Proceedings 4th International Conference on Natural Resources & Environmental Management and Environmental Safety & Health. 24-26 Nov. 2009, Kuching.

TREATMENT OF ANIMAL FARM WASTEWATER USING *IPOMOEA AQUATICA* AND *LIMNOCHARIS FLAVA*

Ling, T.Y. and Diana M.J.*

Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 93400 Kota Samarahan, Malaysia

*Corresponding author: *tyling@frst.unimas.my*

ABSTRACT

Wastewater from intensive animal farming is rich in organic matter and nutrients. Wetland treatment technology is economical and suitable for application in the tropics. Plants that occur naturally in the tropical wetland system can play an important role in the treatment of wastewater. Therefore, in this study two aquatic plants (*Ipomoea aquatica* and *Limnocharis flava*) were investigated for their efficiency in the uptake of nutrients from pig farm wastewater in an outdoor batch experiment for 14 days. Results showed that total nitrogen decreased from 70 mg/L to 18 mg/l in *I. aquatica* system and from 75 to 28 mg/L in *L. flava* system. Total phosphorus decreased from 8 to 0.5 mg/L in *I. aquatica* and from 8 to 0.8 mg/L in *L. flava* system. In the control system where no plant was placed, algae bloomed and total nitrogen decreased from 88 mg/L to 11 mg/L which was the best in performance. However, for total phosphorus, the control did not perform as well as those with macrophytes, where it decreased from 8.4 to 3.6 mg/L. Biomass of *L. flava* and *I. aquatica* increased 22% and 91% respectively. This indicates faster growth rate of *I. aquatica*. Furthermore, nitrogen uptake by *I aquatica* was higher than *L. flava*. However, both initial and final phosphorus content in *L. flava* were higher than *I. aquatica* and plant uptake of *L. flava* was higher than *I. aquatica*. This study shows that not only water quality improved, nutrients could be recycled with annual yield of *L. flava* and *I. aquatica* at 12 and 32 tons/ha respectively.

INTRODUCTION

Wastewater from intensive animal operations is rich in solids and nutrients (Ling et al., 2007; Ainon et al., 2006). In an effort to reduce pollution of rivers, oxidation ponds are constructed for the retention of the wastewater before discharge. However, valuable nutrients available in the organic waste are not recycled as oxidation pond designed for the removal of solids is not as effective in removing nutrients. According to the study of Ling et al. (2007) on oxidation pond systems, reduction of ammonia-nitrogen ranged from 8-14% for 2-pond systems and 85% for 3-pond system. Furthermore, for total phosphorus, reduction ranged from 15-38% for 2-pond systems and even though reduction of 96% was achieved for 3-pond system, the effluent concentration was still high (13 mg/L). As a result, the discharge of high nutrients wastewater may pollute the river causing algae bloom, low dissolved oxygen that affects aquatic life. Therefore, an economical method of nutrient removal is essential for polishing the wastewater before being discharged into the rivers.