

Studying the Effects of Chemical, Physical and Medical Treatment on Some Qualities and Quantities of Valencia Orange

Zeinab Nadimi

Collage of Agriculture, Khorasgan Islamic Azad University, Iran

Abstract

In order to study the effects of different treatments on longevity of Valencia orange storage a survey ,in the form of entirely random districts with 19 treatments and two sizes of the fruit (5/5 to 6 cm and 6/5 to more than7cm), is conducted. The used treatments in the study are Thiabendazole (1500 parts in million),sodium carbonate B (2%), hot water (55 C, 3 min),Thymeextract (1000 parts in million), Rosemarie extract (256, 1024, 2048 parts in million) and binary effects of hot water and Rosemarie extract, hot water and Thyme extract, Rosemarie extract and Thymeextract, and two attestors in the forms of vaccinated and unvaccinated. After making the treatments prepared and putting them in the plastic bags, fruits are kept in a usual warehouse with 20-28 c about 80 days. Base on the results, the most quantity of decay is observed through treatment attestor number2 for about 49/035 percent and the least quantity relates to treatment attestor number 1 about 6/66 percent. The most observed level of losing weight for treatment atestornumber2 was about 11 gram decrease and 4/625 gram for treatment number 1. The highest level of vitamin C is observed with attestor number1 which was about 53.940/100 Mg/MLand the lowest level was for hot water and Rosemarie extract treatment of 1024 part in million for about 48.187/100 Mg/ML extract of fruit and it was not considerable(about 5 percent) for treatments like Thiabendazole, attestortreatment number2 and hot water. The highest level of organic acid relates to Rosemarie extract (256 in million) with .921/100 Mg/ML fruit extract which did not show any meaningful differences in their consequences in comparison with treatments like hot water and Rosemarie extract1024, hot water and Rosemarie extract 256, Rosemarie extract 2048 in million and treatment number 1. The lowest level of organicicid also did not show any meaningful difference in comparison with other treatments like what was observed with Thyme extract and Rosemarie extract 2048 treatment about .759/100 Mg/ML of fruit extract. It is inferred from the obtained results through the present study that: in comparison with other treatments, treatmentnumber1, hot water and Rosemarie extract and Rosemarie extract were more successful in their revenue. So with careful attention to environmental issues and producing organic products, it is recommended to use herbal treatments and hot water and the binary effect of hot water and herbal extracts.

Keywords: Valencia orange, green mould, vitamin, organic acid, herbal extract

Introduction

Orange with its scientific name *Citrus Sinensis L* and the English name Orange is a roughly tall, conical and intensive tree, the height of which is about 5 to 9 meter. This species of fruit is full of vitamins A, B, C, fiber, carbohydrates and some calcium, potassium, niacin and folic acid.

Recently, the reduction of wastage during the harvest is one of the objects that most of international organizations follow. It is believed that the coast of decreasing the rate of wastage

would be lower than increasing production level (Sincliar 1984). Base on this assumption and just by considering the economical aspects, it is acceptable to seek to reduce the wastage of agricultural products. Taking this problem for orange fruits into account, the most prevalent types of fungus reported about oranges wastage are resulting from blue mould and green mould begot (Wilson & Wisniewski 1989). In the past, in order to combat against pathogen factors in warehouse, particularly about moulds issue, different chemical poisons were used and it is proved that the remained effects of chemical poisons can significantly affect the consumer's health.

While it is from long time ago that the study on controlling the quantity of the decay of fruits with the help of chemical poisons has been administrated and their effectiveness has been proved, some species of pathogen factors are found that their resistance to chemical poisons can increase the rate of decay.

Considering the above mentioned issues and dangerous effects of chemical poisons on consumers and natural environment, today, the search for finding a substitute as natural and inoffensive substances has been increased. Base on this assumption the use of herbal extracts instead of chemical substances can efficiently remove concerns about this issue (Aboutalebi & Janparvar 1389).

Smilanick and Sorenson (2001) showed that the flotation of oranges on the water with 53 C temperature would easily take green mould away from fruits with artificial insemination. Campo, Amort and Nguyen (2000) examined Rosemarie extract, which was used as an oil anti Occitan, in front of germs putrefying food. They reported that Rosemarie extract severely control positive warm bacteria and has less effect on negative warm bacteria, in addition, its anti bacteria characteristics would be intensively influenced under the environmental compounds.

