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## Evaluation of *Lemna minor* and *Chlamydomonas* to treat palm oil mill effluent and fertilizer production

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Malaysia is considered as one of the major palm oil producers in the world. Therefore, it is important to develop an environmental friendly and economic method to treat palm oil mill effluent (POME). The main aim of this study was to investigate the potential of *Lemna minor* (*L. minor*) and *Chlamydomonas incerta* (*C. incerta*) with catalogue number (KR349061) for the bioremediation of POME in order to achieve higher water quality standard and further produce organic fertilizer. In this study, three different experiments were conducted by using *L. minor*, followed by addition of *C. incerta* and further combination of *L. minor* and *C. incerta*. The concentration of nitrate (NO<sub>3</sub><sup>-</sup>), ammoniacal nitrogen (NH<sub>3</sub>-N), phosphate (PO<sub>4</sub><sup>-</sup>P), Electrical Conductivity (EC) and salinity in produced fertilizer were measured and then they were compared with two current commercial fertilizers. Growth factors such as growth rates, average number of leaf and height of root of *L. minor* of plants were also determined. The results showed that the microalgae and macrophytes were able to remove only 4.4% of chemical organic demand (COD) whereas the maximum removal rate for NO<sub>3</sub><sup>-</sup>, NH<sub>3</sub>-N and PO<sub>4</sub><sup>-</sup>P were 12.5%, 11.3% and 70.47%, respectively. Also, the average differences of NO<sub>3</sub><sup>-</sup>, NH<sub>3</sub>-N and PO<sub>4</sub><sup>-</sup>P concentrations in produced fertilizer in comparison with two current commercial fertilizers were 95, 39.5 and 62.5 mg/g, respectively. The results of this study revealed that only *L. minor* was converted to fertilizer. This study elaborated that both *L. minor* and *C. incerta* are able to remove a part of organic pollutants and nutrients from POME.

### Biography

He has completed his PhD at the age of 33 years in Faculty of Civil Engineering (Environmental Department), Universiti Teknologi Malaysia (UTM), 2016. He holds a Master in Bioscience and Bioengineering (Biotechnology), 2011 at Universiti Teknologi Malaysia. He was appointed as a visiting researcher from University Illinois Chicago (UIC) and postdoctoral studies at Universiti Teknologi Malaysia (UTM). He has a chair in IWA Emerging Water Leader (EWL). He has published more than 50 papers in reputed journals and has been serving as an editorial board member of repute.

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