

68. 養豬場沼氣利用及減碳評估

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本試驗旨為收集大型養豬場沼氣發電場域資料，養豬場建置厭氧發酵池（15,099 m³）、活性污泥池（1,350 m³）、脫硫設施及發電機組。廢水處理方式為固液分離、厭氧處理、活性污泥法等三段式處理模式，厭氧發酵池導入經固液分離後豬糞尿廢水，收集沼氣後進行沼氣發電售電於台灣電力公司，定期分析各處理單元進及出流水質，評估厭氧處理效率及有機負荷率並收集發電資料，計算售電與減碳效益。結果顯示厭氧發酵槽進流 COD、TS 濃度平均分別為 23,180、15,120 mg/L，有機負荷率則分別為 0.54、0.35 kg/m³/d，厭氧處理對 COD 去除效率平均為 96.2%。養豬場設置 250 kW 發電機，110 年度發電量為 1,681,995 kWh，售電收入 8,424 千元，用於發電之沼氣量為 2,405,253 m³，減碳約 14,680 公噸二氧化碳當量。畜牧場廢水處理產生之沼氣，利用於發電可減少溫室氣體排放。

關鍵語：養豬場、沼氣、溫室氣體

Assessment of biogas utilization and carbon reduction in pig farm

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The purpose of this study was to collect biogas reuse data from large-scale pig farm, which will be equipped with anaerobic fermentation tanks (15,099 m³), activated sludge ponds (1,350 m³), desulfurization facilities and generator. Pig farm wastewater treatment process for solid-liquid separator, anaerobic treatment and activated sludge system. The pig wastewater after solid-liquid separation was into anaerobic fermentation pond, collection of biogas for power generation and sales of electricity to Taiwan Power Company. Regularly analyze the inlet and outflow water quality of each treatment process, evaluate the anaerobic treatment efficiency and organic load rate and collect power generation data, calculate the power sales and carbon reduction benefits. The results showed that the average inflow COD and TS concentrations of anaerobic fermentation tanks were 23,180 and 15,120 mg/L, and the organic load rates were 0.54 and 0.35 kg/m³/d, respectively. The average COD removal efficiency of anaerobic treatment was 96.2%. This pig farm was set a 250 kW generator. In 2021 the total power generation was 1,681,995 kWh, the income from selling the electric power is 8,424,600 NTD. The amount of biogas used in power generation is 2,405,253 m³, reduced about 14,680 metric tons CO₂e. Biogas from wastewater treatment in livestock can be used to generate electricity to reduce greenhouse gas emissions.

Key Words: Pig farm, Biogas, Greenhouse gas emissions