



Research Article

## Utilization of Lapindo Volcanic Mud for Enhanced Sono-sorption Removal of Acid Orange 52

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### Abstract

This study applied ultrasonic irradiation technique to remove acid orange 52 (AO52) and in the meantime utilizing the potential adsorbent, Lapindo volcanic mud (LVM). LVM was collected from the erupted mud in Sidoarjo, Indonesia and calcined prior the adsorption process. Previously in another study, Lapindo was proven to be efficient for adsorption of dyes in single adsorption method. In this study, the combination of adsorption with ultrasound, or as known as sono-sorption shows that the adsorptivity increased from 95.54 mg/g to 129.5 mg/g. The isotherm study shows that this process obeyed Langmuir isotherm model with adsorption capacity of 833.33 mg/g. The enhancement of sono-sorption method as compared to conventional method is believed to be resulted from the facilitated mass transfer driven by the ultrasound, along with the adsorption ability of LVM. The kinetic study fit to the pseudo second order equation. Copyright © 2019 BCREC Group. All rights reserved

**Keywords:** Methyl orange; Lapindo volcanic mud; Ultrasonic irradiation; Adsorption

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### 1. Introduction

Acid orange 52 is widely used in the food industries, dyestuff manufacturing, paper manu-

facturing, textile, printing, and also as pH indicator [1]. However, this compound is considerably toxic to the aquatic life as it is being discharged to the water system. There were many research dedicated to the water system concerning the dyestuff toxicity, contributing to the development of various method of treatments. Among them, adsorption method is seen as

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