

86. 蘭花廢棄植株與牛糞尿廢水共消化之研究

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本研究旨在了解添加不同比例之蘭花廢棄植株 (Orchid plant waste, OPW) 於牛糞尿廢水 (Cow manure wastewater, CMW) 共消化對沼氣產量與廢水處理之影響, 亦找出蘭花廢棄植株最佳添加比例。蘭花廢棄植株來自臺灣蘭花生物科技園區, 而牛糞尿廢水來自飼養 200 頭乳牛畜牧場之廢水處理場。分析蘭花廢棄植株與牛糞尿廢水成分。將蘭花廢棄植株乾燥後細切與粉碎成小顆粒, 再依牛糞尿廢水之 TS (總固形物) 濃度, 計算 0%—20% 之 OPW 添加重量, 最後調製成不同濃度之牛糞尿廢水共消化廢水, 於 5 座 11.4 L 直立連續攪拌式厭氧消化槽進行共消化試驗, 溫度控制在 $37 \pm 1^\circ\text{C}$, 水力留時間設定為 30 天。試驗結果顯示, 添加 0—20% OPW 之共消化廢水之平均比沼氣產量 (Specific biogas yield) 範圍在 0.173—0.208 L/g COD 及 0.243—0.340 L/g VS。添加 15% OPW 有最佳之產氣量。

關鍵語: 蘭花廢棄植株、牛糞尿廢水、共消化

Study on co-digestion of orchid plant waste and cow manure wastewater

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The purpose of this study is not only to know the effect of adding orchid plant waste (OPW) to cow manure wastewater (CMW) for co-digestion on biogas production and wastewater treatment but also to find the optimal proportion for adding OPW. The OPW sources from Taiwan Orchid Biotechnology Park, and the CMW comes from a wastewater treatment facility at a cattle farm with 200 dairy cows. The components of OPW and CMW were analyzed. The OPW was dried, finely chopped, and ground into small particles. Based on the TS (total solids) of the CMW, calculate the OPW addition weight 0% to 20% ratios. This mixture was used for co-digestion in 5 upright continuous stirred-tank anaerobic digesters with a volume of 11.4 liters each. The temperature was maintained at $37 \pm 1^\circ\text{C}$, and the hydraulic retention time was set to 30 days. The results show that the average specific biogas yield of co-digested wastewater with 0% to 20% OPW ranged from 0.173 to 0.208 L/g COD and from 0.243 to 0.340 L/g VS. Adding 15% OPW resulted in the highest gas production.

Key Words: Orchid plant waste, Cow manure wastewater, Co-digestion