

**Title** Mass modeling of pomegranate (*Punica granatum* L.) fruit with some physical characteristics  
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### **Abstract**

Among physical characteristics, dimensions, mass, volume and projected areas are important parameters in sizing and grading systems. Fruits with the similar weight and uniform shape are desirable in terms of marketing value. Therefore, grading fruit based on weight reduces packing and handling costs and also provides suitable packing patterns. The different grading systems require different fruit sizing based on particular parameters. In this study pomegranate mass was predicted by applying different physical characteristics with linear and nonlinear models as three different classifications: (1) single or multiple variable regressions of pomegranate dimensional characteristics, (2) single or multiple variable regression of pomegranate projected areas and (3) estimating pomegranate mass based on its volume. The results showed that mass modeling of pomegranate based on minor diameter and three projected areas are the most appropriate models in the first and second classifications, respectively. In third classification, the highest determination coefficient was obtained for mass modeling based on the actual volume as  $R^2 = 0.99$  whereas corresponding values were 0.93 and 0.79 for assumed pomegranate shapes (oblate spheroid and ellipsoid), respectively. In economical and agronomical point of view, suitable grading system of pomegranate mass was ascertained based on minor diameter as nonlinear relation  $M = 0.06c^2 - 4.11c + 143.56$ ,  $R^2 = 0.91$ .