

# Treatment effects of three-step treatment on pig wastewater with different concentrations <sup>(1)</sup>

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Received: Jan. 20, 2020; Accepted: Jun. 9, 2020

## Abstract

The reduction of flushing water reduces wastewater in pig farms but will increase the concentration of pollutants in wastewater relatively. The study aims to investigate the effect of wastewater concentration on the water quality at different treatment stages after the three-step treatment process, in order to reduce the wastewater product from pig farms. A total of 20 LD (Landrace ♀ × Duroc ♂) castrated boars with an average body weight between 52.9 to 112 kg were fed ad libitum in individually metabolism cages, while feces and urines of individual pigs were collected separately, weighed and recorded after mixture daily. Three pollutants concentrations of wastewater were made up by mixing manure and water at 1:1 (group A), 1:2.5 (group B) and 1:5 (group C) by weight ratio, then processed with a module of three-step treatment system with a treatment period for about 11.5 days to measure the changes in water quality at each processing stage. The results showed that the wastewater of group A contained higher ( $P < 0.05$ ) concentrations of chemical oxygen demand (COD), biochemical oxygen demand (BOD) and suspended solids (SS) in each treatment stage than those of groups B and C. Group A wastewater had higher electrical conductivity (EC) and concentration of copper and zinc than those of group C ( $P < 0.05$ ). The CODs of the three groups A, B and C of wastewater having undergone solid-liquid separation were 12,360, 7,080 and 4,770 mg/L, respectively, and 1,810, 728 and 358 mg/L, after the three-step treatment process. The BODs of the three groups of wastewater after solid-liquid separation were 3,130, 2,050 and 1,290 mg/L, respectively, and 357, 114 and 55 mg/L, after the three-step treatment. The concentrations of COD and BOD in groups A and B failed to meet the standards for pig wastewater discharge, indicating that the treatment of higher concentrations of wastewater requires a longer hydraulic retention time (HRT). Therefore, further research will be conducted to investigate the effect of extending the HRT of anaerobic and aerobic processing on the purification of water quality.

Key words: Grower-finisher pig, Three-step treatment system, Wastewater concentration, Water quality.

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