

**USING OF SOME ENVIRONMENTALLY SAFE
TREATMENTS TO IMPROVE THE
STORABILITY OF ORANGE
FRUITS**

By

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B.Sc. Agric.Sc. (Horticulture), Damascus University 2000

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ABSTRACT

Layla Ibrahim Tabbara: Studies on Using of some Environmentally Safe Treatments to Improve the Storability of Orange Fruits
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This investigation was carried out during two successive seasons 2013 and 2014 on fruits of two orange cultivars, Navel Orange (*Citrus sinensis*) and Valencia orange. The fruit samples were collected from orange orchard belonging to Wadi Elnetron by randomly from all over the orchard which has clay loam soil, the trees were irrigated through far row (surface) irrigation system. An experiment was conducted to evaluate the influence of some environmentally safe treatments to improve the storability of Navel orange (*Citrus sinensis*) and Valencia fruits during 2013 and 2014 seasons, Jojoba oil (1,3,5)%, castor oil (0.5, 1,2)%, yeast(1,2,3)%, seaweed(1,2,3)%, hot water (45° C and commercial wax were used for proposed study, After the application of the treatments on the fruits, fruits were stored at a temperature of 5 ° C and 95% of relative humidity for 60 days, it was determine the physical characteristics (damage cold-loss gravimetric - loss injury fungi - juice ratio-the thickness of the crust) and chemical properties (ratio of ascorbic acid-total soluble solids – total acids –TSS/TA - total phenols - total flavones - sensory evaluation "the taste, color, freshness, flavor") after that fruits were placed at room temperature for 7 days in order to do the sensory evaluation. Results indicated that, castor oil (2 and 1)% and jojoba oil 5% reduced weight loss%, chilling injury%,decay%, ascorbic acid deterioration, deterioration peel thickness, deterioration total acids, phenols increase and increased juice ratio , total soluble solids, TSS/TA rate, flavonoids increase with significant differences compared to control, the above mentioned treatments exhibited the highest degree of evaluating

sensory in terms of color, taste, freshness and flavor in the two studied seasons and for two studied cultivars.

So the results show that, coating orange fruits with castor oil (1-2)% and jojoba oil (5)% the most effective in improve the storability of orange fruits [Navel Orange (*Citrus sinensis*) and Valencia orange].

Key Words: Castor oil, Commercial Wax, Evaluating sensory, Jojoba oil, Navel orange, Quality fruit, Seaweed, Valencia, Yeast.

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INTRODUCTION

Citrus is a genus of flowering trees and shrubs which belongs to Rutaceae family. this genus includes the most important crops (species) like oranges, lemons, grapefruit, pomelo and limes. The most recent researchs indicates that Australia is the origin of Citrus, in addition to New Caledonia and New Guinea (**Liu et al., 2012**). Some researchers believe that the origin is in the part of Southeast Asia bordered by Northeast India, Burma (Myanmar) and the Yunnan province of China were some commercial species such as oranges, mandarins, and lemons originated (**Gmitter and Hu., 1990**). Citrus is considered as the most common popular fruits in the world and it takes second or third position after grapevines and apples (**FAO, 2011**), Brazil's production is forecast up a whopping 27 percent to 18.2 million metric tons based on expected higher yields due to favorable weather resulting in good bloom and fruit set. Brazil is by far the largest citrus producing country followed by China, European Union, the United States, Mexico, Egypt, Turkey and South Africa (**USDA, 2017**). Citrus is a major export produce of Egypt. The total cultivated area for orange is about 133236 ha (333090 feddan), and total production is estimated at 2750000 ton/year (**GAIN, 2015**). Navel orange (*citrus sinensis*) & Valencia are the most important citrus fruits in Egypt which are available during winter. Under Egyptian conditions there are common practices to store mature Navel orange fruits& Valencia until the suitable time for marketing(**Abdel Wahab and Rashid, 2012**). Washington navel orange fruits (*citrus sinensis*) & Valencia are non climactic, with persistently low respiration and ethylene production rates (**Kader and Arpaia, 2002**). Also, Due to their higher water content and nutrient composition, citrus fruit is very susceptible to infection by microbial pathogens during the period between harvest and consumption (**Tripathi and Dubey, 2003**), pathological and physiological diseases cause a considerable losses of citrus fruit during storage and transportation. A new approach to the control of postharvest pathogens, while maintaining fruit quality, has been implemented by the

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application of essential oil amended coatings to citrus. This approach eliminates the need for synthetic fungicides, thereby complying with consumer preferences, organic requirements and reducing environmental pollution, excellent disease control was achieved with the amended coatings, while measured quality parameters indicated that overall fruit quality was maintained. Moreover, moisture loss was decreased significantly in fruit treated with essential oil enriched coatings (**Solgi and Ghorbanpour, 2014**). Essential oils are volatile, natural, complex compounds characterized by a strong odour and are formed by aromatic plants as secondary metabolites. (EOs) ethereal oils are also aromatic oily liquids obtained by steam or hydro-distillation from plant materials such as flowers, buds, seeds, leaves, twigs, bark, herbs, wood, fruits and roots (**Solgi and Ghorbanpour, 2014**). It is well known that in the East began the history of essential oils ; for the process of distillation the technical basis of the essential oil industry was conceived and first employed in the Orient, especially in Egypt, Persia and India. As in many other fields of human endeavor, As usual "The sun rises from the East".

Kamel, (2014) found that treating Valencia orange fruits by immersing it in seaweed extract at 1% was maintained fruit quality longer time comparing to Imazalil and control treatments. **Tarabih and El-Metwally, (2014)** found that use jojoba oil (0.1%) on Washington Navel orange fruits decreased weight losses percentage, fruit decay, total losses in fruit, titratable acidity and ascorbic acid oxidase. **El-Badawy et al., (2012)** reported in their study on the efficacy of propolis and wax coatings in improving fruit quality of "Washington" navel orange under cold storage that the lowest values of weight loss percentage, decay percentage and respiration rate (mg CO₂ /kg fruits/hr) as well as the best results of shelf life, titratable acidity and ascorbic acid (mg/100 ml juice) were gained by wax treatment compared with control. **Sallam et al., (2012)** found that the use of yeast on orange tree as biocontrol of green mold decreased fruit weight loss and the undesirable fruits percentage during cooling period (5° C) for nine weeks compared with control .