

Title Extracting the pomegranate arils (seeds) using a pneumatic method
Author M. Safa, J. Khazaei and M.H. Kianmehr
Citation ISHS Acta Horticulturae 818:353-362. 2009.
Keyword robot; pomegranate; aril

Abstract

In this research, a pneumatic method was used to extract the pomegranate arils. The method is based on opening the fruit (with a cut) in two halves and dislodging the arils by a scanning air jet. The air under pressure is infused into the halves of the fruit so that the arils substantially disintegrate over a predetermined time period. To do the tests, a prototype pneumatic robotic arm was designed and constructed. The system comprises a robotic arm controlled by a hardware system connected to a PC, fruit holder, air compressor and air nozzle through which compressed air is forced into the halved fruit. The robotic arm moves and controls the direction of the air nozzle on the surface of the fruits. The air route of the nozzle and the speed of the air blown out of the nozzle on the surface of the halved fruit was controlled by the hardware attached to the PC. In this research the effect of air pressure and route of the nozzle on the surface of the halved fruits, and number of passages of the nozzle were studied as well as the percentage of removed arils from the pomegranate. Statistical analysis of the data showed that all the variables had a significant effect on removing the pomegranate arils ($p=0.01$). The best combination of the variables to extract the pomegranate arils consisted of an air pressure of 8 bar, 4 times passage of the nozzle and an ∞ -shaped route, while, the best quality of the product was obtained using an air pressure of 7 bar, 4 times passage of the nozzle and an ∞ -shaped route.