

纖維水解菌株與酒精生產菌株之篩選研究

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摘要

隨著世界石油儲量的快速消耗，近年來，生質乙醇已成為最重要的液態替代性燃料資源，並投入了大量的研究在酒精發酵。可再生纖維素資源能生產乙醇，可以改善能源供應，減少大氣中二氧化碳的累積和空氣污染。因而，本研究主要為利用微生物轉化纖維廢棄物為酒精，其結果分為以下兩個部分：第一部分：為了尋找具有高CMCase來生產還原糖，我們自食品工廠與紙廠活性污泥及昆蟲腸內菌中篩選分離出3株細菌並根據16S rDNA基因序列鑑定。這3株具有高纖維分解能力之菌株經鑑定後分別命名為 *Bacillus subtilis* CELL、*Bacillus* sp. 及 *Arthrobacter woluwensis* Wu1。另外，利用羧甲基纖維素(CMC)做為碳源，研究初始pH、溫度及氮源對羧甲基纖維素分解(CMCase)分解羧甲基纖維素之影響。來自 *Arthrobacter woluwensis* Wu1、*Bacillus subtilis* CELL、*Bacillus* sp. 之羧甲基纖維素分解(CMCase)最高產量分別於37、初始pH 5.0、6.0、7.0，CMC濃度皆為15 g/L，以及1、5、5 g/L之yeasty extract作為有機氮源。第二部分：研究酵母菌株 *Candida tropicalis* Wu1生產酒精之發酵能力。在批次培養中，以葡萄糖為碳源，探討初始攪拌速率及氮源對酒精生產之影響。自 *Candida tropicalis* Wu1之酒精最大產量於30、靜置培養，葡萄糖濃度為20 g/L，以及2.5 g/L之(NH₄)₂SO₄作為氮源。另外，探討固定化 *Candida tropicalis* Wu1細胞顆粒生產酒精。實驗結果顯示，在30以及50 rpm培養條件下，以及含有50 g/L葡萄糖培養基中，固定化 *Candida tropicalis* Wu1有最大酒精生產力0.33 g/L/h。

關鍵詞：纖維素、酒精生產、還原糖、固定化

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