

EFFECT OF UPGRADED SEAWATER ALKALINE
PRETREATMENT PROCESS FOR OIL PALM EMPTY
FRUIT BUNCH

MIZAN QISTINA BT SAHARUDDIN

SCHOOL OF OCEAN ENGINEERING
UNIVERSITI MALAYSIA TERENGGANU

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EFFECT OF UPGRADED SEAWATER ALKALINE PRETREATMENT PROCESS
FOR OIL PALM EMPTY FRUIT BUNCH

By
MIZAN QISTINA BT SAHARUDDIN

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

SCHOOL OF OCEAN ENGINEERING
UNIVERSITI MALAYSIA TERENGGANU
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**SCHOOL OF OCEAN ENGINEERING
UNIVERSITI MALAYSIA TERENGGANU**

VERIFICATION AND APPROVAL FORM

This PITA research report entitled *Effect of Upgraded Seawater Alkaline Pretreatment Process for Oil Palm Empty Fruit Bunch* prepared and submitted by Mizan Qistina Bt Saharuddin, Matric No. UK29554 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.

Approved by:

DR. SHAHRUL ISMAIL

Pusat Pengajian Kejuruteraan Kelautan
Universiti Malaysia Terengganu
21030 Kuala Terengganu, Terengganu.
09-668 3324 (pej) 09-668 3991 (fax)
shahrul.ismail@umt.edu.my

Supervisor

Name: Dr. Shahrul Bin Ismail

Official Stamp:

Date: 6/6/16

MOHAMED SHAHRIR BIN MOHAMED ZAHARI

Pensyarah

Jabatan Ilmu Dasar

Pusat Pendidikan Asas dan Liberal

Universiti Malaysia Terengganu

Supervisor

Name: En. Mohamed Shahrir Bin Mohamed Zahari

Official Stamp:

Date: 6/6/16

Head of Environmental Technology Program

Name: Prof. Dr. Ir. Ahmad bin Jusoh

Official Stamp:

PROF. IR. DR. AHMAD BIN JUSOH
Dean
School Of Ocean Engineering
Universiti Malaysia Terengganu

Date: 6/6/16

DECLARATION

I hereby declare that this PITA research report entitled *Effect of Upgraded Seawater Alkaline Pretreatment Process for Oil Palm Empty Fruit Bunch* is the result of my own research except as cited in the references.

Signature : 

Name : MIZAN QISTINA BINTI SAHARUDDIN

Matric No. : UK29554

Date : 13/6/16

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**THE EFFECT OF UPGRADEDE SEAWATER AS ALKALINE
PRETREATMENT METHOD ON LIGNOCELLULOSIC BIOMASS OF
EMPTY PALM FRUIT BUNCH**

ABSTRACT

The demand for renewable fuel sources continues to grow due to diminishing supply of fossil fuel and the growing concerns about environmental. Presently, lignocellulose was reported to be the most favored and valuable compound in biofuel production. However, the presence of lignin in lignocelluloses leads to a protective barrier that prevents plant cell destruction by fungi and bacteria for conversion to fuel. Therefore, the study of pretreatment method on delignification of lignocellulosic materials has increase through the year. In this study, alkaline pretreatment of EFB is carried out at room temperature using different concentration of alkaline solution which are 5%, 10%, 15% and 20% w/v of soda ash (Na_2CO_3) and seawater for 48 hours. The objective of this study is to investigate different concentration of alkaline in delignification of EFB. The degree of delignification is monitored based on the amount of lignin after the pretreatment by using direct spectroscopic kappa number and also be confirmed by Dubois method, FTIR and SEM analyses. The highest percentage of delignification were 70% by using concentration of 15% alkaline solution. The findings from this study are important for development of sustainable and cost effective pretreatment of lignocellulose materials.

THE EFFECT OF UPGRADEDE SEAWATER AS ALKALINE PRETREATMENT METHOD ON LIGNOCELLULOSIC BIOMASS OF EMPTY PALM FRUIT BUNCH

ABSTRAK

Permintaan untuk sumber bahan api yang boleh diperbaharui terus berkembang bagi mengurangkan penggunaan bekalan bahan api fosil dan kebimbangan yang semakin meningkat tentang alam sekitar. Pada masa ini, lignoselulosa dilaporkan sebatian yang paling digemari dan berharga dalam pengeluaran biodiesel. Walau bagaimanapun, kehadiran lignin dalam lignocelluloses membawa kepada satu halangan pelindung yang menghalang kemusnahan sel tumbuhan oleh kulat dan bakteria untuk penukaran kepada bahan api. Oleh itu, kajian kaedah rawatan awal iaitu delignifikasi bahan lignoselulosa telah meningkat sepanjang tahun. Dalam kajian ini, rawatan awal alkali EPFB dijalankan pada suhu bilik menggunakan berbeza kepekatan air laut iaitu 5%, 10%, 15% dan 20% w / v abu soda (Na_2CO_3) dan air laut untuk 48 jam. Objektif kajian ini adalah untuk mengetahui kesan perbezaan kepekatan alkali kepada delignifikasi EFB. Kadar delignifikasi dipantau berdasarkan jumlah lignin selepas rawatan awal dengan menggunakan nombor spektroskopi kappa dan juga disahkan oleh kaedah Dubois, FTIR dan SEM analisis. Peratusan tertinggi delignifikasi adalah 70% dengan menggunakan 15% kepekatan larutan alkali. Dapatan daripada kajian ini adalah penting untuk pembangunan mampan berserta penjimatan kos bagi rawatan awal terhadap bahan lignoselulosa.