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Short Communication

Effect of different chemical treatments on ascorbic acid content of kinnow fruits

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Abstract

Kinnow mandarin is a perishable fruit and decayed within 10-15 days at ambient conditions. This decay is mainly due to attack of microorganisms and high rate of physiological processes. However, certain application of some chemical as surface coating is helpful to check the attack of microorganism and reduce transpiration. Present investigation was conducted to study the effect various concentrations of Gum Arabic, Calcium Lactate and Glycerin and their different combination on ascorbic acid content of Kinnow fruits during storage at room temperature. Ascorbic acid content decreased with advancement of storage period in all treatments. Among the treatments maximum ascorbic acid content were observed in fruits coated with Gum Arabic 10% whereas minimum ascorbic content were observed in control fruits.

Keywords: kinnow, ascorbic acid, calcium lactate and glycerin

Introduction

Fruits constitute a commercially important and nutritionally indispensible food commodity for human beings. The fruits are rich sources of various vitamins, minerals and fibers required by human body for optimal health. To protect their possible damages to biological molecules, especially to DNA, lipids and proteins, all oxygen-consuming organisms are endowed with a well-integrated antioxidant system, including enzymatic and non-enzymatic components. Besides classical antioxidants including vitamin C, E and carotene, phenolic compounds had been identified as important antioxidants contained in fruits. However, fruits are diverse in antioxidant composition and antioxidant activity and those with high antioxidant activity generally contain more antioxidants (Guo *et al.* 1997) ^[4]. Kinnow mandarins are rich in ascorbic acid (13-54 mg per 100 g of edible portion) and calcium (25-46 mg per 100 g of edible portion). Ascorbic acid acts as strong antioxidant present in high amount in kinnow fruits which decreased during storage. Different post-harvest treatments are used to maintain the ascorbic acid during storage. The present experiment was conducted to find out the effective post-harvest treatments of gum arabic, calcium lactate and glycerin or in proper concentration to maintained the ascorbic acid content of Kinnow fruits.

Materials and methods

Present experiment was conducted in the laboratory of department of Botany & and Plant Physiology, CCS Haryana Agricultural University, Hisar. The experiment was designed in completely randomized design. Mature Kinnow fruits of uniform size were harvested with the help of secateurs keeping small intact pedicel with each fruit from the orchard of the department of Horticulture, CCS Haryana Agricultural University, Hisar. Kinnow fruits were cleaned with muslin cloth and were dipped in aqueous solutions of Gum Arabic (5%), Gum Arabic (10%), Calcium lactate (1%), Calcium Lactate (3%), Glycerin (2.5%), Gum Arabic (5%)+Glycerin (2.5%), Glycerin (2.5%)+ Glycerin (2.5%), Calcium lactate (1%)+ Glycerin (2.5%) & Calcium lactate (3%)+ Glycerin (2.5%) for 10 minutes and were dried in shade thereafter were wrapped in cling film. Two kg fruits were packed in each cardboard box and all the treatments were replicated four times. Fruits of all treatments were stored at room temperature. Fruits at random were taken from each treatment for analysis of ascorbic acid content in fresh fruits and at seven days of interval up to 49th day. Ascorbic acid was determined by the titration method of AOAC (1990).

Results and discussion

Ascorbic acid content decreased with increase in period of storage in all the treatments. Maximum ascorbic acid content was observed in fruits of kinnow in all the treatments at the

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initial period of storage i. e. 0 day (31.43mg/100g) which decreased to 24.74mg/100g on 49th day of storage. It might be

due to increase in the activity of the oxidizing enzymes like ascorbic acid

Table 1: Effect of different treatments on ascorbic acid (mg/100g) in Kinnow fruits during storage at room temperature

Treatments	Days of storage								
	0	7	14	21	28	35	42	49	Mean
Gum Arabic (5%)	31.43	30.47	30.00	29.53	27.86	26.90	26.67	25.47	28.54
Gum Arabic (10%)	31.43	31.19	30.24	28.81	28.57	27.38	26.19	25.95	28.72
Calcium Lactate (1%)	31.43	30.23	29.53	26.90	26.90	26.19	25.47	24.53	27.65
Calcium Lactate (3%)	31.43	30.24	29.76	27.38	27.14	26.19	25.71	24.76	27.83
Glycerin (2.5%)	31.43	30.24	29.05	26.67	26.43	25.95	25.24	23.81	27.35
Gum Arabic (5%) + Glycerin (2.5%)	31.43	30.47	29.76	28.33	27.62	26.67	26.19	25.47	28.24
Gum Arabic (10%) + Glycerin (2.5%)	31.43	30.47	30.00	28.81	27.86	26.90	26.19	25.47	28.39
Calcium Lactate (1%) + Glycerin (2.5%)	31.43	30.24	29.29	26.90	26.90	25.95	25.47	24.05	27.53
Calcium Lactate (3%) + Glycerin (2.5%)	31.43	30.24	29.76	27.14	26.90	26.19	25.47	24.53	27.71
Control	31.43	29.76	28.81	26.67	26.19	25.95	24.05	23.34	27.02
Mean	31.43	30.36	29.62	27.71	27.24	26.43	25.66	24.74	
CD at 5%	T=0.43 D=0.41 T×D=1.66								

Oxidase, peroxidase and catalase they might have converted the ascorbic acid into dehydro ascorbic acid. Decrease in ascorbic acid content has also been reported in Aonla (Nayak *et al.* (2011) [6], Pear (Soliva & Martin 2003) [8], Apricot (Ali *et al.* 2015) [1], Tomato (Nath *et al.* 2012) [5] and in Ber (Shahi *et al.* 2015) [7] during storage. Among different treatments, minimum ascorbic acid content was observed in control fruits (27.02 mg/100g). This is obvious as there was no additional coating over the surface of fruit which could have resulted in the increase in activity of oxidizing enzymes. Maximum ascorbic content was recorded in fruits coated with Gum Arabic 10% followed by Gum Arabic 5% i. e 28.72 mg/100g and 28.54 mg/100g, respectively. The highest value of ascorbic acid content in fruits coated with Gum Arabic 10% followed by fruits coated with Gum Arabic 5%. This might be due to the low oxygen permeability of coating which delayed the deteriorative oxidation reaction resulted in decreased activity of oxidizing enzymes. A similar result has also been reported by Asghar *et al.* (2014) [3] in Peach.

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