

Benjapan Inkaew 2014: Development of Natural Treatment by Using Lignite Fly Ash for Pollutants Adsorption in Pulp and Paper Industry Wastewater Treatment. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Nipon Tungkananuruk, Ph.D. 133 pages.

This research was to investigate the feasibility of using lignite fly ash (LFA) residue that results from the combustion of lignite coal 70% and biomass 30% of the pulp and paper industry as pollutants adsorbent in the constructed wetland treatment system. Batch adsorption experiments were conducted to study the optimum removal of water color and COD. The results revealed that 14 g of LFA and contact time 3 h could remove water color and COD in 50 mL of pulp and paper industry wastewater at 21.79% and 57.10% respectively. The adsorption isotherm was conformed to Freundlich and the suitable ratio by weight of LFA to soil was 1:60. Continuous experiments were performed by filled the column size 6.5 cm i.d.x40 cm L with gravel, coarse sand, sand and mixture of fly ash and soil (1:60) from the bottom to the top. It was found that treatment time 3 h gave a better results than the others treatment and 72.58% and 75.00% removal of water color and COD respectively were achieved. Furthermore, the natural treatment was simulated in plastic tank size 51x51x54 cm, growing two types treatment plants (*Typha angustifolia L.* and *Vetiveria zizanioides*) and treated by retention time 3 h. The result was found that *Vetiveria zizanioides* gave a higher removal of water color and COD at 82.07% and 84.61% respectively.

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Thesis Advisor's signature