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## OPTIMIZING LINEAR ALKYL BENZENE SULFONATE REMOVAL USING FENTON OXIDATION PROCESS IN TAGUCHI METHOD

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Linear alkyl benzene sulfonate (LAS), which is the most common used anionic surfactant in detergents manufacturing, can discharge onto water resources through wastewater and causes change in taste and odor, disruption in water treatment processes, aquatics death, and oxygen transfer limitation. Accordingly, this article investigates to optimize LAS removal using Fenton oxidation process in Taguchi Method for the first time. LAS removal using Fenton oxidation was perused experimentally in a lab-scale reactor. In order to save relevant costs, 25 runs were qualified to specify the optimum conditions of Fenton oxidation using Taguchi method by Minitab 16 software. Sampling and testing procedures were executed based on the standard methods for the examination of water and wastewater. The optimum conditions included 900 mg/L hydrogen peroxide, 170 mg/L ferrous ion, pH of 4 and the reaction time of 20 min. Fenton oxidation, as a second order reaction with the rate coefficient of 0.0152 L/mg · min, provided 86.5% efficiency for LAS removal in the optimum conditions. Despite Fenton oxidation appeared as a high efficiency process in LAS removal, low removal efficiency of chemical oxygen demand corresponding with LAS affirmed its partial degradation.

**Keywords:** linear alkyl benzene sulfonate, detergent, Fenton oxidation, wastewater.

### Introduction

Surface active agents, usually referred to as surfactants, are amphipathic molecules that consist of a non-polar hydrophobic portion, usually a straight or branched hydrocarbon chain containing 8 – 18 carbon atoms, which is attached

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