



PERFORMANCES AND KINETIC CHARACTERISTICS OF UNACCLIMATIZED AND ACCLIMATIZED ACTIVATED SLUDGE FOR REACTIVE AZO DYES REMOVAL FROM SIMULATED TEXTILE WASTEWATER

Pasukphun Nittaya^{1*}, Vinitnantharat Soydo¹, Gheewala H. Shabbir²

¹*Division of Environmental Technology, School of Energy and Materials, King Mongkut's University of Technology Thonburi, 91 Prachauthit Rd. Bangmod, Thungkru, Bangkok, 10140, Thailand;* ²*JGSEE International Programme 5th Floor School of Energy and Materials Building, King Mongkut's University of Technology Thonburi, 91 Prachauthit Rd. Bangmod, Thungkru, Bangkok, 10140, Thailand*

Abstract

Effluent from textile industry is a major source of dye pollution. The low biodegradability of many dyes and textile chemicals are not always successful in the treatment, specifically in term of color removal. It is known that anaerobic-aerobic processes can achieve decolorization completely. Two stages anaerobic-aerobic are studied and revealed the dye removal effectively. Also, operating a stage anaerobic+aerobic in the same basin showed the ability of dye removal with simple running and compact area. In this study, conventional activated sludge was adapted to become anaerobic+aerobic sludge in order to be use for reactive azo dye removal experiments. The adapted activated sludge was investigated the dye removal from dye solution (without carbon sources) and simulated textile wastewater (with carbon sources). The experiments were operated on the unacclimatized and acclimatized sludge with various concentrations. The results revealed that acclimatization and increasing sludge concentration could not raise the dye removal efficiencies clearly. Nevertheless, the acclimatization resulted in decrease retention time for execution the dye removal in rang of 68.12%-95.79%. Furthermore, the simple kinetic studies showed that first order was proper for dye removal operating on simulated textile wastewater. The reaction rate constants were very low in range of 0.0003-0.015 mg/L/h. As for kinetic evaluation using applied Monod Eq. found that K_s and k were in range of 41.84-84.03 mg/L and 0.000146-0.000763 h⁻¹, respectively. Besides, adding carbon sources and acclimatization played role in increasing dye removal rate for a stage anaerobic+aerobic operation.

Keywords: activated sludge, dyes, kinetics, textile

* Author to whom all correspondence should be addressed: e-mail: nittapsp@yahoo.com