ABSTRAK

PENGARUH VARIASI SUHU DAN PENAMBAHAN ANTIOKSIDA BHT TERHADAP KARAKTERISTIK PELUMAS PADAT (*GREASE*) BERBASIS MINYAK JELANTAH

Ayu Meilika Sari, 2026, 33 Halaman, 6 Tabel, 6 Gambar, 4 Lampiran

Bio-grease merupakan pelumas semi-padat ramah lingkungan berbasis minyak jelantah sebagai alternatif *grease* mineral. Minyak jelantah yang masih mengandung trigliserida dan asam lemak di *saponifikasi* dengan kalsium hidroksida untuk membentuk sabun kalsium sebagai pengental. Penambahan asam asetat dilakukan untuk menghasilkan sabun kalsium kompleks yang meningkatkan stabilitas termal dan kekuatan struktur *grease*. Proses meliputi pemurnian minyak jelantah, *saponifikasi* pada suhu 185°C,195°C,210°C,225°C,240°C pembentukan sabun kompleks, dan pencampuran dengan *base oil* dengan dan tanpa antioksidan BHT. Produk diuji melalui penetrasi, titik tetes, kadar basa bebas, stabilitas oksidasi, serta analisis FTIR untuk memvalidasi reaksi. Penelitian ini bertujuan memperoleh formulasi optimum yang memenuhi standar mutu pelumas dan berpotensi sebagai alternatif pelumas industri berkelanjutan.

Kata kunci: bio-grease, minyak jelantah, sabun kalsium kompleks, saponifikasi, FTIR.

ABSTRACT

THE EFFECT OF TEMPERATURE VARIATION AND ADDITION OF BHT ANTIOXIDANT ON THE CHARACTERISTICS OF SOLID LUBRICANT (GREASE) BASED ON WASTE COOKING OIL

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Bio-grease is an environmentally friendly semi-solid lubricant based on used cooking oil as an alternative to mineral grease. Used cooking oil that still contains triglycerides and fatty acids is saponified with calcium hydroxide to form calcium soap as a thickener. The addition of acetic acid is carried out to produce a complex calcium soap that improves the thermal stability and strength of the grease structure. The process includes refining used cooking oil, saponification at 185°C, 195°C, 210°C, 225°C, 240°C complex soap formation, and mixing with base oil with and without BHT antioxidants. The product is tested through penetration, droplet, free alkaline content, oxidation stability, as well as FTIR analysis to validate the reaction. This research aims to obtain an optimal formulation that meets lubricant quality standards and has the potential to be an alternative to sustainable industrial lubricants.

Keywords*: bio-grease, used cooking oil, calcium complex soap, saponification, FTIR.*