# The study of the Potential of Nano-Scale Biopolymer Extracted from Coconut Husk as Drag Reducing Agent (DRA) in Water Injection Well

by

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15366

Dissertation submitted in partial fulfilment of

the requirements for the

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(Petroleum)

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**CERTIFICATION OF APPROVAL**

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A project dissertation submitted to the

Petroleum Engineering Programme

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BACHELOR OF ENGINEERING (Hons)

(PETROLEUM)

Approved by,

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UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

MAY 2015

## CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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Muhamad Hibri Hafiz B. Hazli

# ABSTRACT

Drag reducing agent (DRA) is widely used as an additive to reduce the pressure drop in the pipeline system, thus will increase the fluid flow capacity. Whereas, water injection system is a secondary recovery method used to increase the reservoir pressure by injecting water into the reservoir through a number of injection wells. The DRA can be used to increase the performance of water injection system by reducing the pressure drop along injection wells. The synthetic polymer is widely used in the industry have raised an environment concern as it biodegrade very slowly, consequently it will bring harm if the usage is in excess. Hence, this project focuses on using environmentally friendly polymer DRA extracted from organic materials. In this study, grated coconut residue (CR) is used as biopolymer such as Carboxymethylcellulose (CMC) to produce the DRA. The CMC will be extracted from CR by synthesizing the cellulose under the alkali-catalysed reaction with monochloroacetic acid. The CMC will be divides into original scale which is CMC powder produced from the synthesization and the nano scale CMC obtained from grinding the original scale CMC into nano scale using Pulverisette 5 planetary Mill Machine. The objective of this research is to compare performance of the extracted CMC as DRA at different particle scale (nano-scale and original-scale) based on drag reduction percentage (%) in a fluid friction experimental setup. Based on conducted experiment in this research, the nano-scale particle size has better performance than the original-scale on drag reduction percentage resulted from fluid friction experiment.

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