A Study on Nutritional Quality of Pepino Fruit During Storage

Mrs.V. Mehalai
Dept of Biotechnology
DR.R.K.S.Health Science Indili, kallakurichi

Abstract- *Solanum muricatum is a species of evergreen shrub native to South America and grown for its sweet edible fruit. The present species is, however, a close relative of other nightshades cultivated for their fruit, including the tomato and the eggplant which its own fruit closely resembles. Although both ground and cover color (stripes) are used for harvesting purposes, ground color serves as a more robust index due to the strong pigmentation that the purple stripes undergo under direct or indirect sunlight (Lizana and Levano, 1977). The shelf life of the fresh pepino fruits were studied by storing the fruits in two different storages such room temperature (25± 1ºC) and cold storage (7± 1ºC). Various parameters were analysed by the using of various instruments. Through this paper I was evaluated the nutrional quality during storage of pepino fruit.*

Keywords- Species, Pepino Fruits, Storages, Quality.

I. INTRODUCTION

Solanum muricatum is a species of evergreen shrub native to South America and grown for its sweet edible fruit. It is known as sweet cucumber in English, in order to differentiate it from cucumber which is also called "pepino" in Spanish ,the latter is also used for similar species such as *"Solanum mucronatum.*It is also sometimes called pepino melon or melon pear. Another common name, "tree melon", it looks more like a ground cover, trailing plant. The present species is, however, a close relative of other nightshades cultivated for their fruit, including the tomato and the eggplant which its own fruit closely resembles. The fruit is common in markets in Colombia, Kenya, Bolivia, Peru and Chile, but less often overseas because it is quite sensitive to handling and does not travel well. It is grown as an annual and propagated vegetative. Pepinos vary from round to elongate are the 5 to 20 cm in length and are generally yellow with purple stripes. They are juicy and may be eaten singly or as a dessert fruit in a similar manner to rock melon. The fruit is common in markets in Colombia, Kenya, Bolivia, Peru and Chile and in Ooty, Tamilnadu. Delicate and mild-flavoured, pepinos are often eaten as a fresh snack fruit. They combine very well with a few other fruits as well.

II. REVIEW OF LITERATURE

Aroma is defined as the food product (Meilgaard et al., 2007). The odor of a product is detected when volatiles enter the nasal passage (voluntarily or involuntarily) and are perceived by the olfactory system, whereas “aromatics are the volatiles perceived by the olfactory system from a substance in the mouth” (Meilgaard et al., 2007). Aroma is a critical component of perceived quality (Kader, 2002; Paliyath and Murr, 2008; Wills et al., 2007). The quality of a fruit is defined as the set of internal and external features inherent to the fruit, thus determining consumer acceptability (Paliyath and Murr, 2008). These characteristics, which are also known as “quality criteria” for the consumer include appearance (internal and/or external defects, size, color, and shape), texture, nutritional value, safety (Kader, 2002), and taste (Wills et al., 2007).

Aroma is a complex attribute to study due to the use of sensations that are translated into standard vocabulary, and the existence of a wide variety of volatiles. About 17,000 different types of odors are known, of which a trained person can detect 150–200 (Meilgaard et al., 2007). For example, an apple produces ≈270 volatile compounds (Dimick and Hoskin, 1982), a tomato produces close to 400 volatiles (Buttery, 1993), and a strawberry ≈360 volatiles (McFadden et al., 1965). These volatile chemicals fall into several categories including terpenes, esters, aldehydes, alcohols, and ketones. Esters, aldehydes, and alcohols are considered the most important aromatic perception for fresh fruits (Paliyath and Murr, 2008). The ripeness of the fruit will determine the level and type of the defined aroma compounds emitted by the fruit. Often mentioned as the main quality criterion of the ripening stage, this character has been reported as an excellent harvest index for pepino (El-Zeftawi et al., 1988; Lizana and Levano, 1977). Although both ground and cover color (stripes) are used for harvesting purposes, ground color serves as a more robust index due to the strong pigmentation that the purple stripes undergo under direct or indirect sunlight (Lizana and Levano, 1977). Fruit harvest is carried out when ground color is green or white (Fig. 1). However, measuring pepino color has proven challenging as reported by Heyes et al. (1994). Variable ripening rates and the difficulty of a fully “objective”

assessment of pepino maturity (areas free from purple stripes must be chosen), make subjective evaluation system of the whole fruit surface by the naked eye more reliable than instrumental measurements.

