



Determining the modulus of elasticity of chickpea kernels using the elasticity methods

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The modulus of elasticity of chickpea kernels was estimated using 1) the plunger test and 2) compression of cubic specimens of chickpea kernels between two parallel plates (sample compression test). Tests were conducted at three moisture contents (6.7, 12, and 18% w.b). The diameter of the plunger used was 0.67 mm.

Moisture content showed a significant effect on modulus of elasticity of chickpea kernels ($p = 0.01$). At 6.7% moisture, kernels had a mean modulus of elasticity of 134.6 MPa compared with 32 and 7.2 MPa at moisture contents of 12 and 18%, respectively. The mean modulus of elasticity determined using plunger tests (42.9 MPa) was 1.7 times higher than that determined using sample compression tests (73 MPa). At moisture content of 18%, the difference between modulus of elasticity determined by the two methods was not significant ($p = 0.01$).

Force-deformation curves showed that the behavior of kernels with moisture content of 6.7% was similar to brittle elastic materials. But, for samples with moisture contents of 12 and 18%, the behavior was similar to that for elasto-plastic materials.