Chonthicha Maneechote 2014: The Development of Subsurface Flow Constructed Wetland System by Using Lignite Fly Ash as Reactive Dyes Adsorbent for Textile Factory Wastewater Treatment. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Kanita Tungkananuruk, M.Sc. 110 pages.

Wastewater discharge of textile factory containing large amount of residual dyes from the production process can cause aquatic environment problems. The development of using lignite fly ash, a waste material from pulp and paper industry was investigated for removal of nine reactive dyes from 20 ppm of each dyes in aqueous solution together with the subsurface flow in constructed wetland treatment system. From batch experimental results, the average maximum removal efficiency of nine dyes at 92.45 and 99.86 were achieved from 1 g lignite fly ash/ 50 mL mixed dyes aqueous solution and contact time for 4 h and 5 days, respectively. The adsorption model was conformed to Langmuir isotherm and Freundich isotherm. Moreover, the continuous experiment was carried out by filled the column (6.5 cm i.d. x 40 cm L) with gravel, coarse sand, sand and mixture of lignite fly ash and soil (1:60) from the bottom to the top. The results revealed that in 3 different treatments (continuous flow, retention time 4 h and 5 days) gave a nearly 98% removal efficiency at the 1st time and after that continue to decrease. However, removal efficiency of continuous flow decreased more slowly. Furthermore, the continuous subsurface flow constructed wetland was investigated in plastic tank which filled with mixture of lignite fly ash and soil and growing Typha angustifolia L. and Vetiveria zizanioides. The results showed that the treatment experiment units gave high removal efficiency of dyes at 96.81% for T. angustifolia L. and 94.85% for V. zizanioides. While the treatment experiment unit which without lignite fly ash gave removal efficiency lower at 80.87% and also efficiency was reduced rapidly.

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