

Nithipong Jaitab 2014: Transformation of the Sulfur Compounds in Wastewater and Sediment Soil from Domestic Wastewater Stabilization Ponds. Master of Science (Environmental Science), Major Field: Environmental Science, Department of Environmental Science. Thesis Advisor: Associate Professor Kanita Tungkananuruk, M.Sc. 136 pages.

Aim of this research is to determine the concentration of sulfur in form of sulfate ( $\text{SO}_4^{2-}$ ), hydrogen sulfide ( $\text{H}_2\text{S}$ ), hydrogen sulfide ion ( $\text{HS}^-$ ) and sulfide ( $\text{S}^{2-}$ ) and the factors influencing sulfur removal efficiency in wastewater stabilization ponds of The King's Royally Initiated Laem Phak Bia Environmental Research and Development Project. The samples were undertaken in five-pond series. The results revealed that the three depth level (0.300, 0.600 and 0.800 m) of water and season (rainy and summer) had no effect on the concentrations of all forms of sulfur. Sulfate ion was not found in the 1<sup>st</sup> pond to the 4<sup>th</sup> pond except in the 5<sup>th</sup> pond which was found in range 1.542-1.841 mg/L. The concentration tendency of  $\text{H}_2\text{S}$  decreased from the 1<sup>st</sup> pond (0.011 mg/L) to the 5<sup>th</sup> pond (0.000 mg/L) because the decreasing of desulfuration of organic sulfur from the 1<sup>st</sup> pond to the 5<sup>th</sup> pond. Consequently, the  $\text{HS}^-$  and  $\text{S}^{2-}$  could be simply increasing from the 1<sup>st</sup> pond to the 4<sup>th</sup> pond and dropping in the 5<sup>th</sup> pond due to the oxidation of  $\text{HS}^-$  or  $\text{S}^{2-}$  to  $\text{SO}_4^{2-}$ . The  $\text{HS}^-$  and  $\text{S}^{2-}$  concentration in the 5<sup>th</sup> pond in rainy season were 0.061 and 0.061 mg/L respectively and in summer season were 0.049 and 0.049 mg/L respectively. The  $\text{S}^{2-}$  concentrations agreed with water quality standard control (1.000 mg/L). In addition, the amount of  $\text{SO}_4^{2-}$  and  $\text{S}^{2-}$  in sediment of 5 ponds were determined. It was found that the concentration of  $\text{SO}_4^{2-}$  tended to decrease orderly from the 1<sup>st</sup> pond (17.420 mg/kg) to the 4<sup>th</sup> pond (7.770 mg/kg) and get highest in the 5<sup>th</sup> pond (25.370 mg/kg) which corresponding to wastewater. In part of the  $\text{S}^{2-}$  concentration in the 1<sup>st</sup> to the 4<sup>th</sup> ponds in range of 0.575-0.593 mg/kg and get highest in the 5<sup>th</sup> pond (0.785 mg/kg) therefore, the stabilization pond could be used for sulfur treatment in municipal wastewater by reactions in sulfur biogeochemical cycle.

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