ENGINEERING PROPERTIES OF CURED SMALL AND BELLARY ONIONS

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ABSTRACT

Onion (Allium cepa L.) is one of the oldest bulb crops, known to mankind and consumed worldwide. It is one of the most important commercial vegetable crops grown in India. Despite the achievements in onion processing and storage, the versatility of onions grown in India desperately requires clear database of physical, frictional and textural properties for better and precise designing of post-harvest operations like grading, sorting and packaging. The sample size taken is 50 bulbs under each grade and the measured properties include equatorial diameter, polar diameter, neck diameter, geometric mean diameter (D_{GM}), arithmetic mean diameter (D_{am}), frontal surface area (A_{FS}), cross-sectional area (A_{CS}), mass, volume, density, coefficient of friction, cutting strength and TSS. Small onions (CO-3) and Bellary onions though differ in their physiology, the shape index of bulbs are spherical in nature. Neck thickness of CO-3 onions is 0.29±0.13 and Bellary onion is 0.68±0.34 cm. The density of both the onions ranged from 0.95±0.09 to 1.05±0.07 g/cm³. Bellary onions weigh at least 108.47±21.14 to 129.52±33.65 g whereas CO-3 onion contains 8-10 number of bulbs per clump with mass of around 75 g. The Geometric mean diameter (D_{GM}) are 2.51±0.42 to 6.20±0.28 cm, arithmetic mean diameter ranged from (D_{am}) 2.54±0.429 to 6.25±0.27 cm, frontal surface area (A_{FS}) ranged from 6.15±1.886 to 32.693±2.734 cm², cross-sectional area (A_{CS}) from 5.21±1.60 to 30.74±2.70 cm² for CO-3 and Bellary onions respectively. Though the values of D_{GM} AND D_{am} are close to each other the geometric mean gives a normalized mean for the study. The cutting strength of CO-3 onions and Bellary onions are 62.71±15.18 and 129.52±33.65 N. Co-efficient of friction and rolling angle ranged from 0.25±0.05 to 0.27±0.06 and 11.13±1.23 to 11.98±3.15; the total soluble solids of CO-3 onions is 15°Brix which gives promising storage attributes in comparison to 12°Brix in Bellary onions. The redness value of the onions is not significantly different for both and ranged between 12.24±2.40 to 14.84±1.43.

KEYWORDS: Onion, Engineering Properties, Cutting load, Penetration Strength, Co-Efficient of Friction