

Comparative Parametric and Emission Characteristics of Single Cylinder Spark Ignition Engine Using Gasoline, Ethanol, and H₂O as Micro Emulsion Fuels

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Abstract : In this paper, the performance and emission characteristics of a Single Cylinder Spark Ignition engine have been investigated. The research is based on micro emulsion application as fuel in a gasoline engine. We have analyzed many micro emulsion compositions in various proportions, for predicting the performance of the Spark Ignition engine. This new technology of fuel modifications is emerging very rapidly as lot of research is going on in the field of micro emulsion fuels in Compression Ignition engines, but the micro emulsion fuel used in a Gasoline engine is very rare. The use of micro emulsion as fuel in a Spark Ignition engine is virtually unexplored. So, our main goal is to see the performance and emission characteristics of micro emulsions as fuel, in Spark Ignition engines, and finding which composition is more efficient. In this research, we have used various micro emulsion fuels whose composition varies for all the three blends, and their performance and emission characteristic were predicted in AVL Boost software. Conventional Gasoline fuel 90%, 80% and 85% were blended with co-surfactant Ethanol in different compositions, and water was used as an additive for making it crystal clear transparent micro emulsion fuel, which is thermodynamically stable. By comparing the performances of engines, the power has shown similarity for micro emulsion fuel and conventional Gasoline fuel. On the other hand, Torque and BMEP shows increase for all the micro emulsion fuels. Micro emulsion fuel shows higher thermal efficiency and lower Specific Fuel Consumption for all the compositions as compared to the Gasoline fuel. Carbon monoxide and Hydro carbon emissions were also measured. The result shows that emissions decrease for all the composition of micro emulsion fuels, and proved to be the most efficient fuel both in terms of performance and emission characteristics.

Keywords : AVL Boost, emissions, microemulsions, performance, Spark Ignition (SI) engine

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