

Research Title: Extraction of Virgin Vegetables Oil Toward Production of Biodiesel

ABSTRACT

A sustainable transportation fuel known as biodiesel is usually produced by transesterification reaction of vegetable or seed oil. Biodiesel could replace petroleum-based diesel as they have common properties. The objective of this work was to produce different samples of biodiesel from raw materials available in Oman and then test the samples and analyze the results. In this study, virgin oil from coconut and dates kernel were extracted, to produce fatty acid methyl esters from them, using different extraction methods. Hot extraction and chilling, freezing and thawing methods were used to extract virgin coconut oil and solvent extraction method was used to extract virgin dates kernel oil using n-hexane as a solvent. Biodiesel production experiment were carried out with laboratory scales. The biodiesel samples produced from the extracted virgin oil were tested using Gas Chromatography Mass Spectrometry (GC-MS) and Fourier Transform Infrared Spectroscopy (FT-IR). The GC-MS results were imported to an online software called biodiesel analyzer to obtain some of the biodiesel properties such as kinematic viscosity, density, cetane number, cold flow properties, oxidative stability and iodine value. The properties were evaluated based on the American Society for Testing and Materials (ASTM) and European Committee for Standardization specification. Biodiesel derived from virgin coconut oil was found to have high percentage of saturated fatty acid compared with the one derived from virgin dates kernel oil. Therefore, by comparing properties of these samples, the effect of this percentage was noticed. Some properties were found outside the allowed range such as the cloud point and pour point. Biodiesel in this research may have the chance to be used in Oman after carrying more test on it to ensure safety.

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