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[previous paper](#) [back to paper's list](#) [next paper](#)Moisture dependent physical properties of red bean (*Phaseolus vulgaris* L.) grains[\(get PDF\)](#) M. Kiani Deh Kiani¹, S. Minaei¹, H. Maghsoudi¹, M. Ghasemi Varnamkhasi²¹ Department of Agricultural Machinery Engineering, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran² Department of Agricultural Machinery Engineering, Faculty of Biosystems Engineering, University of Tehran, Karaj, Iran

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abstract Physical properties of food materials like grains are important in the design or improvement of harvesting and processing machines. This study was aimed at assessment of some physical properties of red bean grains as a function of moisture content. Based on the results obtained, with increasing moisture content, grain dimensions as well as thousand grain mass increased. In the moisture content range of 10 to 20% w.b., the surface area, true density, and porosity values increased by 10.6-19.7, 4.76-6.24, and 17.91-21%, respectively. This increase in moisture content caused a decrease in bulk density values by 8.35 and 9.70% for the varieties of Goli and Akhtar, respectively. Coefficient of static friction (Goli and Akhtar) increased against surfaces of rubber (27.3 and 27%), galvanized iron (50 and 28.5%), and plywood (32 and 21.4%) as the moisture content increased. Mechanical properties were determined in terms of average rupture force, deformation at rupture point, and rupture energy. Deformation and rupture energy of red bean grains generally increased in magnitude with an increase in moisture content, while rupture force decreased.

keywords bean, moisture content, physical properties