Arras and Vasi in (2001) examined the poisonous effects of 12 herbal extracts in front of *Alternaria Citri*, *Botrytis cinerea*, *P.italicum*, *Penicillium digitatum* moulds. They yeasted orange fruits with moulds spoor of *P. digitatum*, then sprayed them with Thymezero liquid of 75,150,250 Mg/L. the results of the study showed that there is no meaningful statistical differences between this treatment and that of fruits and Thiabendazole as an anti mould with 2000 Mg/L density .

In 2009, also Hadizadeh and his co workers have done a study in which they used Thyme extract (1500 and 2000 density parts in million) and they succeed to stop *Alternaria* decay in oranges to 68.5 and 74.7 respectively.

Recently, as it is recognized that the use of chemical compounds to control insects, disease and physiological disorders are harmful for human beings. So it is necessary to find inoffensive physical and medical treatments to obliterate insects and disease developments. Treating with high temperature and spraying with medical extracts are new technologies used without fungicides. Their positive controlling effects about the decay of fruits have proved their suitability.

Methodology

This study is conducted in the form of entirely random districts with 19 treatments and two sizes of the fruit (5/5 to 6 cm and 6/5 to more than 7 cm). First of all Valencia oranges are washed and disinfected with ethanol 70% after they have been picked up. Before using treatments, the fruit skin was scratched in two parts with a sterile knife and each vertical one with 2 millimeter depth. Then the sooth pension liquid (1× 10) in each milliliter of green mould spoor was sprinkled on fruits, and it was given a 48 hours time till the spoor infiltrate in the scratch. After sprinkling spoor, the use of treatments was done. For each repetition of the study 5 fruits were chosen and then the treated fruits were transferred into a usual store with 20-28 temperature. They were kept there for 80 days. At the end of the study the rate of losing weight, decay, vitamin C, and the organic acid of the fruits were measured. The obtained results were analyzed through SAS software and the average of the results was compared by LSD test.

Results

The quantity of decay

The results of the study are shown in the graph 1-1. From the presented results it can be inferred that the highest quantity of decay has happened with attestor treatment number 2 (T2 49.035%) as there were a meaningful difference in comparison with other treatments. In addition, the lowest quantity relates to treatment number 1 (T1 6/66%). After attestor treatment number 2, hot water and Thyme extract treatment with 1000 parts in million density 29.815% (T18) showed to be more appropriate.

The reason of high rate of decay with attestor treatment number 2 can be resulted from the hidden infection that exists in the surface of growing fruits. Moulds can cause decay through the scratches happening during the picking up the fruits. In addition, if the cuticle epiderm damaged or through keeping the fruits in unfavorable situation weakened it would enable the moulds, for spoor budding and colony to obtained food and humidity from fresh scratches. The obtained results of the study show congruence with what Tavalalie and his co-workers (1386) and what Aboutalebi and Janparvar (1389) reported.

