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ENGINEERING PROPERTIES OF FOXTAIL MILLET GRAINS

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ABSTRACT

Design and development of post-harvest machinery needs information about various engineering properties. The present study focused to measure various engineering properties such as length, breath, thickness, geometric mean diameter, arithmetic mean diameter, equivalent mean diameter, Length-breath ratio, sphericity, 1000 kernel mass, bulk density, true density, porosity, angle of repose, coefficient of static friction, coefficient of internal friction, hardness and terminal velocity of foxtail millet using standard methods. Raw foxtail millets after procured from local market was cleaned to remove dust and impurities. The engineering properties of foxtail millet was recorded at 10.9 % moisture (% db). The results of the study revealed that, the length, width and thickness of foxtail millet was found to be 1.878 ± 0.084, 1.467 ± 0.041 and 1.258 ± 0.061 mm respectively. Arithmetic mean diameter, geometric mean diameter and equivalent mean diameter of foxtail millet was found to be 1.534 ± 0.055, 1.513 ± 0.054, 1.516 ± 0.053 mm respectively. The sphericity, L/W ratio, thousand grain weight, terminal velocity and hardness of foxtail millet grains was found to be 0.806 ± 0.016, 1.28 ± 0.29, 3.126 ± 0.11 g, 3.82 ± 0.08 m/s and 22.383 N respectively. The bulk density, true density and porosity of foxtail millet was found to be 701.2 ± 16.27 (kg/m^3), 1385.2 ± 6.98 (kg/m^3) and 49.376 ± 1.33 % respectively. The frictional properties of foxtail millet were found to be angle of repose (29.66 ± 0.62 degree), coefficient static friction with mild steel (0.288 ± 0.02) and cast iron (0.31 ± 0.02) and coefficient of internal friction with mild steel (0.47 ± 0.03) and cast iron (0.512 ± 0.03). These engineering properties further will be used for development of pneumatic type millet dehuller.

KEYWORDS: Foxtail Millet, Terminal Velocity, Hardness, Length, Breath And Thickness.

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