

“Combination and Optimization of Sorption and Photodegradation Processes for various dyes removal”

Dr. Ong Siew Teng

Dr. Michelle Ng Yeen Tan

Department of Chemical Science, Faculty of Science
Universiti Tunku Abdul Rahman

Through this project, the effectiveness of using TiO_2 and corn cob films to remove Malachite Green oxalate (MG) and Acid Yellow 17 (AY 17) from binary dye solution was studied. The immobilization of adsorbent and photocatalyst were achieved through evaporation casting method. With this, the problem associated with filtration of adsorbent and separation of fine photocatalyst particles that are often encountered towards the end of the treatment process can be avoided. The instruments used in the study included Fourier-Transform infrared spectrophotometer (FTIR), UV-vis spectrophotometer, scanning electron microscope (SEM) and atomic force microscope (AFM). Batch studies were performed under different experimental conditions and the parameters studied involved initial pH of dye solution, initial dye concentration and contact time and reusability. The kinetics of dye sorption fitted a pseudo-second order rate expression. Based on the calculated R_L value which lies between 0.0207 to 0.4534, this indicated that the adsorption process was favorable and corn cob thin films can serve as potential adsorbent for the removal of MG and AY 17 from aqueous solution. Plackett-Burman design was used to evaluate the relative importance of various factors that influence the percentage removal of dyes. The interaction between the factors and their optimum levels for maximum percentage removal were determined using Response Surface Methodology (RSM). The optimum conditions for the removal of both dyes were determined as initial pH 4.54 and contact time 240 minutes.

() Funded by Toray Science Foundation, Japan*

Presented at the MTSF Grant Research Symposium held on 30 November 2018.