

# Effects of growing-finishing pigs in water-pad cooling pig house on growth performance and water quality of wastewater treatment <sup>(1)</sup>

Tein-Ming Su <sup>(2)(3)</sup> Yi-Hsiang Weng <sup>(2)</sup> Cheng-Hsun Chung <sup>(2)</sup> Wei-Zhi Liu <sup>(2)</sup> and Ting-Hsun Hsiao <sup>(2)</sup>

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## Abstract

The purpose of this study was to investigate the effects of raising growing-finishing pigs in a water-pad cooling pig house with manure ditch on the growth performance of pigs, biogas production and effluent quality after anaerobic treatment of wastewater. During the experiment, 64 LD pigs with an average body weight of 23 kg grew to 120 kg, and both diet and drinking water were given *ad libitum*. The manure ditch was washed twice a week with the anaerobic treated wastewater and the raw wastewater produced was stored in a water storage tank. The raw wastewater was automatically controlled into a 10 m<sup>3</sup> vertical anaerobic reactor at a rate of 500 L/day. While the anaerobic treatment system was stabilized, the flushing water for manure ditch, raw wastewater, anaerobic treated wastewater and the mixture in the anaerobic reactor were collected every 2 weeks to analyze the water quality. The biogas production and compositions were also determined. During the finishing stage of pigs, the gas samples of manure ditch before and after flushing were collected to detect the ammonia concentration, and the sampling sites included wet-pad side (P1), the 2<sup>nd</sup> to 3<sup>rd</sup> pen (P2), fan side in the house (P3), and fan side outside the house (P4). The results showed that the weight gain, feed intake and feed efficiency of pigs were 0.90 kg/day/head, 2.24 kg/day/head and 0.40, respectively, during the experiment period. The ammonia concentrations of P2 before and after flushing were 0.53 and 0.25 ppm, and those of P3 were 2.36 and 0.77 ppm. The ammonia concentrations of gas samples after flushing were lower than those before flushing ( $P < 0.05$ ). The average biogas production rate during the experimental period was 3,380 L/day. The concentrations of methane and carbon dioxide in the biogas were 62.0% and 25.6%, respectively. The results of analysis of the mixture of anaerobic reactor showed the copper and zinc concentrations were significantly higher than those of the raw wastewater. In conclusion, it is recommended to flush the manure ditch regularly and remove the sludge in the anaerobic reactor for the maintenance of the air quality in the pig house and reduction of copper and zinc accumulation.

Key words: Manure ditch type, Pig farm, Water-pad cooling pig house.

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(1) Contribution No. 2733 from Livestock Research Institute, Council of Agriculture, Executive Yuan.

(2) Livestock Management Division, COA-LRI, Tainan 71246, Taiwan, R. O. C.

(3) Corresponding author, E-mail: tmsu@mail.tlri.gov.tw.