Abstract

Mass modeling can be used for development of post-harvest equipment related to onion processing such as grading, packing and food production processes. There are instances in which it is desirable to determine relationships among crop physical characteristics. In this study, the mass of Iranian export onion varieties (Azarshahr and Sefide Qom) was predicted by using different physical characteristics applying linear models with three different classifications: 1) single or multiple variable regressions of onion dimensional characteristics, 2) single or multiple variable regressions of onion projected areas, 3) estimating onion mass based on measured (actual) volume and volumes of assumed shapes (prolate spheroid and ellipsoid). The results showed that mass modeling of onion based on length and three projected areas are the most appropriate models in the first and second classification, respectively. In third classification, the highest determination coefficient was obtained for mass modeling based on the actual volume as R2 = 0.99, whereas corresponding values were 0.96 for both assumed onion shapes (prolate spheroid and ellipsoid), respectively. In economical and agronomical point of view, suitable grading system of onion mass was obtained based on length as nonlinear relation M = 0.035a*2 - 1.64a + 36.137, R2 = 0.96.