2011-10-19

Evaluation of the Oxidation Stability of Biodiesel Produced from Moringa oleifera Oil

Kivevele, Thomas

ACS Publications

https://doi.org/10.1021/ef200855b

Evaluation of the Oxidation Stability of Biodiesel Produced from Moringa oleifera Oil

Thomas Kivevele, Makame M. Mbarawa, Ákos Bereczky, and Máté Zöldy

To download full text click that link
DOI: https://doi.org/10.1021/ef200855b

Abstract

Biodiesel is considered as an alternative fuel to petroleum-based conventional diesel fuel. Dependent upon the raw material, biodiesel can contain more or less unsaturated fatty acids in its composition, which are susceptible to oxidation reactions accelerated by exposure to oxygen and high temperatures. The present study evaluated the oxidative stability of biodiesel produced by methanolysis of Moringa oleifera oil, primarily available on the African continent. The evaluation was conducted by means of the Rancimat instrument, at a temperature of 110 °C, with an air flow of 10 L/h. Moringa oil methyl ester (MOME) displayed an oxidation stability of 5.05 h. Thus, MOME met the oxidative stability requirement in the American Society for Testing and Materials (ASTM) D6751 standard, which prescribes a minimum of 3 h, but did not meet the minimum requirement prescribed in the EN 14214 standard, which is 6 h. Also, this study evaluated the effectiveness of four antioxidants, 1,2,3-trihydroxybenzene [pyrogallol (PY)], 3,4,5-trihydroxybenzoic acid [propyl gallate (PG)], 2-tert-butyl-4-methoxyphenol [butylated hydroxyanisole (BHA)], and 2,6-di-tert-butyl-4-methylphenol [butylated hydroxytoluene (BHT)], on the oxidation stability of MOME. The result showed that the effectiveness of these antioxidants was in the order of PY > PG > BHA > BHT.

Keywords

Lipids, Antioxidants, Biodiesel, Oxidation, Stability