摘　要

本研究由高雄縣十三坑的溫泉露頭取得之溫泉水/底泥樣品，分離純化出一株嗜熱厭氧澱粉水解菌 strain S2302。Strain S2302 為桿菌，大小約 0.8-1 x 6.0-9.0μm，革蘭氏陰性菌，不具移動性。生長介於 60-80^{o}C 與最佳生長酸鹼度 pH 7.2。strain S2302 可利用的碳源有 mannose、starch、xylose、glucose、maltose、fructose、sorbose、sucrose、pullulan，不可利用 lactose、glycine、mannital、neopeptone、carboxylmethl cellulose、raffinose、arainose、galactoe、rhamnose、cellubiose、glycerol、gelatin、sorbitol、esculin、xylan、cellulose、carbon monoxide 為碳源生長。利用葡萄糖為碳源醱酵時之主要產物為 ethanol、acetic acid、butyric acid。Strain S2302 之生長可被 20μg/ml polymyxin B 與 vancomycin 所抑制，但是無法被 100μg/ml penicillin 與 ampicillin 所抑制。於培養基添加硫代硫酸鈉可增加 strain S2302 的生長速率及生物量。Strain S2302 於不同濃度的可溶性澱粉之比生長速率倒數對不同濃度的可溶性澱粉倒數分析，得到最大比生長速率為 0.345 h^{-1} 與半飽和速率常數為 0.613 g/L。Strain S2302 可水解經由乾燥研磨過的米粉與甘藷粉，但是不能水解經由經由乾燥研磨過的玉米粉。Strain S2302 的最高產率為 0.1618 g 還原糖/g 可溶性澱粉，此時的轉換率為 99%。16S rDNA 分析，strain S2302 與

Caldanaerobacter 屬較為接近。初步測試 strain S2302 的 amylase 酵素比活性為 638.9 U/mg。

關鍵字：嗜熱菌、厭氧菌、澱粉水解菌、澱粉水解?

Abstract

A thermophilic anaerobic starch-hydrolyzing bacterium was isolated from Shihsankeng hot spring at Kaohsiung county. The isolate was a non-spore former and tentatively named strain S2302. Cell of strain S2302 was gram-negative, non-motile rod whose size was from 0.8-1 by 6.0-9.0μm. Growth occurred between 60 and 80°C and the optimum pH was 7.2. Strain S2302 fermented substrates such as mannose, starch, xylose, glucose, maltose, fructose, sorbose, sucrose and pullulan. Lactose, glycine, mannital, neopeptone, carboxylmethl cellulose, raffinose, arainose, galactoe, rhamnose, cellubiose, glycerol, gelatin, sorbitol, esculin, xylan and cellulose were not fermented. The predominant fermentation end products from glucose were ethanol, acetic acid and butyric acid. Growth of strain S2302 was inhibited by 20 μg/ml polymyxin B and vancomycin, not by 100 μg/ml penicillin and ampicillin. Thiosulfate was found to enhance the growth rate and cell yield of strain S2302. Analysis of growth kinetics of strain S2302 showed the μ_{max} was 0.345 h^{-1} and Ks was 0.613 g/L. Analysis of the 16S rDNA sequence revealed that strain S2302 was closely related to the members of genus *Caldanaerobacter*. Strain S2302 could hydrolyze

crude starch of ground rice and sweet potato, but not crude starch of corn. Strain S2302 exhibited a highest reducing sugar production yield of 0.1618 g / g soluble starch and the conversion was 99%. The amylase specific activity of strain S2302 was 638.9 U/mg.

Key words: thermophiles, anaerobes, starch-hydrolyzing, amylolytic enzymes

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