Analysis of the heat release rate of low-concentration bioethanol from sago waste

Numberi Johni Jonatan, author

Abstrak

This study aimed to analyze the heat release rate from the combustion process of bioethanol from sago waste to determine the viability and feasibility of low-concentration bioethanol as an alternative fuel. The heat release rate, exhaust gas, and flame temperature were measured using a cone calorimeter, and bioethanol combustion was conducted using the pilot ignition method, with an ethanol quality range of 60–70%. The analysis that the heat release rate of 60% bioethanol combustion ranged from 20 to 140 kW/m2, while a lesser range resulted from 70% bioethanol combustion (18–45 kW/m2). The flame temperature for 60% bioethanol was found to be 440°C, while the smoke and orifice temperature was 150°C. The combustion of 70% bioethanol produced a flame temperature of 450°C and a smoke and orifice temperature of 120°C after approximately 6 min of combustion. This study contributes a solution for meeting the energy demand in rural areas, where the access to and availability of major fuel resources are limited. In addition, from the obtained results, this research concluded that bioethanol made from sago waste is suitable as a clean and alternative fuel for household applications in rural areas.