

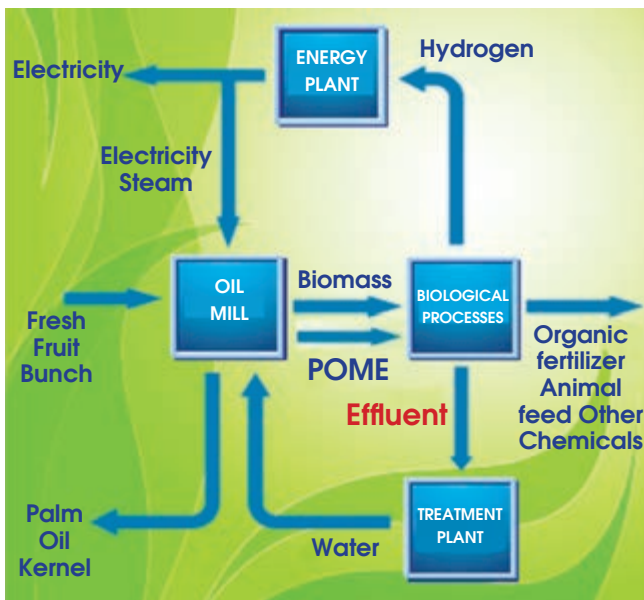
ZERO WASTE PALM OIL PROCESSING: AN INDUSTRY-UNIVERSITY INITIATIVE

WOMEN ENGINEERS SECTION

reported by



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Integration of zero waste palm oil processing

Prof. Ir. Dr Mohd. Sobri Takriff, Director of IDEA Centre at Universiti Kebangsaan Malaysia and Co-chair Professor of Universiti Kebangsaan Malaysia-Sime Darby Foundation Chair on Sustainable Development, delivered a technical talk on a research programme on zero waste technology for the palm oil industry.

The palm oil industry is the key driver for rural development in the country and provides direct employment for half a million Malaysians and indirect employment for another 250,000 people. However, it faces numerous environmental challenges due to the waste generated during its production process. Every ton of fresh fruit bunch processed generates 0.5-0.7 tons of Palm Oil Mill Effluent (POME), 0.37 ton of solid wastes that is made up of Empty Fruit Bunch (EFB), 0.22 tons of EFB, 0.06 tons of kernel shell, and 0.09 tons of fibre.

POME, the single largest source of industrial wastewater pollution is conventionally treated in open ponds where it is subjected to a series of biological treatments.

Nevertheless, this conventional treatment method results in the emission of greenhouse gases, namely methane and carbon dioxide. According to a Roundtable on Sustainable Palm Oil (RSPO) greenhouse gas working group report in 2009, 70% of greenhouse gases emitted from palm oil mills is contributed by POME. The fibres are used as boiler fuel, EFB is used for mulching at the plantation, while the kernel shell and kernel cake are sold as low value product.

Universiti Kebangsaan Malaysia, Sime Darby Foundation and Sime Darby Research Sdn. Bhd., have embarked on a collaborative initiative since 2010 to come up with a practical strategy for zero waste palm oil processing. The research programme, with a total funding of RM 21.6 million, is supported by Sime Darby Foundation and Sime Darby Research Sdn. Bhd. through an endowment, scholarships and research grant.

This industry-university research and development work focuses on pre-treatment of EFB for bio-hydrogen production, fermentative bio-hydrogen and bio-methane production from POME and pre-treated EFB, catalytic reforming of bio-methane, power generation from hydrogen gas, carbon dioxide sequestration and POME treatment using native microalgae species, membrane technology for water recycle and reuse as well as bioconversion of EFB agro waste into organic fertiliser with the aim of eliminating the waste to the air, ground and water body.

SUSTAINABLE APPROACH TO ZERO WASTE PALM OIL PROCESSING

This initiative is an excellent example of industry-academia collaboration to tackle sustainability issues for the palm oil industry. The jointly-developed strategy utilises the liquid effluent and solid by-products to generate renewable energy, produce bio-fertiliser, capture greenhouse gases and recycle the water as boiler feed. The developed zero waste technology is fully demonstrated in a pilot-scale facility installed at one of Sime Darby plantation's palm oil mills in Selangor. This integrated zero waste technology promises an alternative sustainable management practice in oil palm industry. ■