

Title Mechanical harvesting of pistachio nuts  
Author Refik Polat, Ibrahim Gezer, Metin Guner, Ergin Dursun, Dogan Erdogan and Hasan C. Bilim  
Citation Journal of Food Engineering, Volume 79, Issue 4, April 2007, Pages 1131-1135  
Keywords Pistachio nut; Mechanical harvest; Limb shaker; Detachment force

### **Abstract**

An inertia type limb shaker, hydraulically powered and driven by the tractor power take-off, was used for mechanical harvesting of pistachio nuts. The study included optimum frequency and amplitude to obtain maximum fruit removal percentage, harvesting rate of the shaker and comparisons with other harvesting methods. Harvesting rate was calculated by weighing both the harvested and unharvested pistachio nuts. In the tests the limbs of trees were shaken at 40, 50, 60 mm amplitude of the connecting rod attached to the crankshaft and 10, 15, 20 Hz frequencies. The results were analyzed according to the maximum fruit removal percentage. Shaking time was 10 s for all of the frequency and amplitude tests. Maximum fruit removal (100%) was achieved by operating the shaker at amplitude of 60 mm and a frequency of 20 Hz. But closely results were achieved at amplitude of 50 mm and a frequency of 20 Hz. At this amplitude and frequency, fruit removal was 95.5%. The shaker caused excessive vibration of the frame when it was operated at great amplitudes. Therefore, amplitude of 50 mm and a frequency of 20 Hz for mechanical harvesting of pistachio nut trees can be suggested. In addition, it was found that the most appropriate harvesting time for Kirmizi variety of pistachio nut is the first week of September. Because, the ratio of fruit detachment force (FDF) to fruit weight (W) measurements, performed at different maturity times, was 6.8 N/g at the first week of September.