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Smart bioactive compounds: Their synthesis and potential application in biodiesel oxidation stability enhancement

Anuchaya Devi

Tezpur University, India

Renewable fuels are one of the technological issues that became more fascinating due to the environmental benefits. In this context, biodiesel deserve highlight because of its biodegradability and low pollutant emission compared to petro diesel. The key problem associated with the use of biodiesel is its low oxidation stability which affects its storage and makes it unsuitable for engine. The oxidation of the biodiesel primarily increases the peroxide value and then a decrease as primary products degrades to form secondary products. The increase in peroxide value can impart the rise in cetane number, which reduces ignition delay and can cause various engine problems. As an option to stop or slowing down the oxidation process, antioxidants are added to inhibit the initiation and propagation of free radicals, reducing the formulation of secondary degradation compounds. Synthetic antioxidants have phenolic compounds therefore they are added to biodiesel to inhibit the radical formation. Butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA), tert-butylhydroquinone (TBHQ) and propyl gallate (PG) are commonly used synthetic antioxidants in biodiesel. These synthetic antioxidants are made from non-renewable sources and has carcinogenic health constrains for the living organisms directly exposed to them, because of these negative attributes renewable antioxidant sources containing phenolic compounds are more desirable than the synthetic antioxidants. In this context, Bio-active compounds like polyphenols which are present in various natural plant based materials and they are very important constituents and plays a crucial role in protecting lipid oxidation. Ginger extract contains phenolic compounds naming gingerol and shoagol which are effective agents for stopping radical propagation. Ginger extract presented greater protection for biodiesel during the oxidation stability test by Rancimat method. A higher percentage of added nature based robust ginger extracts results in the enhancement of the oxidation stability due to the presence of more antioxidant compounds in it.



Biography

Anuchaya Devi has her expertise in biodiesel production from different non-edible oil sources. Her research is primarily focused on biodiesel fuel quality enhancement in terms of improving its oxidation stability by different methods. She has developed designer biodiesel by blending different non-edible oils in different volumetric ratios with improved fuel quality. In recent times she focused on searching some alternative natural antioxidant sources which can be applied to biodiesel in place of synthetic antioxidants for protecting biodiesel from oxidation. She has identified the application of Ginger extract in biodiesel as a novel additive antioxidant source which is tremendously capable in protecting biodiesel from oxidation.

anuchaya.tezu13@gmail.com

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