

COMPLETION REPORT

A Study of Cooperation between Malaysia and Japan Towards Biolubricants Resources and Utilization for Sustainable Development

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Growing environmental apprehensions has resulted in huge demand and widespread use of biolubricants in lubricant industry. Biolubricants are natural, biodegradable, renewable, non-toxic, non-polluting and emits net zero greenhouse gas. Biolubricants have great potential in lubricant industry owing to increasing attention to sustainable development. Prominence on the development of renewable, biodegradable, and environmentally friendly lubricants due to global attention to sustainable development have renewed interest in development of biodegradable lubricants. Vegetable oils can be used in an extremely wide range of automotive and industrial applications. Vegetable based oils are an important part of developing new strategies, policies, and subsidies that aid in reducing the dependence on mineral oil and other non-renewable sources. It will be challenging to find a balance between the economic possibilities, environmental requirements and social responsibilities of biolubricants.

The main objective of the present study is to provide information about the areas of cooperation between Malaysia and Japan on biolubricants. Reviews of various published works in Malaysia and Japan related to biolubricants for sustainable development are included in this study. Factors for bilateral cooperation presented in this study are driven by environmental impact, economic development, technological progress and social considerations. This work proposes to embrace technological progress to ensure sustainable development. Technological progress for sustainable development are highlighted in Malaysia and Japan based on biolubricants as basestock, biolubricants in mixtures and biolubricants with additives. The investigations on improvement in tribological characteristics based on test methods from numerous research studies in Malaysia and Japan are highlighted. Vegetable oils are promising candidates for biodegradable lubricants in Malaysia and Japan. Importance of various lubricant base stocks depends upon type of applications, cost and biodegradability requirements. Focus is on research and development of additives for biolubricants to reduce wear and friction in the tribological systems. New methods for energy conservation based on technological progress are vital with biolubricants that could offer potential environmental conservation, economic development, and social impact. Biolubricants development with cooperation between Malaysia and Japan increases markets in industrial applications for sustainable development.

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Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)

1. T. V. V. L. N. Rao, Ahmad Majdi Abdul Rani, Mokhtar Awang, Masri Baharom, Yoshimitsu Uemura, "An Overview of Research on Biolubricants in Malaysia and Japan for Tribological Applications" (Presented at 5th International Conference and Exhibition on Sustainable Energy and Advanced Materials (ICE-SEAM2017), in Melaka, Malaysia on 16-19 October 2017) Jurnal Tribologi, 2018, Accepted.
2. T. V. V. L. N. Rao, Ahmad Majdi Abdul Rani, Mokhtar Awang, Masri Baharom, Yoshimitsu Uemura, "A Study of Cooperation between Malaysia and Japan towards Biolubricants Resources and Utilization for Sustainable Development" To be communicated to Renewable and Sustainable Energy Reviews, 2018.

Book (Publisher and Date of the Book, Title and Author of the Book, etc.)