Modelling the mechanical damage to lentil seeds under impact loading

J. KHAZAEI, A. LOTFI, M. AMIN-NAYYERI, M. H. KIANMEHR, A. ZAKI - University of Tehran, Iran

Tests were conducted to determine the extent of physical damage to lentil seeds due to impact caused by threshers, conveyors, and other process units. The effects of impact velocity (at 5, 12, 15, and 18 m/s) and seed moisture content (at 5, 10, 15, and 20%w.b) were studied. The results showed that, increasing the impact velocity from 5 to 18 m/s caused an increase in the physical damage from 6.4 to 27.3%. Corresponding data for the seeds at moisture content of 5% was from 12.7% to 60.7%. moisture content had a decreasing effect on physical damage. Decreasing the moisture content of the lentil seeds from 20% to 5%, increased the the physically damaged seeds from 4.2% to 36%. The effect of impact velocity on percentage of physical damage was more strong at lower moisture contents than that at higher moisture contents. At the critical range of threshing, when the moisture content is decreased from 10% to 5%w.b, the maximum rate of increase in damaged seeds was obtain for the impact velocity of 18 m/s with the mean value of 6.2 (%damage/%mc). The maximum rate of increase in damaged seeds was belong to the impact velocities of 12 to 15 m/s. At this critical range of impact velocity, the maximum rate of increase in damaged seeds was belong to moisture content of 5% with the mean value of 6.4 (%damage/1m/s).