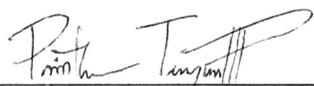


Parinthorn Temyarasilp 2008: Preparation and Characterization of Activated Carbon from *Dendrocalamus asper Backer* and *Dendrocalamus latiflorus*. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Apisit Songsasen, Ph.D. 285 pages.

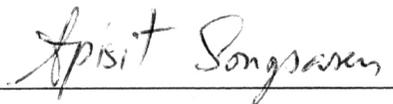
The preparation and characterization of activated carbon from *Dendrocalamus asper Backer* (DB) and *Dendrocalamus latiflorus* (DL), 1 – 3 years, from Kanchanaburi province, were studied. The chemical agents used for activation were phosphoric acid (H_3PO_4), potassium hydroxide (KOH) and nitric acid (HNO_3). The results showed that properties of prepared activated carbon depend on the breeds and ages of bamboos, chemical agents and activation conditions such as chemical concentrations and activation time. In addition, proximate analysis (moisture, ash, volatile matter and fixed carbon) and pH were studied. Afterwards, the structure and functional group of activated carbon were studied by SEM and FTIR. Then, the adsorption of cadmium, methylene blue, phenol and iodine from aqueous solutions were also studied and compared with commercial activated carbon and commercial bamboo charcoal. Finally, DB's and DL's vinegars from carbonization, were analyzed in order to measure organic acid concentration.

The results of SEM showed that activated carbon had larger pore sizes and pores distribution than non-activated charcoal. FTIR spectra of the activated carbon showed the stronger band of carbonyl and carboxyl groups at $1600 - 1700\text{ cm}^{-1}$. From the study, Langmuir isotherm was fitted with the adsorption of cadmium(II). The activated carbon of 2 years DB activated by KOH had highest adsorption capacity (0.19 mg/g) and highest specific surface area ($0.61\text{ \AA}^2/\text{g}$). However in the study of methylene blue, phenol and iodine adsorption, isotherms were fitted with both Langmuir and Freundlich isotherm. For methylene blue adsorption, the activated carbon of 3 years DL activated by KOH had highest adsorption capacity (14.75 mg/g) and highest specific surface area ($33.31\text{ \AA}^2/\text{g}$). For phenol adsorption, the charcoal of 3 years DL had highest adsorption capacity (2.66 mg/g) and highest specific surface area ($2.70\text{ \AA}^2/\text{g}$). For iodine adsorption, the activated carbon of 2 years DL activated by KOH had highest adsorption capacity (420.34 mg/g) and highest specific surface area ($638.05\text{ \AA}^2/\text{g}$).

In the analysis of the concentrations of organic acids in bamboo vinegars, the results indicated that the concentrations of each organic acid depend on breeds and ages of bamboos. In additions, the highest acid concentration of all bamboo vinegars is acetic acid.



Student's signature



Thesis Advisor's signature

31 / March / 2008