

Determination of some Physical and Mechanical Properties of Chickpea

Zaki Dizaji, H.^{1*}, Minaei, S.²

1- Ph. D. Student, Department of Agricultural Eng., College of Agriculture, Tarbiat Modarres University

2- Department of Agricultural Eng., College of Agriculture, Tarbiat Modarres University

Leguminous crops, chickpea specifically, are usually hand-harvested for several reasons: lack of dedicated combines, small field sizes and short plant canopies. Chickpea losses and kernel damages are in the form of embryo damage, kernel breakage or scratching and splitting. In this research, three varieties of chick pea (Bivani, ILC482 and Philip 93-93) at three levels of moisture content (15-16, 20-21 and 25-26 percent on wet bases) and two loading directions were tested under compression loading. Independent variables were force and energy of rupture, stiffness, and deformation at the rupture point as well as some physical properties. Effect of moisture content on chickpea mechanical properties was found to be very significant (0.01). Increasing moisture content, results in significant decrease of rupture force, energy and stiffness on one hand and increase of deformation on the other. Minimum and maximum values of rupture energy were obtained to be 24.7 mJ at 25% mc wb, and 156.3 mJ at 15% mc wb, respectively, both in the longitudinal loading direction. Results of test indicated that splitting of peas is most probable at 25 moisture content under length compression. Among the three varieties of chickpea, ILC 482 variety was most sensitive to splitting. Logarithmic regression equations were obtained having R^2 values over 0.90 for estimation of chickpea mechanical properties based on moisture content and physical properties.

Key words: Chickpea (*Cicer arietinum* L.), Splitting, physical & Mechanical properties

*Corresponding author E-mail address: zakih@modares.ac.ir