

## ABSTRACT

Exact information of mechanical properties of straw are necessary to be executed for designing the equipment's and machineries being used for harvesting, threshing and other post-harvest practices. This study in this importance was carried out to assess the mechanical properties of rice straw as effected by different moisture, variety and loading rates, which have never been accounted before. Three different rice varieties i.e. Yue76, Qianjindao and Yue61 when harvested were collected for experimentation. Mechanical properties of rice straw were evaluated at three internodes (IN1, IN2 and IN3) down from ear, and were subject to two different moisture contents (11 and 18%) and loading rates (10 and 20 mm min<sup>-1</sup>). The experimental design was subject to randomized complete block design, replicated thrice. The results revealed that the rice straw parameters and their interactions were significantly affected ( $p \leq 0.05$ ) by different moisture content, variety and loading rate. The average values obtained were significantly different from each other, the average values for shear strength were observed to be 14.18, 9.95 and 11.99 MPA, for specific shearing energy the average values were observed to be 17.30, 13.34 and 15.93 mJ mm<sup>-2</sup>, for bending strength the averages values were observed to be 11.33, 7.40 and 9.54 MPa, and for young's modulus the average values were observed to be 1.06, 0.73 and 0.99 GPa for Yue76, Qianjindao and Yue61 varieties respectively. The study revealed that shear strength and specific shearing energy increased with increasing moisture content and loading rate, where the bending strength and young's modulus decreased. The outcomes of current study revealed a wide variation between the parameters observed, which makes it necessary to assess the mechanical properties of rice straw before designing and judging the equipment's and machineries being used for post-harvest operations.