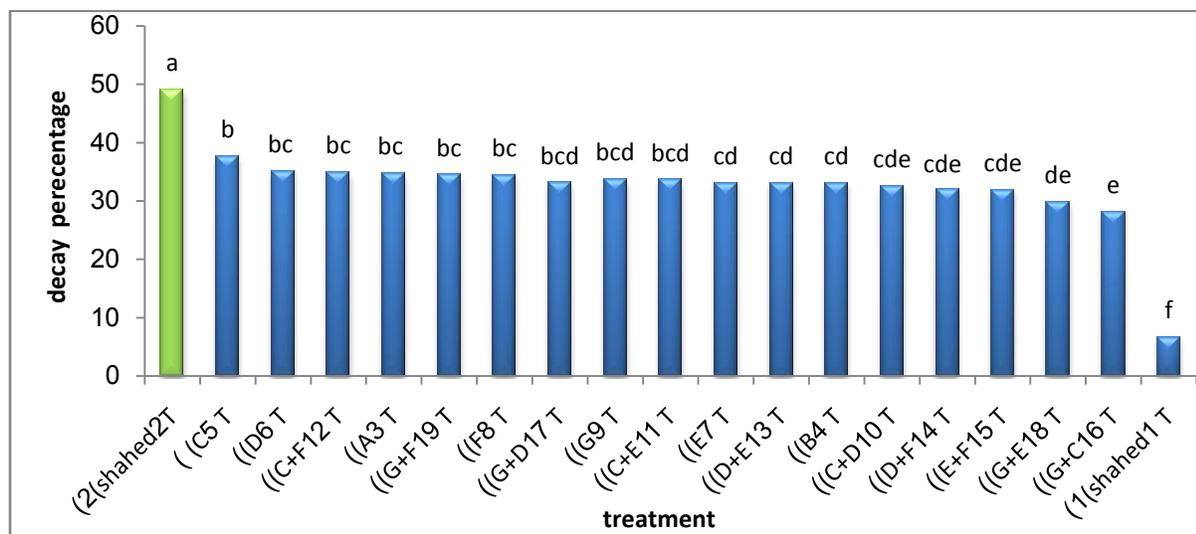


Figure.1. The quantity of decay

The quantity of losing weight

According to graph 1-2 and comparing the averages, the highest rate of losing weight can be observed with attestor treatment number 2 (T2) which is about 11 g and which has a meaningful difference of about 5% with other treatments. The lowest level of losing weight, also comes with the use of at test or treatment number 1 (T1) 4.625g.

After attestor treatment number 1, treatments of hot water and Thyme extract (1000 parts in million) hot water and Rosemarie extract (1024 parts in million) were more successful in comparison with other treatments, while there were no meaningful differences among them.

The heating treatment influence as a control on losing weight of the fruits can be related to the hot water effects. Its effect on the fruits skin can reduce the negative effects of hand contact on the skin. These obtained results are in harmony with Schirra and his co workers reports on the same issue. They reported that high temperature can increase the rate of transpiration and respiration which turns to the losing weight of fruits.

