Naphatsawan Tangtermsarp 2014: Domestic Wastewater Treatment by Utilizing Lignite Fly Ash from Pulp and Paper Industry as Pollutants Adsorbent in Natural Treatment System. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Kanita Tungkananuruk, M.Sc. 127 pages.

The purposes of this research was to remove pollutants in domestic wastewater by utilizing lignite fly ash residue from pulp and paper industry be used as pollutants adsorbent in natural treatment system. In the batch experiments, it was found that lignite fly ash 5 g per 50 mL of domestic wastewater from collected pond of Kasetsart University with 4 h of retention time gave the maximum removal efficiency of water color and COD at 81.52% and 75.00% respectively and also the suitable ratio by weight of lignite fly ash to soil was 1:20. The adsorption isotherm was consistent with both of the Langmuir and Freundlich isotherm. The continuous flow experiment revealed that at 4 h of treatment time gave the more removal efficiency of water color (85.35%) and COD (90.91%) than others treatment. In addition, the natural treatment (constructed wetland) were performed in square tank which filled with filtration layer and mixture of lignite fly ash and soil in ratio by weight at 1:20 on the top layer growing *Typha angustifolia* L. and *Vetiveria zizanioides* and 4 h of treatment time. The results revealed that both of plants gave a good efficiency to treat color, BOD, COD, TKN and orthophosphate which were 86.05%, 85.94%, 86.36%, 61.18% and 94.84% respectively for *Typha angustifolia* L. and 93.42%, 90.63%, 95.45%, 75.66% and 95.80% respectively for *Vetiveria zizanioides*. While the controlled treatment unit which without using lignite fly ash gave the poor removal which were 17.63%, 12.50%, 27.27%, 22.37% and 4.13% respectively. Therefore, lignite fly ash have a good potential for improving the treatment efficiency of the natural treatment system.

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