



Effect of Citrashine Coating on Post Harvest Quality of Grapefruit Cv. Star Ruby under Ambient Conditions

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ABSTRACT

This study was conducted to observe the effect of citrashine coating on post harvest quality of grapefruit cv. Star Ruby under ambient conditions. For this, fully mature, uniform, healthy and disease free fruits of grapefruit cv Star Ruby were individually waxed with citrashine wax and kept at ambient temperature (20-25°C) in well ventilated room. The fruits were analyzed for physiological loss in weight, organoleptic rating, spoilage, TSS and total acids after 7, 14 and 21 d of storage. Fruits coated with citrashine wax retained their general appearance and taste after storage. The physiological loss in weight (2.58%) and spoilage (0.0%) were minimum in citrashine treated fruits after 14 d of storage as compared to uncoated fruits where physiological loss in weight was recorded as 7.01 per cent and spoilage was 4.9 per cent. The wax treated fruits showed higher organoleptic rating up to 14 d of storage. Total soluble solids increased up to 14 d of storage interval. However, acidity decreased non-significantly with the increase in storage interval in both the treatments.

Keywords: Citrashine wax, Organoleptic rating, Shelf life, Star Ruby, Weight loss.

INTRODUCTION

Grapefruit is an important citrus fruit which has high medicinal value. It is an excellent source of vitamin C, potassium and dietary fibre. The Star Ruby grapefruit is the benchmark standard of grapefruits regarding colour, flavour and fragrance. The extent of postharvest losses in this crop is comparatively very high. Hence, in order to reduce the postharvest losses, there is need to enhance shelf life of fruits under ordinary marketing conditions. Coating of fruits with shellac wax increase shelf life, besides, improving appearance of the fruits. Application of a physical barrier, such as a wax coating, slows down the permeability of water vapour and other gases (Mahajan *et al*, 2002), retards ripening and also checks the microbial infection. According to Bajwa and Anjum (2007), wax coating reduced the chilling injury, rind staining and physiological loss in weight in mandarins, which limit post harvest shelf life and reduce quality of mandarins. However, very limited information is available with respect to effect of surface coatings on shelf life of grapefruit cv. Star

Ruby. Keeping in view the medicinal importance and increasing market value of this fruit there is an utmost need to evaluate the citrashine wax to enhance shelf life of the fruits.

MATERIALS AND METHODS

This study for the evaluation of wax on the shelf life of grapefruit cv Star Ruby under ambient conditions was conducted in the Department of Fruit Science, Punjab Agricultural University, Ludhiana in 2013, 2014 and 2015. The healthy fruits were harvested in last week of November. The freshly harvested fruits of grapefruit cv Star Ruby were washed in clean water with wet foam, followed by dip in chlorinated water (0.01%) for one minute. These fruits were partially dried under shade and coated with Citrashine wax with the help of foam pad. The waxed fruits were again dried in shade. The treated fruits were stored under ambient conditions (Temp. 20-25 °C) for 7, 14 and 21 d in Corrugated Fiber Board boxes of standard size i.e. 45 x 23 x 18 cm. The physiological loss in weight

(PLW) was determined by subtracting final weight from initial weight of fruits. Spoilage percentage was calculated by counting the fruits that had rotten during the studies. The total soluble solids (TSS) were recorded with hand refractometer and temperature correction applied. The acidity was determined by titrating one ml of juice against 0.1 N sodium hydroxide using *Phenolphthalein* as an indicator. The results were expressed as percentage of anhydrous citric acid. The fruits were rated organoleptically by a panel of 5 judges on 0-10 scale. The statistical analysis was done by using t-test of significance.

