

微藻培養於養豬廢水之氮磷去除效果評估

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Evaluation of nitrogen and phosphorus removal effects of microalgae cultured in pig wastewater

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At present, the three-stage wastewater treatment system used in pig breeding sites greatly reduces the concentration of COD, BOD and SS in wastewater, and can reach the discharge water standard, but the nitrogen and phosphorus content in the discharge water is still high. In this study, *Chlorella sorokiniana* TJ5 was preliminarily cultured in BG-11 medium with an algal content of 360 mg/L. Total nitrogen 660 mg/L and total phosphorus 446 mg/L of pig wastewater after the anaerobic treatment were added in 50% of the half batch in a 1L serum bottle, was cultivated for 6 days under the condition of 24 hours light and air exposure. And the algae was separated by centrifugation at 3500 rpm for 10 minutes to determine the total nitrogen and total phosphorus. The results showed that the removal rates of nitrogen and phosphorus were 57% and 76%. The removal effect was good. At present, the problem of treating microbial wastewater in pigs is that the large-scale outdoor culture conditions are difficult to control, and the cost of subsequent separation of algae is high. The subsequent tests will be further carried out to evaluate the feasibility of introducing microalgae culture into the pig wastewater treatment system.

Key Words: Microalgae, Pig wastewater, Total nitrogen, Total phosphorus

前言

目前養豬場所採用之三段式廢水處理系統，大幅降低廢水中 COD、BOD 及 SS 的濃度，並可達到放流水標準，但放流水中氮和磷的含量依舊偏高。雖目前環保法令未管制畜牧業放流水中氮及磷含量，但未來亦有管制的可能。若能將微藻培養系統導入廢水處理系統，回收利用微藻之附加價值，並降低廢水中之氮磷含量，將使畜牧業之廢水處理提升至更高的層次。

材料與方法

將小球藻 (*Chlorella sorokiniana* TJ5) 以 BG-11 培養基初步培養之藻液，藻體含量為 360 mg/L，依半批次 50% 之比例加入總氮 660 mg/L、總磷 446 mg/L 厭氧處理後之養豬廢水中，於 1 L 血清瓶以 24 小時光照、曝氣的條件下培養 6 天，以 3500 rpm 離心 10 分鐘分離藻體測定上澄液之總氮及總磷。

