EFFECT OF CHITOSAN AND CALCIUM NANO-PARTICLES ON QUALITY AND STORABILITY OF STRAWBERRY FRUITS

By

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ABSTRACT

Safaa Zakaria Mahmoud Mohamed: Effect of Chitosan and Calcium Nanoparticles on Quality and Storability of Strawberry Fruits. Unpublished Ph.D. Thesis, Department of Horticulture, Faculty of Agriculture, Ain Shams University, 2017.

Two field experiments were carried out during the two successive winter seasons of 2014-2015 and 2015-2016 at sandy loam soil in a private farm located at Tokh district, Qalubia Governorate, Egypt, and the storage rooms of Handling of Vegetable Crops Dept., Hort., Res. Institute, ARC, Giza, to study the effect of spraying chitosan and calcium nanoparticles on preserving the quality parameters and storability of the strawberry festival cultivar. The preparation and characterization of chitosan and calcium nanoparticles were carried out in Nanotechnology and Advanced Material Central Lab., Agriculture Research Central, Giza, Egypt. The first experiment was designed to study the effect of foliar application of nano-chitosan (0, 125, 250 or 500 ppm) and bulk chitosan 500 ppm on fruit quality and storability for 20 days of storage at 0°C plus 2 days shelf life at 10°C. The second experiment was designed to study the effect of foliar application of nano-calcium (0, 15, 30, 60 or 120 ppm), bulk calcium (120 ppm) and EDTA calcium (500, 750 or 1000 ppm) on fruit quality and storability at the same conditions. The experimental design was complete randomized block design for the field experiments but the lab experiments were complete randomized design with three replicates. Data were recorded on fruit quality (fruit length, diameter, weight, firmness, dry matter percentage, TSS, TA, anthocyanin, vitamin C and total sugar content) and storability (weight loss, fruit decay, general appearance, firmness, color, anthocyanin, vitamin C, TSS, TA and total sugar content).

Results indicated that fruit harvested from plants, which were sprayed with nano-chitosan at 125 ppm in the first experiment or nano-calcium at 15 ppm in the second experiment had significantly positive

effect on fruit quality, also gave the lowest values of weight loss, decay percentage, maintained fruit firmness and L-ascorbic acid, also decreased color development through the storage period plus shelf life. Furthermore, they also gave fruits with a good appearance without any decay till 20 days at 0 ºC plus shelf life 2 days at 10 ºC (shelf life). The study recommended that Strawberry fruits obtained from plants sprayed with nano-chitosan at 125 ppm or nano-calcium at 15 ppm are very important to improve quality and storability of strawberries.

Key Words: Strawberry, nanoparticles, nanotechnology, foliar spray, chitosan, calcium, shelf life, quality, storability.

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