

## Biodegradable Grease from Palm Oil Industry Wastes

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### Abstract

This paper presents an experimental grease formulation made from spent bleaching earth (SBE) as the thickener, waste cooking oil (WCO) as the base oil and fumed silica as the additive. The properties of the different grease formulations, such as the thermal stability, the decomposition temperature, the penetration, the corrosivity on a copper strip, the drop point, and the friction-coefficient, were evaluated by standard methods and the grease formulations with and without the additive were compared. The results show that the grease without fumed silica required a high percentage of SBE (up to 80% w/w) while the addition of the fumed silica reduced the amount of SBE and increased the amount of the base oil. Fumed silica increased the penetration number of the grease by 1 standard (NLGI standard), made the grease slightly corrosive, eliminated the drop point, and increased the decomposition temperature. The friction coefficient of the formulated grease had an average value of 0.095 without fumed silica and 0.11 with fumed silica. The overall results show that SBE and WCO can be used to formulate grease and that fumed silica can increase the performance of the formulated grease.

*Keywords:* Grease; Tribology; Vegetable oil; Thermal stability; Corrosion