# EFFECT OF SOME ENVIRONMENTALLY SAFE TREATMENTS ON STORABILITY AND QUALITY APPEARANCE OF EARLY SWEET GRAPES

**Submitted**
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## ABSTRACT

The effect of two environmentally safe postharvest covered with potassium silicate (PS) and Gum Arabic (GA) with three wrapped materials, heat shrink film (SH), perforated polyethylene (PPE) bags 40 mu and perforated polyethylene (PPE) bags 80 mu on Early sweet grape and stored during 28 days at $0^oC$ or $7^oC$, relative humidity (90 – 95 %) and after then in marketing temperature in 2013 and 2014 seasons, data reveal that, clusters grapes were dipped in potassium silicate (PS) or in Gum Arabic (GA) and wrapped with heat shrink film (SH) were had the lowest significant percentages of fruit weight loss, decay, shatter and total lose berries percentages these due to increasing in bunch freshness. Average berry firmness and adherence strength decreased as the storage period increased reaching its lowest values at the end of storage in both storage degrees in two seasons, potassium silicate and Gum Arabic with heat shrink reflected the highest berry firmness and adherence strength in this respect during the different periods of storage in two seasons of study. The highest percentages were suggested on weight loss, decay, shatter and discarded berries when clusters dipped in Gum Arabic and wrapped by perforated polyethylene (PPE) bags 80 mu, it was worse than untreated treatment (control) and that due to unacceptable clusters in marketing

All privies physical properties were discussed in marketing temperature at ($25^oC$) and found the same liner.

When tested effect of treatments on chemical properties such as T.S.S, acidity, TSS / acid ratio found that gradually increased and acidity decreased with extend of storage period during two seasons. On the end of storage days, the untreated clusters and treated clusters with potassium silicate and Gum Arabic plus profited polyethylene 40 and 80 mu give the lowest values of T.S.S without significant different between them. Total acidity in berry juice tended to fluctuate, but some increment was found as a storage period prolonged till 28 days of two cold storage studded ($0^oC$ or $7^oC$). Thus, all treatments produced a lower acidity in berry juice compared with the control after 28 days of cold storage.

Gum Arabic with profited polyethylene in 80 mu (GA + PPE 80 mu) treatment gave the lowest values in T.S.S /acid ratio followed by Gum Arabic with profited polyethylene in 40 mu (GA + PPE 40 mu), potassium silicate with profited polyethylene in 40 mu (PS + PPE 40 mu) and potassium silicate with profited polyethylene 80 mu (PS + PPE 80 mu), potassium silicate with heat shrink (PS + SH) to reach the highest value to Gum Arabic with heat shrink (GA + SH) as compared with the control treatment.

Dipping clusters in Gum Arabic (GA) or potassium silicate (PS) and wrapped by shrink film (SH) tend to have the effective role in reducing the rate of respiration of grape clusters. The same liner were found when tested effect of treatment on marketing period after cold storage.

It can conclusion that the best treatment record for dipping clusters in potassium silicate and wrapped by heat shrink film

**Key words**: Early sweet grapes, Gum Arabic, Potassium silicate, Modified atmosphere packing (MAP), Heat shrinkable, Cold storage.

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# *INTRODUCTION*

# 1- INTRODUCTION

Table grapes are one of the most widely grown fruit crops in Egypt. It's considered to be the second most important fruit crop after citrus. Table grapes are grown from Alexandria in the north of Egypt to Aswan in the south. There are many varieties of table grapes produced in Egypt, like Early sweet, Superior, Thompson seedless, Flame seedless, Crimson, and Red globe. Competition among Egyptian growers is tough. There's always more competition every year because of the new grape plantations coming into production every year, so the only thing that keeps one ahead of others in the market is the ability of producing high quality grapes. Egyptian's geographical spread of production enables fresh sweet grapes to be available From May to July for the main export destinations such as the European Union (UK, Netherlands, Italy …), Russia, and Gulf region (Emirates). Grapes can be picked, packed and air freighted to markets within 60-72 hours of harvest. Shipping to the Middle East countries takes almost 48-60 hours. Egypt exports around 7% from the total volume of produced grape. In 2013, the total volume of the exported grape was around 80,000 tones **AGQ (2014)**.

Storage methods used to protect freshness of grapes are chemical protect, controlled atmosphere storage and cold storage. Cooling is the most active method to control maturity of vegetables and fruits in practice. Maturity of vegetables and fruits are the decaying caused by changing of chemical changing in organic matters. Enzymes can cause chemical changing in organic matters. Chemical reaction is too slow at below $0^{o}$C Selcuk **and Serap (2004).** Storage affected the change of different parameters in different way as well as the change of the quality of evaluated samples. Sensory traits like taste scent and texture decreased during storage. The storage reduced also the quality measured physical parameters fixing ability of grape berries and firmness of grape skin **Minarovska and Horcin (2000).** However, despite good temperature control during postharvest storage, table grapes continue to lose mass mainly due to the micro-climatic conditions that were created within the enclosed fruit packages.

**Ngcobo *et al*. (2012**) reported that there were significant differences in mass loss of table grapes packed in different multi packages, where the perforated liners films resulted in a higher mass loss than the non-perforated liner films during cold storage period.

The table grape is not exempt from issues of degrading quality, and many problems have been detected during postharvest storage and shelf life. Quality losses include weight loss, color change, berry softening and rachis browning, leading to reduced shelf life and overall quality **Valverde *et al.* (2005).**

Packaging and handling systems have been developed in many countries to move products from farm to consumer expeditiously in order to minimize quality degradation. Procedures include lowering temperature to slow respiration and senescence, maintaining optimal relative humidity to reduce water loss without accelerating decay, adding chemical preservatives to reduce physiological and microbial losses, and maintaining an optimal gaseous environment to slow respiration and senescence **Wills *et al*. (1989);Workneh *et al*. (2011)**. It is widely accepted that modified atmosphere packaging (MAP) helps to retard tissue senescence and consequently extends storage life of produces **Lurie *et al*. (2007).** However, reliable knowledge about the practical use of MAP on the quality of minimally processed grapes is still limited. **Kader (2002)** recommended the use of MAP as a supplement to avoid skin browning incident which is a significant problem occurring in storage of perishable produces like grapes.

In the absence of cold storage, deterioration is often faster because of the production of vital heat and carbon dioxide release from respiration. Thus, cold storage is mainly used to decrease the respiratory rate, reducing losses, and retaining the product features that are associated with quality. Modified atmosphere packing (MAP) leads to a reduction in the fruit respiration rate depending on the levels of fruit respiration and the film permeability, there may be an increase in the $CO_2$ levels that leads to anaerobic respiration, ethanol accumulation and physiological injuries to the product **Artes *et al.* (2007).**

Recently dipping in solutions of natural compounds in combination with modified atmosphere packaging (MAP) was proven as promising means for postharvest control decay **Valero *et al*. (2006).** The principal advantage of shrink wrapping are: reduced weight loss, minimized fruit deformation reduced chilling injury and reduced decay by preventing secondary infection.