

# **Evaluation of Adsorption Dynamic Retention of Copper Ion in Porous Agricultural Soil**

## **ABSTRACT**

The persistence of heavy metals on the environment is very harmful because they cannot be degraded and likely to accumulate in the soil. Agricultural activities, industrial waste or even industrial accident often contain appreciable amounts of heavy metals that leads to heavy metals pollution on soil, which may reduce soil fertility as well as health effect of the plant consumer. Therefore, it is important to know the ability and capacity of soil in retaining heavy metals. This study aims to measure and evaluate the adsorption equilibrium data of Cu(II) onto kaolinite clay soil in batch experimental. The equilibrium data was fitted using Langmuir and Freundlich isotherm model to represent the liquid-solid equilibrium condition. The maximum adsorption capacity of Cu(II)-clay of 2.015 mg/g was observed. In addition, this work contributes to model the transport of Cu(II) in the porous media of clay soil, using numerical computation. The simulation utilized mathematical model framework of well-known Advection-Dispersion-Diffusion (ADDE) equation model to predict the retention time of Cu(II) in kaolinite clay soil, by taking a small section of 30 cm × 1.6 cm clay soil as a representative elementary volume. The result from numerical computation revealed that kaolinite clay soil have a relatively low capability for Cu(II) uptake, most probably due to its lower cation exchange capacity (CEC), which responsible for holding positively charged ions.