

Nut Pookerdsin 2013: The Study of Nitrogen and Phosphorus Removal Efficiency of Media from Waste Materials. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Pongsak Noophan, Ph.D. 83 pages.

This research is to synthesize the porous media from materials available in local area of Thailand. This porous media was applied to wastewater for removing phosphorus and fixing of nitrifying bacteria. The synthetic media consists of blood cockle shells and alum residuals from water supply plant. The shape of media were formed as tablet, cylinder and sphere. The phosphorus removal efficiency of the synthetic media was determined by using adsorption isotherm. Langmuir equation was used to describe the adsorption characteristics of this media. The result showed P sorption capacity was 4.85 mg P/g for tablet, 7.63 mg P/g for cylinder and 4.95 mg P/g for sphere. Furthermore, the nitrogen removal was investigated by packing media in column with size of 24 mm diameter and 150 mm height. The 0.22-0.24 kg N/m<sup>2</sup>-d of synthetic wastewater was dropped to the layers of media that pack in column. After 47 day, the ammonia removal efficiency was 48.3% for tablets, 53.1% for cylinder and 53.1% for sphere.

Cylinder shape media was selected for study the removal of nitrogen and phosphorus simultaneously because of the highest ability of phosphorus sorption. Eventhough, changing the shape of the media was not demonstrate a difference in nitrification efficiency. The 10 cm diameter of column reactor was used in this experiment with designed of one-tier and three-tier. Next, the 0.14-0.15 kg N/m<sup>2</sup>-d and 0.018-0.021 kg P/m<sup>2</sup>-d of synthetic wastewater was dropped to the layers of packing media. After 25 day, The efficiency of nitrogen and phosphorus removal in the three-tier reactor was better than one-tier reactor. The 85.4% of nitrogen and 30.8% of phosphorus removal efficiency was observed in three-tier reactor. This low efficiency of phosphorus removal is due to the poor of contact time between the synthetic wastewater and media in reactor.

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Thesis Advisor's signature