

Monitoring the effect of damages on tomato quality under non controlled storage atmosphere by nondestructive ultrasonic testing

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Abstract

In last two decades, a considerable enhancement in developing and using of nondestructive techniques in the field of agriculture yields quality-metering is achieved. Ultrasonic test, as a nondestructive test method, is being developed in agriculture yields quality-metering. Among native fruits, tomato, for many reasons have a special place, but main studies about damages to its texture have not been conducted. For this reasons, tomato was selected for this study. In this study, Ultrasonic Quali-Meter System (UQS) is utilized to investigate the texture and other sough properties of tomatos by sending and receiving the ultrasound waves through the tomatos. UQS by sending and receiving non-continuous signals determines ultrasonic indexes such as velocity of waves passing through tomatos, attenuation coefficient and so on. In this study, 360 ripe early tomato (first tomato) samples of Khuzestan province were made available and prepared for the tests. The tomatoes are divided into four groups of 90 units each. Out of these groups, the fourth group was selected as the instance group, on which loading it is not performed. The other three groups were exposed to traumatic loading by free drop test method at three energy levels of 0.8, 1 and 1.2 J.. Every day, out of each group, 9 samples were randomly selected and surveyed for the ultrasonic, biochemical, mechanical and physical indices. Results showed that tomato damage level and storage time have meaningful effect on ultrasonic wave velocity and stiffness. Hence, use of the ultrasonic method provides the possibility of determination and estimation of some parameters related to tomato ripening in supplying lines such as separating operation and fruit grading.

Keywords: Quality-Meter, Tomato, Nondestructive test, Ultrasonic, Ultrasonic indexes, Attenuation coefficient, Wave velocity.

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