

## **Explosion severity of rice dust in a spherical system**

*Nur Hikmah Semawi, Prof. Dr. Siti Zubaidah Sulaiman, Muhammad Syahrul Ridhuan Mazilan, Dr. Shalyda Md Shaarani, Dr. Rohaida Che Man, Dr. Siti Kholijah Abdul Mudalip, Dr. Zatul Iffah Mohd Arshad, Dr. Aainaa Izyan Nafsun*

University Malaysia Pahang, Faculty of Chemical and Process Engineering Technology,  
Gambang, 26300, Malaysia

### **ABSTRACT**

Rice is relatively rich in minerals, including iron, magnesium, and selenium. In the presence of a spark, rice dust suspended in air in a range of concentrations can ignite and explode. The explosion characteristics of brown, black, white, glutinous, and Bario rice were studied in a 20-L spherical vessel. Brown rice recorded the highest explosion pressure and rate of pressure rise in both dried and undried forms, while Bario rice recorded the lowest. Brown rice was more combustible and tended to develop a fast flame mechanism once ignited owing to its low moisture content and high volatility, which made its explosion more severe compared to that of black, white, glutinous, and Bario rice.

### **KEYWORDS**

Explosion severity; Flame propagation; Rice dust explosion; Rice production technology

**ACKNOWLEDGEMENT**

The authors would like to thank the Ministry of Higher Education for providing financial support under Fundamental Research Grant Scheme (FRGS) No. FRGS/1/2021/TK0/UMP/02/13 (University reference RDU210119) and Universiti Malaysia Pahang for providing laboratory facilities and additional financial support under Internal Research grant RDU192325.