

An Analysis of Diesel Engine Output using Low and High Oxygen Content Soapnut Biodiesel Blends

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Abstract: 18 soapnut biodiesel-diesel mixes, some with soapnut oil, were tested in a diesel engine to see how oxygen concentration affected engine performance and emissions. The results were displayed using changing fuel oxygen concentration to account for fuel blends' considerable oxygen content differences. Fuel oxygen level between 1.8% and 3.0% generated the optimum engine performance, whereas 0.71% to 2.37% produced the best engine emissions. Considering engine performance and emissions, the recommended fuel oxygen concentration range is 1.80% to 2.37%. Thus, biodiesel mixed fuels with an oxygen content in the above range may be used in diesel engines with comparable emissions and performance. If blends include more biofuel, additional research is required to lower fuel oxygen levels to this optimal range. Additionally, utilizing proper additives in biodiesel mixed fuels may help achieve the aim, although more research is needed.

Keywords: Soapnut biodiesel; diesel engine; engine performance; NO_x emissions; fuel oxygen content