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Explosibility and burning properties of pulverised rice husk and their dependence on particle sizeMuhammad Azam Saeed, Nieves Fernández Áñez, Gordon E Andrews, Herodotos N Phylaktou and Bernard Gibbs
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Renewable biomass crop residues are a viable and low cost fuel option for power generation plants. For an agricultural country like Pakistan this locally accessible fuel source can be used as a substitute for coal for a more environmentally friendly, distributed grid of smaller power generation plants. However, these alternative fuels have unquantified fire/explosion risks associated with their handling and also unknown burning characteristics which will affect the burner design. Reliable measurements of the reactivity parameters for these biofuels depend on a number of factors arising from their chemical and physical properties. In this work, fundamental properties such as flame speeds, burning velocities, maximum pressure and the explosibility coefficient have been measured for different size fractions of a selected rice husk crop residue using a modified 1 m³ vessel. Explosibility properties were found to be more severe for the finer fractions compared to the coarser sizes. MEC were measured to be from 0.4 for the finest fraction to 2.1 for coarser fraction in terms of actual burnt equivalence ratio. Most reactive concentration was measured at low equivalence ratio for fine fraction as compared to coarse size fraction. Peak volume normalised rate of pressure rise for fine fraction was measured to be 83 bar m/s higher than 33 bar m/s for the coarse fraction. Surface morphological study showed more fines contributing in flame propagation leaving coarse particles partially burnt. The finer powder samples were also shown to have a higher ash content which may adversely affect the burning rates and pre-washing of the samples may eliminate some of the inert content and improve burning characteristics.

Biography

Muhammad Azam Saeed is pursuing his final year PhD in the field of 'Pulverized Biomass Flame Propagation'. His main expertise are in the agricultural waste crop residue as energy source and hazards assessment associated with these fuels. He has 8 conference papers presented in the renowned international conferences. He has one published paper in the Journal of Loss Prevention and three other papers are in the revision phase in *Combustion Science and Technology Journal*, *fuel journal* and *International Journal of Hydrogen Energy*.

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