

CELEBRATING
COMMERCIALISATION
YEAR 2014

iiindex 2014

AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

invention
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exposition 2014

INNOVATEUR
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2014

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UNIVERSITI TEKNOLOGI MARA
MALAYSIA

*Bridging
the valley of death :
advancing the
commercialisation
of research*

RESEARCH BOOK

iiindex2014

AN INTERNATIONAL EXPOSITION ON RESEARCH AND INNOVATION

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FOREWORD

The Honourable Minister of Science, Technology and Innovation (MOSTI) has launched 2014 as Malaysia Commercialisation Year 2014 (MCY2014) with the theme Science Technology and Innovation (STI) for Wealth Creation. In line with this theme, Invention, Innovation, Design & Exposition 2014 (iidex2014) is an annual exposition organized by UiTM and is the ultimate platform to highlight and commercialise new inventions and innovations. Researchers and inventors will exhibit their products which cater to the needs and wants of the community and the country.

The iidex2014 creates a new dimension by fusing two competitive concepts, a competition among innovative products and a competition to invite Innovateur Wannabes to perform live pitching of their products to the audience. The iidex2014 focuses on comprehensive commercialization and creating opportunities for entrepreneurs to carry out R&D as well as to provide avenue to commercialise their products. Through expositions such as iidex2014, MOSTI hopes to inculcate the culture of commercialisation of new technology designed and created by Malaysians.

I wish to congratulate all the participants of the iidex2014 and this is the opportunity for all researchers to show their ideas and exhibits their products and creativity. Apart from showcasing their products, innovators will have the opportunity to provide a window to the industry for business matching during the exposition.

Tan Sri Dato' Sri Sallehuddin Mohamed
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KHAYA SENEGELANSIS : A NATURAL OIL ADSORBENT FOR PRODUCED WATER TREATMENT

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Petroleum is the main source of energy in the world. The production of petroleum increases every year to cater to the rise in global demand for oil and gas. However the extraction process of petroleum from oceans contributes to the increase in liquid waste. Produced water contributes 80% of liquid waste that is being generated. Produced water consists mainly of heavy metals, radionuclides, oil and grease, process chemicals, numerous types of dissolved gases, salts, solids, microorganisms, and dissolved oxygen. Oil and grease content in produced water can be divided into two types, which are dissolved oil and dispersed oil. Dissolved oils which consist of benzene, ethylbenzene, and xylene are the main organic compounds in produced water. However, dispersed oils are small droplets of oil suspended in liquid phase and contain fewer suntans of hydrocarbons. Untreated produced water contains numerous substances such as dispersed and dissolved oil, heavy metals, and production chemicals that can cause harm towards the environment. Dispersed oil content in produced water may vary in different oil wells. Dispersed oil in water is classified as toxicants to human beings and marine life. The dispersed oil can cause physiological damage and cancerous effects to living creatures. Over the years, numerous technologies have been established in order to treat dispersed oil in produced water treatment. Current treatment that is being used is by using physical method and also chemicals treatment that may gave side effects to the ecosystem. Thus from the research, the dried Khaya Senegelansis leaves have been identified as a natural oil adsorbent that have the ability to adsorb dispersed oil. Khaya Senegelansis dried leaves were chosen due to its abundant availability along the streets in Malaysia. These types of trees are used as landscaping trees and are planted throughout most major urban cities. These trees are crucial towards developing a greener environment in urban areas. As a major problem, the falling leaves of the trees become waste on the streets. With the utilisation of this waste will help the local authorities to turn the waste into a useful product. The dried leaves of Khaya Senegelansis was collected along the streets in FKK UiTM were washed, dried and grounded before being mixed with synthetic produced water for 24hr. The mixed solution was than stirred by using a magnetic stirrer. The engine oil used as synthetic produced water solution was SAE40 Petromas Mach 5 Mineral Engine Oil with distilled water. The results from Partition Gravimetric Method shows that the dried Khaya Senegelansis leaves are good oil sorbents due to the ability to remove 73% of oil from the solution in ambient temperature. Images obtained from the Scanning Electron Microscope (SEM), Gemini models also proved that patches of oil appeared on the surface of the leaves after 24 hours of contact time. This is because Khaya Senegelansis rich of phytochemical constituent which is lipophilic in nature. The constituents include flavonoids, carbohydrates, glycosides, saponins, tannins and anthraquinones. Saponins and flavonoids are the main factor that contributes to oil absorptivity due to their lipophilic properties. A few series experiments has been conducted based on the effect of various temperatures and oil concentration to investigate it's capability in adsorbing more oil and grease especially in produced water treatment. From the results obtained, it is believed that this Khaya Senegelansis dried leaves can turn the waste into useful product that is natural and environment friendly oil adsorbent. The findings also help the local authorities to manage the landscaping waste as well as to help the oil and gas companies to have more choices in treating Produced Water