

Impact of Binary Antioxidant Proportions on Antioxidant Synergy and Biodiesel Oxidation Stability †

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Abstract: Biodiesel is environment friendly, clean-burning, and renewable energy source which can be utilized in an existing diesel engine without any major modification. One of the biggest issues with biodiesel is its storage instability. The present manuscript deals with the impact of different binary antioxidants' proportions on antioxidant synergy and storage stability of biodiesel. Biodiesel was prepared by transesterification of Jatropha oil using KOH as catalyst and methanol as solvent. The reaction was carried out at 60°C for 3 h in a batch-type reactor. Biodiesel was blended with conventional diesel in different proportions v/v ratio (B05, B10, B20, and B40). Pyrogallol:Propyl gallate (PY:PrG), Pyrogallol:tert-butyl hydroquinone (PY:TBHQ), and Pyrogallol:Butylated hydroxyanisole (PY:BHA) at weight ratios of 9:1, 3:1, 2:1, 1:1, 1:2, 1:3, and 1:9, respectively and were used in biodiesel-diesel blends. However, for all blends, the total amount of added binary antioxidant combination was fixed at 400, 500, 600, and 700 ppm. The results revealed that 500 ppm concentration of PY:PrG (1:3 / 3:1) was the most effective than others, while PY:BHA (1:9 / 9:1) showed the worst performance.

Keywords: biodiesel; storage stability; antioxidants; Pyrogallol, Propyl gallate.

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Conflicts of Interest

The authors declare no conflict of interest.