

Effect of Cooking Time on Select Physical and Mechanical Properties of Dried Pigeon pea (*Cajanus cajan*)

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Abstract: Improvement of the processing technology of pigeon pea requires accurate information on the physical and mechanical properties of the legume, as affected by primary processing. This study investigated the effect of cooking duration on select physical and mechanical properties of dried pigeon pea. The physical properties measured were length, breadth, thickness, mass, density, sphericity, aspect ratio and moisture content, using standard methods. Force at yield, break and peak; energy to yield, break and peak; deformation at break and peak; and Young modulus, were the mechanical properties measured using a Testometric device. Cooking times (1, 2, 3, 4, 5, and 6 hours) at 100°C was used. Means of 250 replicates were calculated and data analysed using ANOVA and regression. The length, breadth, and thickness of the samples varied from 6.29 ± 0.39 to 8.18 ± 0.61 mm, 5.59 ± 0.30 to 6.95 ± 0.84 mm and 4.18 ± 0.29 to 5.40 ± 0.61 mm, respectively. With increase in cooking time, mass, sphericity, aspect ratio, density and moisture content, ranged from 0.11 to 0.20 g, 71.1 ± 7.8 to 100.0 ± 9.4 , 63.7 ± 4.1 to 88.0 ± 6.5 , 0.91 ± 0.1 to 1.47 ± 0.3 kg/cm³, and 8 ± 0.7 to 66 ± 4.1 %, respectively. Effect of cooking time on mechanical properties of force, energy, deformation, and Young modulus was significant at 5% level of significance. Polynomial models were fit to express the relationships. Coefficient of determination R^2 of the equations ranged from 0.7 to 1.0. Cooking duration of two hours was adequate to soften the pea, using strength as the criterion. The data generated can be applied in the design of processing equipment.

Keywords: Pigeon pea, cooking, duration, physical properties, mechanical properties