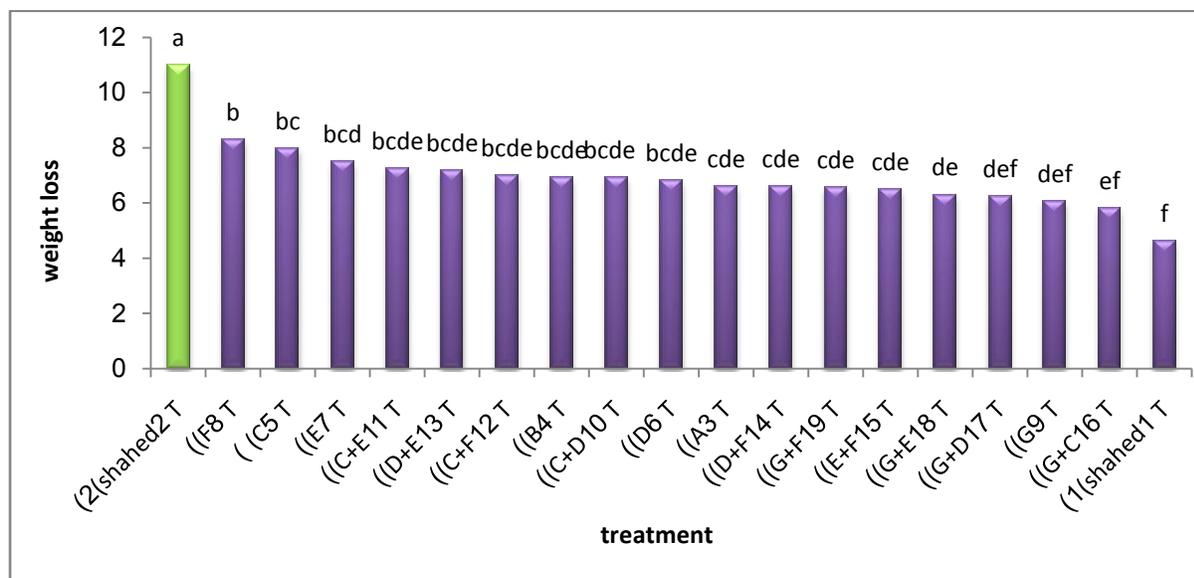


Figure.2. The quantity of losing weight

The quantity of vitamin C

the comparison between the averages, as it can be observed in graph 1-3, shows that the highest level of vitamin C is resulted with attestor treatment number 1 (T1) that contains 53.940/100 mg/ml extract of fruit. Moreover the lowest level of vitamin C is obtained with hot water and Rosemarie extract of 1024 density in million (T17), Thiabendazole1500 parts in million (A) 48.730, at test or treatment number 2 (T2) 48.840 and hot water treatment (G) with 49.019/100 mg/ml extract of fruit. The obtained results of these treatments showed a meaningful difference with attestor treatment number 1 but there is no significant difference with other treatments.

As it can be inferred from the obtained results after attestor treatment number1 it is the type of treatment that influences the stability of vitamin C. Generally after controlling the decay of the orange fruits, keeping the rate of Vitamin C stable is one of the major purposes. Vitamin C is unstable and decreases immediately in the unfavorable situation of environment and store (light, temperature, humidity, disease...).

The above mentioned reason can be the cause of decrease of vitamin C in attestor treatment number 2 in comparison with attestor treatment number1 which can be resulted from moulds invasion and their effects on vitamin C level. The mollifying enzymes of tissues which cause physical and metabolic changes in cells turn complex compounds into simpler types and

demolish cells. The result of such activities leads to weakening the fruits power and decreasing the qualitative and physical characteristics of fruits.

In addition, the reduction of vitamin C level can probably comes from the accretion of oxidation activities of water reduction.

In the present study after attessor treatment number1 (T1), for the quantity of vitamin C, the highest quantity of vitamin C is obtained with treatment out of extracts, especially Rosemarie extract with different density. The reported results of the study follow what Aboutalebi and Mohammadi (1389) and Aboutalebi and Janparvar (1389) reported about the controlling effects of extracts on moulds activity.

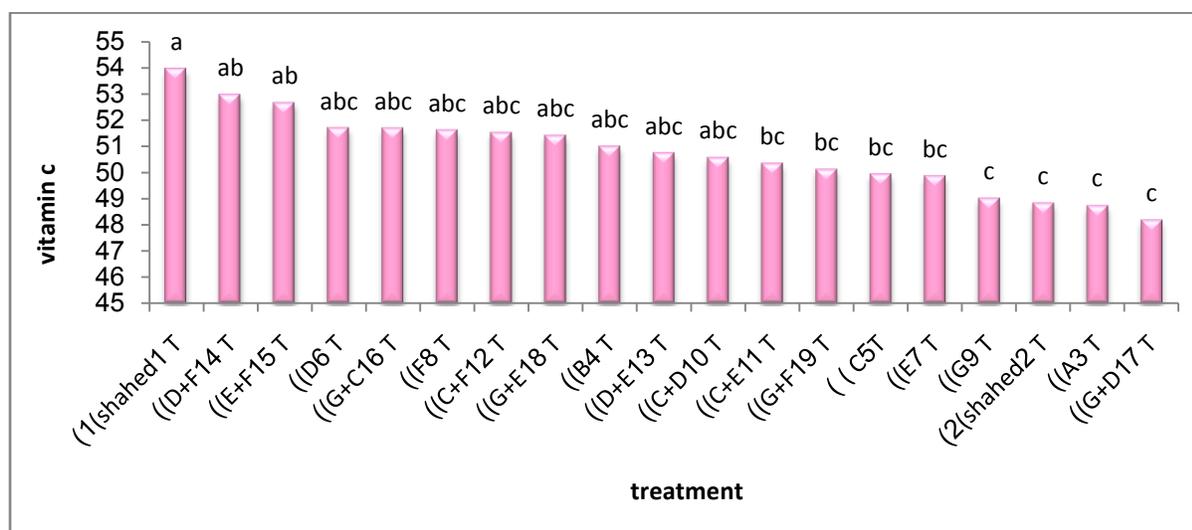


Figure.3. The quantity of vitamin C

The quantity of organic acid

Based on the obtained results through the present study, it can be inferred from comparing the averages in graph 1-4 that the highest level of organic acid can be observed with Rosemarie extract treatment (T7) 256 parts in million density and .921/100 mg/ml extract of fruit, and there is no meaningful differences, though comparing with other kinds of treatments the observed difference was meaningful, between this treatment and those of hot water and Rosemarie extract such as:

