

Explosion of Undried and Dried Rice Flour with Ignition Time of 20 ms

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ABSTRACT

In this work, the explosion characteristics of rice flour towards difference concentration at ignition time of 20ms were analyzed. A series of experiments were performed in a 20 L spherical chamber to obtain a maximum overpressure (P_{max}), rate of the pressure rise (dP/dT), and deflagration index (K_{st}) of undried and dried commercial rice flour. The dust sample and air were ignited by two chemical ignitors. Kistler piezoelectric pressure sensor was used to determine the propagation of pressure wave during the explosion. The moisture content of the samples was measured via proximate analysis. The P_{max} was obtained at the highest pressure over the range of concentrations. P_{max} for undried rice flour was 10.9 bar at concentration of 1000 kg/m³. P_{max} for dried rice flour was 14.4 bar at concentration of 1000 kg/m³. The highest dP/dT rise was 103 bar/s for undried flour achieved at concentration of 750 kg/m³ and 202 bar/s for dried flour achieved at concentration of 1000 kg/m³. K_{st} for undried and dried rice flour are 27.96 bar.m/s and 54.83 bar.m/s respectively. It was found that the explosion severity increased as the dust flour concentration increases.

KEYWORDS: Rice flour, Explosion, Maximum overpressure, Rate of pressure rise, Deflagration index

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