



SEMINAR ANNOUNCEMENT

Combustion Characteristics of Cottonseed Biodiesel and Chicken Fat Biodiesel Mixture in a Multi-Cylinder Compression Ignition Engine

by

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Abstract:

Although waste animal fats such as chicken fat are promising alternative energy sources, biodiesels produced from these types of feedstocks hardly satisfies the EN14214 biodiesel standards. In this study, biomixtures were prepared by blending cottonseed biodiesel and chicken rendering fat biodiesel which were produced via transesterification method. First, fuel properties of the neat biodiesels and novel biomixtures were measured and compared to European biodiesel standards and diesel. Then, the engine performance, combustion characteristics and exhaust emissions of these novel biomixture fuels were measured in a three-cylinder indirect injection diesel engine under various engine loads and at constant speed of 1500 rpm. The fuel characterisation showed that biomixtures met the European standards. The Brake Specific Energy Consumption and Brake Thermal Efficiency of all biomixtures were comparable with neat biodiesels and diesel at the full engine load. The combustion results revealed that the maximum in-cylinder pressure and energy release values of the CO50CH50 were 4.2% and 4.4% higher than the diesel at full engine load because of optimised fuel properties of biomixture such as molecular structure, viscosity, cetane number and iodine value. CO50CH50 had 2.9% reduced CO₂ and comparable CO emission compared to diesel, which were also 5.6% and 13% lower than cottonseed biodiesel respectively. However, NO emission of CO50CH50 was found 3.8% and 5.8% higher than diesel and cottonseed biodiesel. To conclude, this research showed that biodiesel/biodiesel blending is a promising approach to meet the EN14214 standards and reduce exhaust emissions. However, this study also reveals that the biodiesel/biodiesel mixtures does not help with biodiesel NO_x penalty.

Biography:

Kemal Masera is working as an Energy Consultant since September 2023 in a private company in UK. He is providing energy efficiency, energy management and energy decarbonisation solutions for commercial buildings and industrial processes. His clients include globally recognised companies such as McLaren, AstraZeneca, BBC and UK defence industry. At the same time, he is teaching in the mechanical engineering program at METU NCC as a part-time Assistant Professor. He is also appointed as a visiting lecturer at Aston University, Birmingham UK. He worked as a Research Fellow from 2020 to 2022 at Brunel University London on an EU funded project entitled Application of Solar Thermal Energy to Industrial Processes. He worked as a



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Teaching Fellow from 2019 to 2020 at Aston University taught mechanical engineering laboratories and participated in the UKRI funded Waste to Engine project. He received his PhD degree with the thesis titled as Biodiesel-Biodiesel Mixtures to Upgrade Fuel Properties and Lower Exhaust Gas Emissions. His research is focused on renewable energy systems and biofuels including their system level applications and modelling.