

## Production of Biodiesel Fuel from Non-edible Lipids by use of Superheated Methanol Vapor Method

HIROSHI NABETANI<sup>1</sup>, SHOJI HAGIWARA<sup>1</sup> and MITSUTOSHI NAKAJIMA<sup>2</sup>

<sup>1</sup>National Food Research Institute, NARO, Tsukuba, Ibaraki 305-8642, Japan

<sup>2</sup>Alliance for Research on North Africa (ARENA), University of Tsukuba, Tsukuba, Ibaraki 305-8572, Japan

Email: nabetani@affrc.go.jp

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**Abstract:** Biodiesel fuel is a replacement for diesel as a fuel produced from biomass resources. It is usually defined as a fatty acid methyl ester derived from vegetable oil or animal fat. In European countries, such as Germany and France, biodiesel fuel is commercially produced mainly from rapeseed oil, whereas in the United States, soybean oil is more frequently used. In many other countries such as Japan and countries in Southeast Asia, lipids that cannot be used as a food source could be more suitable materials for the production of biodiesel fuel because its production from edible oils could result in an increase in the price of edible oils, thereby increasing the cost of some foodstuffs. Therefore, used edible oil, lipids contained in waste effluent from the oil milling process, by-products from oil refining process and crude oils from industrial crops such as jatropha could be more promising materials in these countries. The materials available in Japan and Southeast Asia for the production of biodiesel fuel have common characteristics; they contain considerable amount of impurities and are high in free fatty acids. Superheated methanol vapor (SMV) reactor might be a promising method for biodiesel fuel production utilizing oil feedstock containing free fatty acid (FFA) such as waste vegetable oil and crude vegetable oil [1, 2]. In the conventional method using alkaline catalyst, FFA contained in waste vegetable oil is known to react with alkaline catalyst such as NaOH and KOH generating saponification products and to inactivate it. Therefore, the FFA needs to be removed from the feedstock prior to the reaction. Removal of the alkaline catalyst after the reaction is also required. In the case of the SMV reactor, the processes for removing FFA prior to the reaction and catalyst after the reaction can be omitted because it requires no catalyst [3]. Nevertheless, detailed study on the productivity of biodiesel fuel produced from waste vegetable oils by use of the SMV reactor has not been examined yet. Therefore, this study aims to investigate the productivity of biodiesel produced from waste vegetable oils using the SMV reactor.

*Keywords: Biomass, Biodiesel, Superheated methanol vapor*

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