T17:1024 parts in million density and .872/100 mg/ml extract of fruit

T18: 256 parts in million density with .855/100 mg/ml extract of fruit

T8: 2048parts in million density with .852/100 mg/ml extract of fruit

T1: Attestor treatment number1 with .847/100 mg/ml extract of fruit

In addition, while the lowest quantity of organic acid is observed with Thyme extract of 1000 parts in million density and Rosemarie extract with 2048 parts in million (T12) .759/100 mg/ml extract of fruit, it doesn't have any meaningful differences with other kinds of treatments.

Considering that the highest level of organic acid is obtained through hot water and Rosemarieextract with different densities, it seems the controlling effects of extracts in addition to their direct influence on moulds relates to extracts effects on motivating the defensive reaction of plants which turns to the lowering the rate of decay in fruits and keeping the qualitative features that they have. These findings are validated with what Aboutalebi and Mohammadi (1389) studied about.

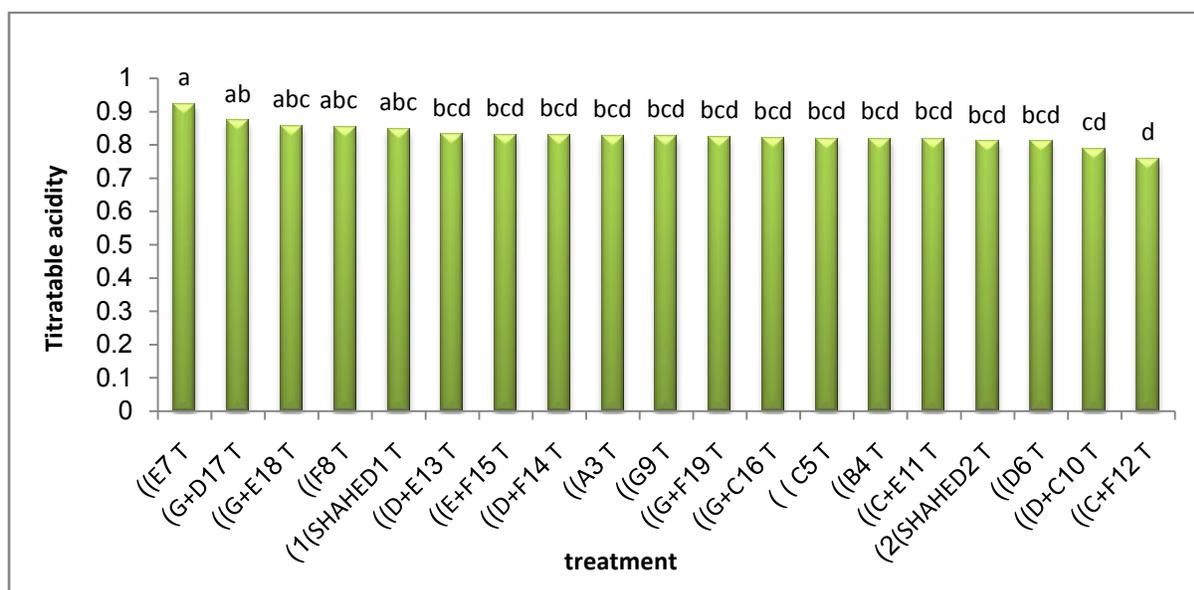


Figure.4 The quantity of organic acid

Conclusion

Concluding the obtained results, on the whole it can be said that qualitative and quantitative characteristics of Valencia orange can be influenced with the nature of treatments and the used herbal extracts showed to have potential to retain those characteristics. The issue with considering the consumers' tendency toward organic products may enjoy great significance to study about.

Concluding the total results obtained through the present study, it suggest that herbal extracts, hot water and the double influence of hot water and extracts can be applicable in order to control and retain the qualitative and quantitative characteristics of Valencia orange in the usual stores.

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