

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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RESEARCH INNOVATION BUSINESS UNIT
UiTM-MTDC Technopreneur Centre, Universiti Teknologi MARA
40450 Shah Alam, Selangor Darul Ehsan, MALAYSIA
Tel : +603-5544 2747/2748/2750
Fax : +603-5544 2790

Web : www.iiindex.com.my
Email : iiindexuitm@gmail.com



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
Pro-Chancellor, Universiti Teknologi MARA

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REUSABILITY OF IRON SLUDGE BY SOLAR PHOTO-FENTON OXIDATION IN TREATMENT OF PALM OIL MILL SECONDARY EFFLUENT (POMSE)

Qistina Binti Omar, Norulnazilah Binti Ab'lah, Norlaily Binti Ahmad, Hazilia Binti Hussain
Nurul Shairah Binti Ahmad Syahrifun
UiTM Shah Alam, Selangor.
Email: qistina71@salam.uitm.edu.my

Solar photo-Fenton oxidation process is one of the advanced oxidation processes that have been proposed as an alternative in wastewater treatment. This paper reports on the reusability of iron containing sludge generated from the solar photo-Fenton oxidation on Palm Oil Mill Secondary Effluent (POMSE) based on COD and colour removal since this ion (Fe^{2+}) was used to react with H_2O_2 to generate more hydroxyl radicals. The experiment was conducted at pH3 using 1000 mL POMSE, 22.34g of Fe and 2.12 of COD/ H_2O_2 ratio. The sample was characterized by using DR5000U spectrometer, DRB200 and DR2800. In this study, the capabilities to reuse the iron containing sludge was determined by recycling the sludge five times at three different contact times which were 15 min, 30 min and 60 min. The iron containing sludge from each cycle was used as a source of iron to react with added H_2O_2 in the treatment of POMSE. The result showed that the trend of COD removal decreased with increasing number of recycle. Highest COD removal was 82.14 % by using fresh iron and decreased to 74.98% at first recycle with 60 min contact time and the lowest was 32.70 % in fifth recycle with 15 min contact time. The colour removal using fresh iron for 60 min contact time gave slightly decreased value compared to 15 and 30 min contact times which were 96.52%, 97.74% and 97.72% respectively. The results showed a little fluctuation in readings for 60 min contact times compared to other two contact times but it not very significant. The fifth recycle of color removal for 60 min contact time gave high value, 74.77% of colour removal compared to 15 min (57.57%) and 30 min (63.18%) contact times. This can be conclude that the effective reusability of iron containing sludge for COD removal was until first recycle with 60 min contact time. Despite decreasing percentage of colour removal for each cycle, the value is still acceptable and can be categorized in high percent removal. In future, the iron containing sludge will be dried and baked at certain temperature to prevent any organic content that can discard the removal of COD before used in the treatment of POMSE.