity was at pH7.0 (50 mM Phosphate buffer) for KS7.4, KS7.7 and TK8.8 and pH9.0 (50 mM Tris-HCl) for RP5.2. The optimum temperature was 60°C for KS7.7, TK8.8 and RP5.2 and 45°C for KS7.4. The lipase activity was activated by addition of 10 mM Na⁺, K⁺ and Ca²⁺ for all crude enzymes from all strains. Ca²⁺ could activate enzyme activity from KS7.7 higher than Na⁺ and K⁺. In contrast, EDTA strongly inhibited enzyme activity in both KS7.4 and RP5.2 whereas Mn^{2+} , Ni^{2+} and Co²⁺ slightly inhibited the activity in all strains. The lipase enzymes from KS7.4, KS7.7 and TK 8.8 showed high specificity to palm oil and olive oil. Furthermore, lipase enzyme from KS7.7 and TK8.8 could use soy bean oil as substrate.

Keywords: Lipase, Peat swamp forest, Microbial enzyme, Bacteria