利用篩選之光合細菌去除水中氨氮同時生產類胡蘿蔔素之研究

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摘 要

本研究自彰化地區湖泊篩選光合細菌(Photosynthetic bacteria, PSB)，由於PSB 能夠直接去除氨氮，因此，對於工業廢水處理的 應用相當重要。對於PSB 的生長，培養基組成與環境因子是相當 重要的參數，本研究探討不同培養基組成與環境因子(碳源、氮源 濃度、金屬離子、初始pH 值、溫度、光源和曝氣量)對PSB 去除 氨氮和生產類胡蘿蔔素之影響。實驗結果顯示在不同的培養基組 成與環境因子下，PSB 菌量和類胡蘿蔔素含量分別可達到8 g/L 和 5 mg/g-dried cell weight。在曝氣條件下(4vvm)，固定化系統可達最 高氨氮利用速率(25 mg/L/h)和100%氨氮去除效率(初始濃度1000 mg/L)，這可能歸因於含氧濃度的提升，而PSB 的菌體生長、氨氮 去除效率和氨氮利用速率都會隨著曝氣量提升而增加。將PSB 置 入連續式攪拌反應器(continuous stirred tank reactor, CSTR)測試，並 比較懸浮和固定化菌體去除氨氮的能力。實驗結果顯示固定化系 統可達100%的氨氮去除效率(初始濃度為1000 mg/L)。另外，PSB 菌體內所含的類胡蘿蔔素，經過傅立葉轉換紅外線光譜(Fourier Transform Infrared Spectrometry, FTIR) 和高效液相層析儀 (High-Performance Liquid Chomatography, HPLC)的分析比對後，證 實其中一種為葉黃素(Lutein)。

關鍵詞 : 光合細菌，氨氮利用速率，氨氮去除效率，類胡蘿蔔素， 葉黃素

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