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低温脂肪酶产生菌筛选与鉴定、产酶条件及酶学性质研究

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Isolation and identification of a cold-adapted lipase producing bacterium, study on fermentation conditions and lipase properties

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全文: PDF (741 KB) HTML (1 KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要 昆明东站一家屠宰厂冷库中筛选到14株产脂肪酶低温菌株.选取1株胞外低温脂肪酶高产菌,进行显微形态及生理生化特征、16S rRNA基因序列分析,将其初步鉴定为*Yersinia enterocolitica*的一株菌,命名为KM1.对该菌发酵产酶条件研究,发现其最佳产酶发酵条件为:培养温度13℃,pH7.2,摇瓶培养时间54h.在最佳产酶发酵条件下酶活由1.8U/mL提高到3.1U/mL,提高了72%.对该菌脂肪酶的酶学性质研究表明:在0℃时仍具有最高酶活的20%,最适反应温度37℃,最适反应pH为9.0.在25℃以下,pH7.2~10范围内均能保持良好的稳定性.该酶在有机溶剂中较稳定,即使在50%的甲醇中仍能保持60%以上的活性,该酶的最适底物为C₈的酯化物,且对C₄~C₁₂的酯化物均有较好的催化能力.

关键词: 低温微生物 低温脂肪酶 鉴定 发酵 酶学性质

Abstract: Fourteen bacterial strains with potential lipase activity were collected from a refrigerators of a meat factory in Kunming, Yunnan Province, China. The strain showing the highest lipase activity was selected for lipase assay and named KM1. Based on morphological characteristics and 16SrRNA gene sequence analysis, KM1 were identified as *Yersinia enterocolitica* KM1. It showed that the optimal fermentation condition were 13 °C, pH7.2, 54 h, and the lipase activity was increased from 1.8 U/mL to 3.1 U/mL. The enzyme was stable at 25 °C, pH7.2-10, and the optimal temperature and pH of the enzyme were 37 °C and 9.0, respectively. The enzyme showed good thermal lability, only 18% of the original activity was remained by incubation at 75 °C for 15 min. The substrate specificities of the lipases toward various p-nitrophenyl were examined. The higher hydrolytic activity was obtained with C₄-C₁₂ p-nitrophenyl esters, with the highest activity toward p-nitrophenyl caprylate (C₈). The lipase exhibited good tolerance to low concentration of organic solvents (acetonitrile, methanol, ethanol and DMSO), it could keep nearly 60% activity even at 50% methanol.

Key words:

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