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Application of Tocopherol as Antioxidant to Reduce Decomposition Process on Palm Oil Biodiesel

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Abstract : Biodiesel is one of the alternative fuels promising for substituting petrodiesel as energy source which has an advantage as it is sustainable and eco-friendly. Due to the raw material that tends to decompose during storage, biodiesel also has the same characteristic that tends to decompose during storage. Biodiesel decomposition will form higher acid value as the result of oxidation to double bond on a fatty acid compound on biodiesel. Thus, free fatty acid value could be used to evaluate degradation of biodiesel due to the oxidation process. High free fatty acid on biodiesel could impact on the engine performance. Decomposition of biodiesel due to oxidation reaction could prevent by introducing a small amount of antioxidant. The origin of raw materials and the process for producing biodiesel will determine the effectiveness of antioxidant. Biodiesel made from high free fatty acid (FFA) crude palm oil (CPO) by using two steps esterification is vulnerable to oxidation process which is resulted in increasing on the FFA value. Tocopherol also known as vitamin E is one of the antioxidant that could improve the stability of biodiesel due to decomposition by the oxidation process. Tocopherol 0.5% concentration on palm oil biodiesel could reduce 13% of increasing FFA under temperature 80 °C and exposing time 180 minute.

Keywords : antioxidant, palm oil biodiesel, decomposition, oxidation, tocopherol
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