“Numerical Simulation of Dilute Gas-Droplet Flow with Evaporation”
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Vegetable oils, due to their agricultural origin, are able to reduce net CO2 emissions to the atmosphere along with import substitution of petroleum products. However, several operational and durability problems of using straight vegetable oils in diesel engines are reported in the literature, which are because of their higher viscosity and low volatility compared to mineral diesel. In the present research, experiments were designed to study the effect of reducing Jatropha oil’s viscosity by blending and transesterification (methyl ester of Jatropha) and thereby eliminating adverse effects on performance, emission and combustion characteristics of the engine. In the present experimental research, Jatropha oil and Jatropha methyl ester which is derived through transesterification of Jatropha oil using methanol in presence of sodium hydroxide catalyst. Experimental investigations have been carried out to examine the performance, mass emission and combustion characteristics of in an indirect injection transportation diesel engine running with diesel, vegetable oil, biodiesel and its blends with diesel. Engine tests were performed at different engine loads ranging from no load to rated (100%) load at fixed engine speed (2000 rpm). All test fuels exhibited similar performance, emission and combustion characteristics as diesel however vegetable oil, biodiesel and its blends showed slightly higher thermal efficiency, mixed trend in mass emission of gaseous pollutants. Pressure rise for all vegetable oil and diesel blends was found to be higher than mineral diesel and earlier start of combustion along with relatively lower heat release during premixed combustion phase at all engine loads.