

# The effect of particle size on physicochemical and thermal analysis of rice husk for explosion studies

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## ABSTRACT

The effect of rice husk particle size on physicochemical and thermal behaviour was studied for identify whether it has the potential to explode. The thermal degradation of the lignocellulosic constituent in rice husk was evaluated via thermogravimetric analysis (TGA). Rice husk morphology and elemental composition were evaluated via scanning electron microscopy with energy dispersive X-ray (SEM-EDX). Results showed that the rice husk samples were richer in cellulose than in lignin in terms of weight percent, indicating that they were combustible. Uncontrolled combustion propagation can lead to an explosion. However, the presence of  $\pm 5$  wt% silicon in rice husk may reduce the explosion severity due to its low thermal conductivity. Furthermore, the smallest particle size, 71  $\mu\text{m}$  recorded faster thermal degradation and more explosive as compared to 106, 160 and 250  $\mu\text{m}$ . This preliminary data is very useful to improve the safety technique specifically for rice husk dust explosion protection, prevention, and mitigation.

## KEYWORDS

Thermal degradation; Cellulose; Silicon; Rice husk; Explosion

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