RESULTS AND DISCUSSION

Physiological loss in weight

The physiological loss in weight (PLW) was recorded to be significantly less in Citrashine coated fruits at all the storage intervals as compared to uncoated fruits (Table 1). On the other hand, the highest mean PLW (12.25%) was observed in control fruits up to 21 d of ambient storage. The

fruits coated with wax retained their weight up to 14 d of ambient storage, but uncoated fruits were highly shriveled after 21 d of storage. After twenty one days of storage, uncoated fruits became unmarketable (PLW > 10%) as physiological loss in weight is directly linked to the shelf-life of any produce. These results were in confirmation with the findings of Jhalegar *et al* (2015) who also reported that the surface coated Kinnow fruits showed lesser loss in weight in comparison to untreated fruits, which indicates that surface coated fruits, can be stored for a longer time than untreated fruits. The wax coatings on fruit surface acted as barrier and prevented water loss and desiccation by affecting the opening of stomata and lenticels, also delayed aging of the rind tissue and reduced rate of respiration (Hagenmaier and Baker, 1993). Manhein and Soffer (1996) and Pal *et al* (1997) made similar observations on the effect of wax emulsions on weight loss in Marsh grapefruit and Kinnow mandarin, respectively.

Table 1. Effect of Citrashine wax on shelf life and quality of Grapefruit cv Star Ruby (pooled mean of three years).

Parameters	Storage days	Treatments		Test of sig. (5%)
		Citrashine wax	Control (Without wax)	
PLW (%)	7	0.95	3.95	S
	14	2.58	7.01	S
	21	5.65	12.25	S
Organoleptic rating (1-9 Hedonic scale)	7	8.0	7.1	S
	14	7.7	6.5	S
	21	6.4	6.1	S
Total soluble solids (0 Brix)	7	9.7	9.2	NS
	14	9.9	8.9	S
	21	10.0	8.5	S
Acidity (%)	7	1.25	1.23	NS
	14	1.21	1.18	NS
	21	1.15	1.13	NS
Spoilage (%)	7	0	0	NS
	14	0	4.9	S
	21	5.04	10.2	S

Effect of Citrashine Coating on Quality of Grapefruit

Spoilage

Both, the fruits coated with citrashine wax and uncoated fruits did not show any spoilage for 7 d of ambient storage but after 14 and 21 d of storage, the mean spoilage (Table 1) in uncoated fruits was 4.9 and 10.2 per cent, respectively, which was significantly higher than citrashine wax coated fruits. Wax coating of fruits prevent fresh inoculation during storage periods and contaminations from the rotting fruits, thus total spoilage was reduced.

Organoleptic rating

The organoleptic rating (Table 1) of wax coated fruits was recorded to be significantly higher than control fruits at all the storage intervals. Considerable reduction in organoleptic rating was observed in uncoated fruits after 14 d of storage as compared to wax coated fruits. After 21 d of storage, mean organoleptic rating of Citrashine wax treated fruits was significantly higher (6.4) than uncoated fruits (Table 1). The observed superior organoleptic rating may be due to the better retention of quality parameters. These results were in confirmation with the findings of Mahajan and Singh, (2014). Uncoated fruits were severely shriveled, showed unacceptable appearance and fruits lose their taste after 7 d of storage.

Total Soluble Sugars

The TSS of wax coated and uncoated fruits did not differ significantly upto 7 d of storage (Table 1). However, after 14 and 21 d of storage, significant difference in TSS was recorded in citrashine treated fruits and uncoated fruits. TSS was recorded to be significantly higher in citrashine treated fruits than uncoated fruits after 14 and 21 d of storage. Mandal (2015) also reported a sharp decline in TSS of uncoated kinnow fruits after 7 d of storage under ambient conditions due to rapid metabolic breakdown in these fruits.

Acidity

The acid content of the wax coated fruits showed non-significant difference with control (Table 1). The acid content was observed to be decreased with the

increase in storage interval from 7 to 21 d. The decrease in titratable acids during storage may be attributed to utilization of organic acid in pyruvate decarboxylation reaction occurring during the ripening process of fruits. When the fruits were coated, the lowering of acidity was delayed, which might be due to the effect of coatings in delaying the respiratory and ripening process (Mahajan and Singh, 2014)

CONCLUSION

It may be concluded that the grapefruit cv Star Ruby fruits treated with citrashine wax prior to storage under ambient conditions can retain their post-harvest quality for about two weeks which may help in extending the marketing period for better economic returns.

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