

Production and physico-chemical analysis of lubricant from castor beans

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Abstract

The large scale industrial production of lubricants is based on the use of fossil fuel. A journey has started towards the utilization of the renewable resources for lubricant production. The castor beans and Lubricant produced (LPN) were collected from Rubavu district (Nyamyumba). The production of lubricant LPKL (lubricant produced in KIST laboratory) and lubricants analysis were performed in KIST IV laboratory. The castor oil was extracted using hot extraction with water as a solvent and extracted oil was heated about at 450°C to produce the lubricant. Physicochemical analysis of the produced lubricant was carried out: acid value, iodine value, saponification values and total acid number (TAN) were measured using titration method; viscosity, pH and refractive index were measured using viscometer, pH meter and refractometer respectively; water content and specific gravity was determined using gravimetric methods. According to results obtained, it was observed that viscosity; acid value, iodine value, pH, refractive index, water content and specific gravity of both LPN and LPKL are within the allowed limits. Saponification values of both LPN and LPKL were below the limit of 186-198 for vegetable oil designed for lubricating base oil, while TAN of LPKL exceeded the limit values. The lubricant production yield (LPKL) was 25%, which is less than 48% of castor oil content in castor seeds. The values obtained were compared with the commercial lubricant as reference. It can be concluded that when it is well purified castor oil can be utilized as engine lubricant. It was also observed that candles can be produced from the byproducts thus minimizing the waste generated.

Keywords: extraction, lubricant, viscosity, castor oil.