

Abstract

Attempts to use many types of biofuel have been tried throughout the past. Waste cooking oils (WCO) represent attractive alternatives to edible fat and oils for the production of biodiesel fuel from different points of view: they are inexpensive feedstock for biodiesel production. At the same time, using this kind of feedstock eliminates food versus fuel competition. Finally, Their use supposes an environmentally friendly approach. Internal combustion engines operate correctly on a wide range of speeds and loads. However, only few studies on biodiesel fueled engines are undertaken for performance mapping. In the present study, the effects of entire operational range of speed/load on engine performance and emission levels of an engine are investigated when neat WCO biodiesel (B100) and its blends (B25) and (B50) are used. The obtained results are compared to those of conventional diesel (B0). The suitability of WCO biodiesel has been established by many researchers. However their results report a wide disparity on emission levels. Combustion characteristics, performance and emission maps will be performed to give appropriate indications explaining the divergence reported in literature. The map indicates that B50 and B25 exhibit similar trends of BSFC to diesel fuel, across the speed variation albeit with difference in response levels. Contrariwise B100 shows an inverse behavior with speed increase. Results show also that Unburned Hydro-Carbons (UHC) emissions are highly correlated with engine speed. However, CO and PM emissions are extremely correlated with load and they are less sensitive to engine speed. NO_x emissions are generally higher with biodiesel except some extreme zones of the map