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A Study on corrosion inhibition efficiency of bamboo charcoal
and its behavior in human urine treatment / Poo Mun Yee.

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PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

A STUDY ON CORROSION INHIBITION EFFICIENCY OF
BAMBOO CHARCOAL AND ITS BEHAVIOR
IN HUMAN URINE TREATMENT

By
Poo Mun Yee

A thesis submitted in partial fulfillment
of the requirement for the award of the degree of
Bachelor of Applied Science
(Electronics, Physics and Instrumentation)

DEPARTMENT OF PHYSICAL SCIENCES
FACULTY OF SCIENCE AND TECHNOLOGY
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DECLARATION

I hereby declare that this thesis entitled a Study on Corrosion Inhibition Efficiency of Bamboo Charcoal and Its Behavior in Human Urine Treatment is the result of my own work except as cited in references.

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A STUDY ON CORROSION INHIBITION EFFICIENCY OF BAMBOO CHARCOAL AND ITS BEHAVIOR IN HUMAN URINE TREATMENT

ABSTRACT

This research consists of two aims which are to investigate the behavior of bamboo charcoal in human urine treatment and its efficiency in inhibiting corrosion. The analysis of Scanning Electron Microscopy was carried out to analyze the microstructure and macrostructure pores within bamboo charcoal. The images obtained from the analysis showed that bamboo charcoal had large amount of pores and hence had high adsorption capacity. Besides that, analysis of X-ray Fluorescence (XRF) had shown that bamboo charcoal consisted of several minerals. Potassium, calcium, manganese, iron, copper and zinc were found in bamboo charcoal. In order to carry out the urine treatment process, simple filtration apparatus was set up in which bamboo charcoal was the main adsorbent. Human urine samples which were filtrated or infiltrated were then analyzed by spread plate method. The result of spread plate method showed that the amount of bacteria colonies in untreated urine sample had decreased after treatment. Bamboo charcoal had efficiently adsorbed and prevented the growth of bacteria in the urine samples. On the other hand, steel nails and bamboo charcoal were prepared for corrosion process. Electrochemical Impedance Spectroscopy (EIS) was used to analyze the steel nails. The result from EIS showed that the more bamboo charcoal used in the water, the lower the corrosion rate of steel nails. The percentage inhibition efficiency of bamboo charcoal was also calculated. The calculation showed that the more bamboo charcoal was used, the higher the percentage inhibition efficiency. As a summary, this study showed that bamboo charcoal was a good adsorbent in urine treatment and as an efficient corrosion inhibitor.

**PENYELIDIKAN TENTANG KECEKAPAN PENCEGAHAN KAKISAN
ARANG BULUH DAN CIRI-CIRI ARANG BULUH DALAM
PERAWATAN AIR KENCING MANUSIA**

ABSTRAK

Penyelidikan ini mengandungi dua tujuan iaitu untuk mengkaji ciri-ciri arang buluh dalam perawatan air kencing manusia dan kecekapan arang buluh dalam pencegahan kakisan. Analisis Kemikroskopan Elektron Imbasan telah dijalankan untuk mencerakin microstrucutre dan makrostruktur liang-liang dalam arang buluh. Imej-imej yang diperolehi dari analisis tersebut menunjukkan arang buluh mempunyai jumlah liang-liang yang banyak dan oleh itu mempunyai kuasa penyerapan yang tinggi. Selain itu, analisis bagi Sinar X Fluorescene telah membuktikan buluh arang mengandungi beberapa jenis mineral. Kalium, kalsium, mangan, besi, tembaga dan zink telah ditemui dalam arang buluh. Untuk menjalankan proses perawatan air kencing, cara penurasan biasa digunakan di mana arang buluh adalah bahan penapis utama. Sampel air kencing manusia yang selepas dan sebelum dituraskan dianalisis dengan menggunakan kaedah plat penyebar. Hasil dari kaedah plat penyebar menunjukkan bahawa jumlah koloni-koloni bakteria dalam sampel air kencing yang tidak dirawat telah berkurang selepas rawatan. Arang buluh telah berjaya untuk menyerap bakteria dan menghalang pertumbuhan bakteria dalam air kencing. Pada masa yang sama, kuku keluli dan arang buluh disediakan untuk proses kakisan. Elektrokimia Spektroskopi Galangan digunakan untuk menganalisis keluli kuku. Keputusan menunjukkan semakin banyak arang buluh digunakan dalam air, semakin rendah kadar kekakisan bagi kuku keluli. Peratusan kecekapan dalam perencatan oleh buluh arang juga dihitung. Hasil pengiraan menunjukkan semakin banyak arang buluh digunakan, semakin tinggi peratusan kecekapan dalam perencatan oleh arang buluh. Kesimpulannya, kajian ini menunjukkan arang buluh merupakan satu bahan penyerap yang baik dalam rawatan air kencing dan sebagai satu perencat kakisan yang cekap.