COAGULATION-FLOCCULATION BY UTILIZING *Moringa Oleifera* SEED AND PAPAYA PEEL AS COAGULANTS AT DIFFERENT SEDIMENTATION TIME IN WATER TREATMENT

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Coagulation-flocculation by utilizing moringa oleifera seed and papaya peels as coagulants at different sedimentation time in water treatment / Phon Mun Yee.

Lihat Sebelah

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By
POON CHIN VOON

A PITA research proposal submitted in partial fulfilment of
the requirements for the award of the degree of
Bachelor of Technology (Environment)

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VERIFICATION AND APPROVAL FORM

This PITA research report entitled Coagulation-Flocculation by Utilizing *Moringa Oleifera* Seed and Papaya Peel as Coagulants at Different Sedimentation Time in Water Treatment prepared and submitted by Poon Chin Voon, Matric No. UK29564 in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (Environment) has been examined and is recommended for approval of acceptance.

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DECLARATION

I hereby declare that this PITA research report entitled Coagulation-Flocculation by Utilizing *Moringa Oleifera* Seed and Papaya Peel as coagulants at Different Sedimentation Time in Water Treatment is the result of my own research except as cited in the references.

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ABSTRACT

Water is not only important for human health but also central to plant and animal life. In order to reduce the effect of water pollution to marine ecosystems, wildlife health, and human well-being, water treatment plant has been introduce to treat water to make it more acceptable for a specific end use. However, the most commonly used chemical coagulant, alum has proven to link to serious health effect. *M. oleifera* seeds and papaya peel which is natural and inexpensive has been used in this study. Therefore, this study was proposed to determine the efficiency of turbidity and total suspended solid removal from the process of coagulation-flocculation of synthetic turbid water by utilizing *M. oleifera* seeds and papaya peel at different sedimentation time. The objectives of this study are to identify the optimum dosage and sedimentation time of *M. oleifera* seeds and papaya peel as coagulants to increase the efficiency of turbidity and total suspended solid removal. The properties of *M. oleifera* seeds and papaya peels has been study by using FTIR, SEM and BET peel in term of functional groups, surface morphology and total surface area. Hydroxyl, carbonyl and amide functional groups, porous surface and high surface area has revealed by both *M. oleifera* seeds and papaya peel that play an important role in bioadsorption. The optimum dosages in term of ratio and sedimentation time are 25:3 with 300 min for alum-*M. oleifera* seed test and 10:3 with 210 min for alum-papaya peel test has been determined by the percentage of turbidity and total suspended solid removal. The findings from this study are important for development of sustainable and cost effective of coagulation-flocculation process in water treatment.

PENGGUMPALAN-PEMBUKUAN DENGAN MENGGUNAKAN BENIH *M. oleifera* DAN KULIT BETIK SEBAGAI BAHAN PENGGUMPAL PADA MASA PEMENDAPAN YANG BERBEZA

ABSTRAK

Air bukan sahaja penting untuk kesihatan manusia tetapi juga penting kepada tumbuhan dan haiwan. Dalam usaha untuk mengurangkan kesan pencemaran air kepada ekosistem marin, kesihatan hidupan liar, dan kesejahteraan manusia, loji rawatan air telah diperkenalkan untuk merawat air untuk menjadikannya diterima untuk penggunaan akhir yang khusus. Walau bagaimanapun, bahan kimia penggumpal yang paling biasa digunakan iaitu alum telah terbukti mengandungi kesan kesihatan yang serius. Benih *M. oleifera* dan kulit betik yang bersifat semula jadi dan murah telah digunakan dalam kajian ini. Oleh itu, kajian ini telah dicadangkan untuk menentukan kecekapan penyingkiran kekeruhan dan jumlah pepejal terampai dari proses penggumpalan-pembukuan air keruh sintetik dengan menggunakan benih *M. oleifera* dan kulit betik pada masa pemendapan yang berbeza. Objektif kajian ini adalah untuk mengenal pasti dos dan masa pemendapan benih *M. oleifera* dan kulit betik yang terbaik untuk meningkatkan kecekapan penyingkiran kekeruhan dan jumlah pepejal terampai. Sifat-sifat benih *M. oleifera* dan kulit betik telah dikaji dengan menggunakan FTIR, SEM dan BET dari segi kumpulan berfungsi, morfologi permukaan dan jumlah luas permukaan. Kumpulan berfungsi hidroksil, karbonil dan amida, permukaan berliang dan luas permukaan yang tinggi telah didedahkan oleh kedua-dua benih *M. oleifera* dan kulit betik yang memainkan peranan penting dalam biopenjerapan. Dos yang optimum dari segi nisbah dan pemendapan masa adalah 25:3 dengan 300 min bagi ujian alum- benih *M. oleifera* dan 10:3 dengan 210 min bagi ujian alum- kulit betik telah ditentukan oleh peratusan penyingkiran kekeruhan dan jumlah pepejal terampai. Dapatan daripada kajian ini adalah penting untuk pembangunan rawatan air yang mampan dan kos efektif.