Under storage conditions, significant differences in fruit color development have been found. When stored in air at 5, 8, and 10 °C, minor flesh color change was noted, but considerable variation was found for ground color (Lizana and Levano, 1977). Similar findings were reported in pepino by Martínez-Romero et al. (2003) after storage treatments. These authors studied the cv. Sweet Long at three different maturity stages (green, light green, and yellow green) stored at 1, 10, or 20 °C. Martínez-Romero et al. (2003) found significant differences in the yellow green stage stored at 1 °C, but no significant color differences were found in the green and light green stages at different temperatures. They also reported changes in color due to external chilling injury (CI), where more than 9% of the fruit turned brown in color after 28 d of storage. In contrast, for controlled atmosphere (CA) storage conditions, Huyskens-Keil et al. (2006) reported that CO_2 gas concentrations (5% O_2 and 5, 15, or 20% CO_2 at 5 and 10 °C) inhibited undesired color changes in mature and ripe pepinos for 21 and 14 d, respectively, i.e., the fruits maintained color, regardless of the atmospheric composition. This observation is consistent with findings for various other commodities (Kader, 2002), where high CO_2 concentrations led to the retention of color intensity (Huyskens-Keil et al., 2006).

Lizana and Levano (1977) reported a dramatic loss in firmness after 30 d of storage, finding values of 3 lb after 60 d of storage at 5, 8, and 10 °C. Three maturity stages were evaluated yellow (M1), green yellow (M2), and green white (M3). All pepinos stored at 20, 10, and 1 °C showed a significant decrease during storage, especially during the first 2 weeks (Martínez-Romero et al., 2003). However, these authors found that for fruits stored at 10 °C, the loss of firmness was lower than for those stored at 1 and 20 °C at any ripening stages, and the greatest firmness losses were found at 1 °C, likely as a consequence of the CI. The beneficial effects of high CO_2 concentrations in reducing fruit softening for mature pepinos are presumably due to the inhibition of cell wall–degrading enzyme activities, e.g., PME and PG, as reported by Heyes et al. (1994). CA studies showed that mature pepino fruits exhibited significantly higher firmness than ripe fruits under all tested CA storage conditions until 14 d of storage (Huyskens-Keil et al., 2006). Plant nutrition levels have also been examined as a factor that contributes to fruit firmness. Ruiz and Nuez (1997) determined that nutrition treatments (focused on K^+ among other nutrients) did not significantly affect pepino fruit texture.

Another parameter closely related to firmness is bruising. The propensity of pepino to show bruising after handling and transport also has become a limiting factor in its commercial development (Gould et al., 1990). Gould et al. (1990) documented that pepinos show a dark “waterlogged” or “soggy” area after compressive force. These authors studied two cultivars (Suma and El Camino) and 16 selections of pepino, determining that softer fruit are more likely to show bruise injury than a firmer fruit. Thus, bruising increases as a fruit ripens. The Suma cultivar was identified as the most susceptible to bruising, whereas El Camino fruit presented a moderate susceptibility. Bruising is associated with the size and compactness of exocarp cells. For example, the ‘Suma’ fruit possesses larger air pockets, providing little resistance to an applied load, whereas for resistant selections, air spaces are smaller, and the stress is dispersed over a larger surface area, thus decreasing the average loading transmitted onto mesocarp cells (Gould et al., 1990). For shipping purposes, pepinos are harvested at an early ripening stage, because they are highly sensitive to bruising (Huyskens-Keil et al., 2006).

MATERIALS AND METHODS:

- Shelf life of the freshly harvested pepinos (ripe and unripe) was selected according to their size, shape, and ripening stage. Screening pepinos were packaged in 300-gaugepolyethylenebags. The shelf life of the fresh pepino fruits were studied by storing the fruits in two different storages such room temperature (25± 1ºC) and cold storage (7± 1ºC).
- Physiological weight loss (PLW %) quality evaluation (5-point rating scale), colour, texture were observed in 5 days interval of storage and recorded.
- Quality evaluation was included based on the decay, incidence, surface, discolouration, internal appearance using scales of 1 to 5 (where 1 -none,2-slight,3-moderate,4-moderately severe,5-severe).

