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## Performance and emission characteristics of biodiesel–diesel blend and environmental and economic impacts of biodiesel production: A review

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### ABSTRACT

The objective of this review is to illustrate the properties, engine performance, and emission characteristics of biodiesel–diesel blends employed in CI engines under different conditions worldwide as well as the environmental and economic impacts of biodiesel production, and the effects of this blend on engine durability are also discussed. Biodiesels are gaining more importance as a promising alternative energy resource due to the global fossil fuel crisis and emission problems. However, it was realized that extensive utilization of biodiesel would tax the food chain and could lead to food shortages. Thus, the use of a blend of biodiesel with conventional fuel was suggested to balance its usage, which could still provide a beneficial greenhouse effect. From the results of the investigation, it is reported that blends containing up to 30% biodiesel have almost the same properties as diesel. Most investigation results have shown that, compared to diesel, biodiesel–diesel blend provides shorter ignition delay and a reduced heat release rate as well as a slightly higher efficiency by sacrificing a small amount of fuel. The HC, CO, and PM emissions are reduced to a great extent but the NO<sub>x</sub> emission becomes slightly higher. Biodiesels are expected to reduce the dependence on imported petroleum with the associated economic vulnerability, reduce greenhouse gas emissions and other pollutants, and revitalize the economy by increasing demand and prices for agricultural products. From the review, it can be said that blends of biodiesel with a small content by volume can be used in existing CI engines without any major modifications.

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