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Editorial: The future prospects of alternative fuels

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Editorial on the Research Topic
The future prospects of alternative fuels

Recent political issues have prompted governments to re-evaluate their energy strategies, with a growing emphasis on local resources. Biofuels, derived from various sources, stand out as a promising alternative to imported fuels that are often controlled by a few countries. When used in internal combustion engines, the potential of these biofuels could not only significantly reduce environmental hazards but also offer a bright future for energy sustainability.

Our examination of internal combustion engines focuses on fuels that are readily available and that can be sourced locally in the majority of countries. This emphasis on local resources underscores the resourcefulness and adaptability of engineers, providing reassurance about the industry's ability to adapt to and thrive in a changing energy landscape.

Şanlı et al. conducted a comprehensive investigation of a diesel engine, considering thermodynamic, thermoeconomic, and exergoeconomic aspects. Their study, which involved fueling the engine with tung oil and operating it at high speeds of 2,400, 2,600, and 2,800 rpm, provided valuable insights. While the findings showed that conventional diesel fuel was better than Tung biodiesel blend fuel in terms of energy conversion rate into useful work, they also demonstrated that energy and exergy efficiencies dropped with higher engine speeds, which provided confidence in the thoroughness of the research.

In addition to conventional diesel and biodiesel fuel, the effect of Hydroxy gas (HHO) was evaluated by Çalık According to the experimental results, the author discovered that the increase in Brake Specific Fuel consumption and decrease in Brake Thermal Efficiency with canola biodiesel was limited with the addition of HHO. Both biodiesel and HHO fuels improved CO and CO_2 emissions; however, the fuels worsened NO_x emissions.

The study by Onojowho and Asere included CFD modeling in their experimental measurements. They performed experimental and numerical studies on the flow characteristics of diesel-biodiesel fuel blends after fuel injection mode. The authors focused on the relationship between the in-cylinder fluid motion and the combustion chamber. According to the results, the authors observed that the engine combustion

efficiency increased by up to 88% as the fuel mass flow rate increased. The rising biodiesel ratio and mass flow rate reduced fuel consumption, and diesel fuel has better lubricating properties and exergy progress.

In the last article to be included in this Research Topic, Lyv examined carbonyl compound emissions from 11 types of fuels, including straw, wood, and coal. The emission factor and modified combustion efficiency mapping were presented to identify the characteristics of the test fuel emissions. The results showed that the emission factor decreased with the increase of modified combustion efficiency due to improved combustion. The study also indicated that the fuel composition heavily influences the emission composition of different fuels and aromatic aldehydes and acrolein can be separated from more formaldehydes and acetaldehydes.

These studies showed that locally sourced fuels can replace conventional diesel fuel in many ways. Moreover, they can also reduce harmful emissions into the environment.

Author contributions

EU: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing–original draft, Writing–review and editing. BŞ: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing–original draft, Writing–review and editing. JR: Project administration, Writing–review and editing. RR: Project administration, Writing–review and editing. PI: Project administration, Writing–review and editing.

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