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# Studies on some physical properties of sweet orange relevant to bulk handling

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**ABSTRACT :** Sizing and grading of orange is needed for the fruit to be presented to local markets and for proper handling, processing and storage. A study of sweet orange physical properties is therefore, indispensable. Some physical properties of grade I (large), grade II (medium) and grade III (small) oranges were investigated. These properties included: principal axial dimensions, mass, volume, sphericity, surface area, porosity, bulk volume, bulk density, co-efficient of packaging and co-efficient of static friction. The mean length, breadth and width of grade I (large) oranges were 75.97, 84.32 and 84.00 mm; grade II (medium) oranges were 61.08, 66.99 and 66.75 mm; grade III oranges were 53.71, 58.41 and 58.02 mm, respectively. Volume and mass of the grade I oranges were 285.55 c.c and 248.77 g; grade II oranges were 143.69 c.c and 152.62 g; grade III oranges were 88.73c.c and 96.80 g, respectively. The bulk density and fruit density for grade I oranges were 0.50 and 0.88 g $cm^{-3}$; grade II oranges were 0.58 and 1.06 g $cm^{-3}$; grade III oranges were 0.52 and 1.09 g $cm^{-3}$. Porosity of grade I, grade II and grade III oranges were 49.04, 51.04 and 49.00 per cent, with their sphericity being 1.01, 1.02 and 1.03, respectively. The co-efficient of static friction for grade I orange on mild steel, glass and plywood surfaces were 0.20, 0.22 and 0.23, respectively; for grade II orange on mild steel, glass and plywood surfaces were found to be 0.16, 0.21 and 0.18, respectively; for grade III orange on mild steel, glass and plywood surfaces were found to be 0.19, 0.22 and 0.21, respectively. The three classes of sweet oranges were significantly different from each other regarding their physical properties.

**KEY WORDS :** Physical properties, Sweet oranges, Co-efficient of static friction, Packaging co-efficient

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