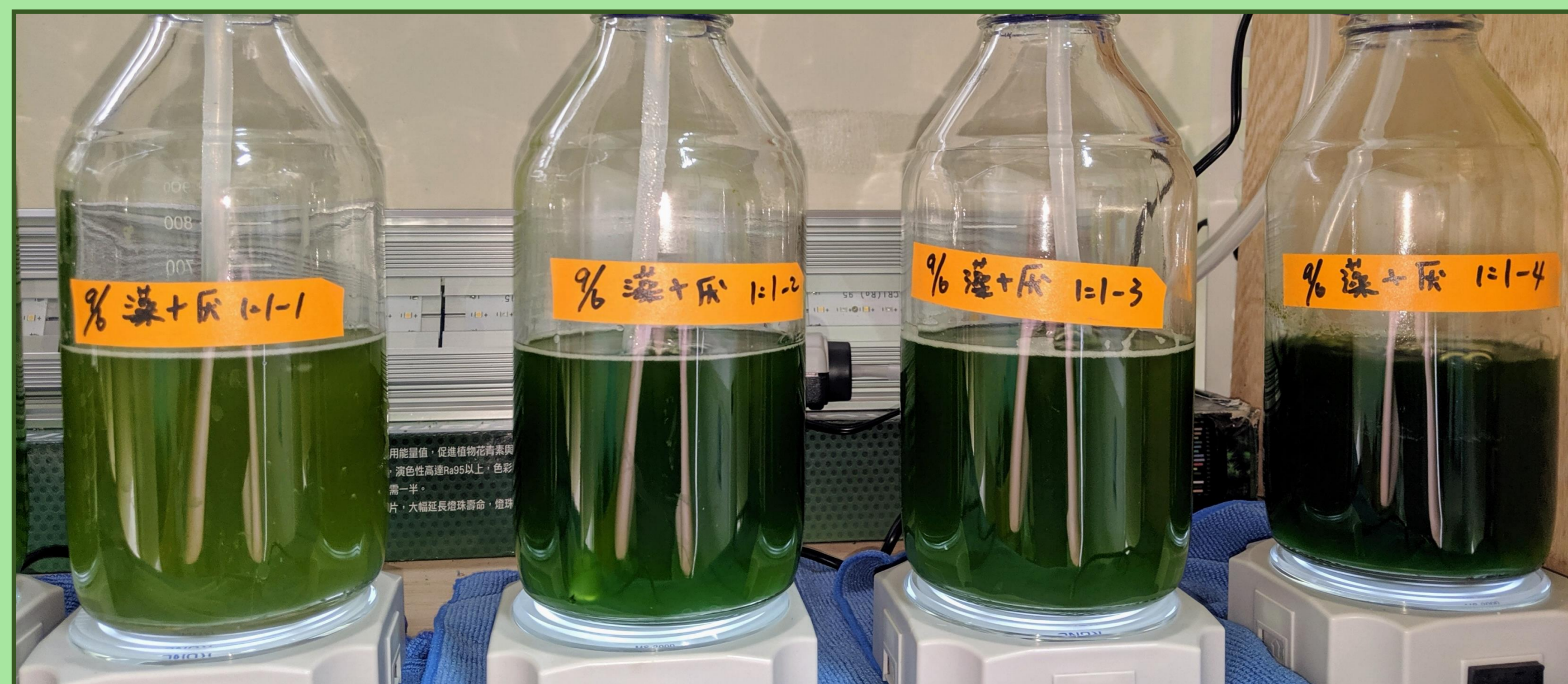


圖1.加入厭氧處理後養豬廢水培養之藻液

結果與討論

結果顯示，氮、磷去除率平均分別為 57%、76%，去除效果良好。

結論

以微藻處理養豬廢水面臨之問題為戶外大規模培養條件難以控制，以及後續分離藻體之成本偏高，後續將進一步進行測試，評估將微藻培養導入養豬廢水處理系統之可行性。

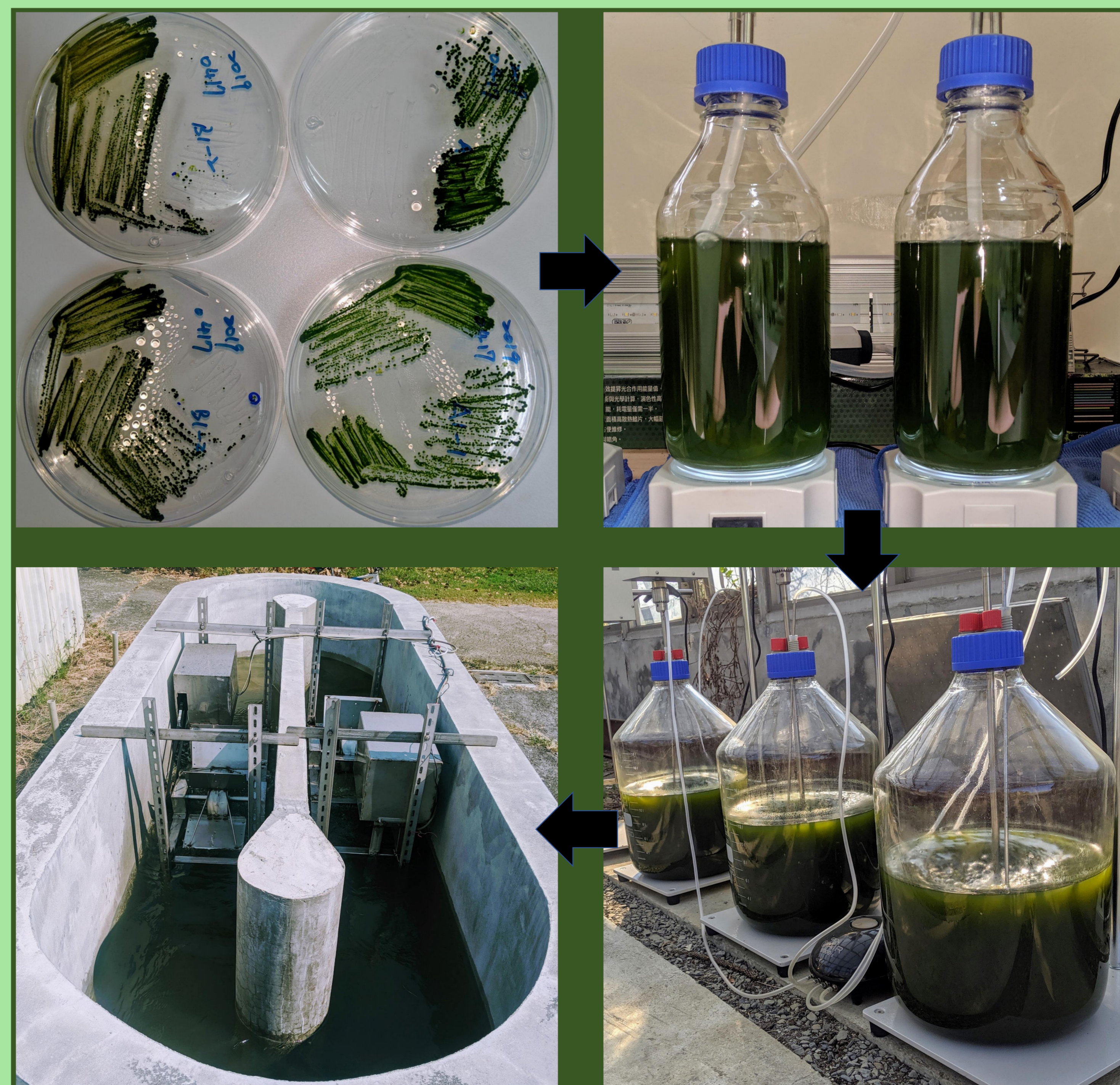


圖2.微藻放大培養