

A COMPARATIVE STUDY OF ORGANIC COMPOUNDS DEGRADATION KINETICS FROM COFFEE EFFLUENT USING BATCH AND RECYCLE PHOTO REACTORS

L. RIADI* AND L. HWA

*Department of Chemical Engineering, Faculty of Engineering, University of Surabaya
Surabaya, Indonesia
lieke@ubaya.ac.id

ABSTRACT - *Drinking water is one of the basic factors for human being, and it is increasingly becoming a limiting factor. Wastewater treatment is among the technologies to improve water quality. One of the technology that has been studied to overcome the color and organic compound removal simultaneously is photo-fenton technology. UV light can be supplied from the sun or a UV-lamp, while the chemicals needed are hydrogen peroxide and Fe(II) ion. The coffee effluent treated contained melanoidin which is not biodegradable, hence a chemical degradation using chemicals is needed to solve the problem without creating another waste. There are three steps in the photo-fenton reaction. These are the reaction between Fe ion in $Fe_2SO_4 \cdot 7H_2O$ with H_2O_2 in the presence of UV light. These reactions are Fenton, photolysis of H_2O_2 , and photo-fenton reaction. The first reaction is a reaction of Fe^{2+} with H_2O_2 , which generate OH radicals and oxidize Fe^{2+} to Fe^{3+} . The second reaction is the formation of $\cdot OH$ by photolysis of hydrogen peroxide. The third reaction is a reaction of Fe^{3+} with water which occurs when the light of wavelength 352 nm is irradiated, the OH radicals are generated and Fe^{3+} is reduced to Fe^{2+} . These reactions work continuously and result $\cdot OH$ radicals which will degrade melanoidin and organic compounds into CO_2 and H_2O .*

Keywords: *recycle photo reactor, organics compounds degradation, coffee effluent*