
Hormesis phenomena of some parameter aspect in usage of water lettuce (*Pistia stratiotes* L.) for Phytoremedia Process of petroleum liquid waste

Hanifa Marisa* and Sri Pertiwi Estuningsih

Biology Department of Faculty of Science, The University of Sriwijaya, Indonesia 30662

*Corresponding author's email : gmdiqhan2002@yahoo.com

ABSTRACT

The research about potential test of water lettuce (*Pistia stratiotes*) in order of phytoremediation of petroleum liquid waste had been done during June until December 2012 at Microbiology Laboratory, Department of Biology, Faculty of Science, The University of Sriwijaya, Indonesia. Completely Randomized Design was used in the experiment while the concentration of liquid waste as treatment were: 0, 15, 30, 45, 60 and 75 %. Each treatment were replicated 4 times. Three parameter was measured; Total Petroleum Hydrocarbons (TPH) reduction percentage, efficiency of phytoremediation and number of tillers. Regression analysis were used for the data and two of parameters show the hormesis phenomena, were; efficiency of phytoremediation and number of tillers. The highest peak effect of treatment for efficiency of phytoremediation and number of tillers was on 45 %. TPH reduction percentage was the only ones parameter that shows linier regression.

| hormesis | *Pistia stratiotes* | TPH | phytoremediation | tiller |

Enhanced Adsorption and Stability of Aspirin Molecules on Magnetic α -Fe₂O₃/MCM-41 Composites

H. T. Teo¹, W. R. Siah², and L. Yulianti^{2*}

¹Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor

²Ibnu Sina Institute for Fundamental Science Studies, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor.

*Corresponding author's email : leivy@ibnusina.utm.my

ABSTRACT

In this work, magnetic mesoporous silica (α -Fe₂O₃/MCM-41) composites were prepared by incipient-wetness impregnation and direct hydrothermal methods, while their drug adsorption properties were investigated by using aspirin as the model of the drug. As for the characterization results, X-ray diffraction patterns (XRD) and diffuse reflectance ultraviolet-visible (DR UV-Vis) spectra revealed that hematite nanoparticles were successfully incorporated into the mesoporous network of MCM-41. The adsorption capacity towards aspirin over the prepared α -Fe₂O₃, MCM-41, and α -Fe₂O₃/MCM-41 composites was investigated by monitoring the absorption wavelength of aspirin at 226 nm using UV spectroscopy. It was obtained that aspirin was not stable and converted to salicylic acid when using bare α -Fe₂O₃. On the other hand, the aspirin breakdown was not observed when using MCM-41 and α -Fe₂O₃/MCM-41 composites as the adsorbents. The adsorption capacity of the MCM-41 was found to be significantly improved when the α -Fe₂O₃ was incorporated into the mesoporous network. This result demonstrated the importance of both the MCM-41 support and the dispersion α -Fe₂O₃ to get enhanced adsorption and stability of the aspirin. Under the same condition, all of the hydrothermally prepared composites showed significantly higher amount of adsorbed aspirin as compared to the composites prepared by impregnation method. Since the hexagonal mesoporous structure of the composites prepared by hydrothermal method was maintained better than that prepared by the impregnation method, it was proposed that the ordered structure of the MCM-41 support played important role in the adsorption of aspirin.

| Adsorption | Stability | Aspirin | α -Fe₂O₃/MCM-41 composites | Hydrothermal method |

Interactive Graph Dynamics for Fuzzy Autocatalytic Set of Fuzzy Graph of Type-3 for Combustion Process in a Circulating Fluidized Bed Boiler

Hazwani Hashim¹, Sumarni Abu Bakar², Razidah Ismail³

Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA(UiTM) 40450 Shah Alam, Selangor, Malaysia

*Corresponding author's email : wanihashim88@gmail.com, sumarni@tmsk.uitm.edu.my, razidah@tmsk.uitm.edu.my

ABSTRACT

Dynamical changes of chemical reactions which occurred during combustion process in Circulating Fluidized Bed boiler (CFB) has been modelled using transition matrix of Fuzzy Autocatalytic Set (FACS) of fuzzy graph type-3 whereby the result shows that end-product of the combustion process in the boiler namely Water and Hydrogen is in accordance to the purpose of boiler system. Graph Dynamic Algorithm (GDA) was developed to facilitate the analysis of the process where behaviour of the graph is investigated through the left Perron vector (LPF) which served as an indicator for the existence of which species is insignificant at time t. However, the algorithm is not feasible to assist analysis of dynamical changes for sparse graph. Therefore Interactive Graph Dynamics (IGD) is developed whereby the GDA is improvised to facilitate the analysis of graph dynamics of FACS of combustion process in the CFB. This paper describes the development of IGD in order to analyse sequence of changes of chemical reactions during combustion process in CFB by using MATLAB.

| Fuzzy Autocatalytic Set | left Perron vector | Transition Matrix | Graph Dynamic Algorithm | Interactive Graph Dynamics |
