

**Işık E, Ünal H(2007).** Moisture-Dependent Physical Properties of White Speckled Red Kidney Bean Grains, *Journal of Food Engineering*, 82(2): 209-216 (SCI)

### **Abstract**

Physical and mechanical properties of food crops gain importance during harvesting with machines, separation and cleaning processes of this crop and also during the designation or improvement of this type of machines. Therefore, this study was conducted to investigate some moisture-dependent physical properties of round red lentil grains namely, grain dimensions, thousand grain mass, surface area, projected area, sphericity, bulk density, true density, porosity, terminal velocity, static coefficient of friction against different materials and shelling resistance.

In the study, the average length, width and thickness were 9.222, 12.843 and 7.062 mm, at a moisture content of 9.77% d.b., respectively. The arithmetic and geometric mean diameters increased 7.92% and 8.95%, respectively, while the sphericity decreased 3.40% with an increase in the moisture content range 9.77–19.62%.

In the moisture range from 9.77% to 19.62% d.b., studies on rewetted white speckled red kidney bean grains showed that the thousand grain mass increased 7.32%, the projected area from 55.17% mm<sup>2</sup>, the true density 12.91%, the porosity from 46.40% to 58.22% and the terminal velocity from 10.40%. The bulk density decreased 13.57% with an increase in the moisture content range of 9.77–19.62% d.b. The static coefficient of friction of white speckled red kidney bean grains increased the linearly against surfaces of six structural materials, namely, rubber (16.48%), aluminum (22.42%), stainless steel (24.45%), galvanized iron (17.64%), glass (25.82%) and MDF (23.71%) as the moisture content increased from 9.77% to 9.62% d.b. The shelling resistance of white speckled red kidney bean grains decreased as the moisture content increased from 98.26 to 53.67 N.