- **COLOUR**

Fruit colour was measured with a hunter lab calorimetric lab scan XE model, virgina USA. Calibrations are conducted using a white tile. Colour measurements were expressed in the a,b & C scale. From these values the hue angles and chromo values were calculated.

- **TEXTURAL PROPERTIES**

Fruit firmness was measured by texture analyzer (TADHI) Stable micro systems, UK with a 2 mm Diameter probe. The measurements for each fruit carried out an three different positions. The average values per samples were

recorded and statistically analyzed (Huyskens., Et al., 2006). The pepino fruit were undergone the biochemical analysis during the fruit storage.

- Moisture, Acidity ,PH, total ash content,(TAC),Total soluble content (TSC) total sugars, and maturity index were analysed.
- Free sugars analysed by the use of HPLC.
- Vitamins analysed by the use of HPLC.
- Phenolic compounds and Antioxidant activity were done.

NUTRITIONAL EVALUVATION OF PEPINO FRUITS

S.NO	NUTRIENTS	RANGES OF VALUES PER 100 (GRAMS)
1	MOISTURE	90-92
2	ACIDITY	0.128 – 0.285
3	pH	4.05- 5.73
4	TOTAL SUGARS	0.42- 0.62
5	TOTAL PHENOLIC CONTENTS	47-93
6	VITAMIN C	36- 43
7	MINERALS	12-14
8	ANTIOXIDANT ACTIVITY	6.90

III. CONCLUSION

In this paper work the pepino fruit which is mainly used for ant diabetic agent in unripe stage. It was collected from the Horticulture Research institute, TNAU ooty, Tamilnadu. pepinos are harvested at an early ripening stage, because they are highly sensitive to bruising (Huyskens-Keil et al., 2006). Sensory and statistical analysis by using ten points in the score cards for untrained judies. These characteristics, which are also known as “quality criteria” for the consumer include appearance (internal and/or external defects, size, color, and shape), texture, nutritional value, safety. The Various parameters were analysed by the using of various instruments. Through this paper I was evaluated the nutrional quality during storage of pepino fruit.

REFERENCES

[1] Ahumada, M. & Cantwell, M. 1996 Postharvest studies in pepino dulce (*Solanum muricatum* Ait.): Maturity at harvest and storage behavior *Postharvest Biol. Technol.* 7 129 136

[2] Anderson, G., Jansen, R. & Kim, Y. 1996 The origin and relationships of the pepino, *Solanum muricatum* (Solanaceae): DNA restriction fragment evidence *Econ. Bot.* 50 369 380

[3] Blanca, J., Prohens, J., Anderson, G., Zuriaga, E., Cañizares, J. & Nuez, F. 2007 AFLP and DNA sequence variation in Andean domesticate, pepino (*Solanum muricatum*, Solanaceae): Implications for evolution and domestication *Amer. J. Bot.* 94 1219 1229

[4] Bravo, A. & Arias, E. 1983 Cultivo del pepino dulce *El Campesino* 114 15 33

[5] Burge, G.K. 1989 Fruit set in the pepino (*Solanum muricatum* Ait.) *Sci. Hort.* 41 63 68

[6] Buttery, R.G. 1993 Quantitative and sensory aspects of flavor of tomato and other vegetables and fruits, p. 259–286. In: T.E. Acree and R. Teranishi (eds.). Flavor science: Sensible principles and techniques.

[7] Daunay, M., Rousselle-Bourgeois, F., Lester, R. & Peron, J. 1995 Known and less known *Solanum* species for fresh market *Acta Hort.* 412 293 305

[8] Dimick, P. & Hoskin, J. 1982 Review of apple flavor-state of the art *Crit. Rev. Food Sci. Nutr.* 18 387 409

[9] Zeftawi, B., Brohier, L., Dooley, L., Goubran, F., Holmes, R. & Scott, B. 1988 Some maturity indices for tamarillo and pepino fruits *J. Hort. Sci.* 63 163 169

[10] Galletti, L., Berger, H., Drouilly, D. & Lizana, A. 2006 Atmósfera modificadaenfruto de pepino dulce *IDESIA (Chile)* 24 35 40

[11] Gould, K., Hammett, K. & Steinhagen, S. 1990 Mechanism of bruise resistance in pepino (*Solanum muricatum*) fruit *Ann. Bot. (Lond.)* 66 155 161

[12] AOAC (1985) Official Methods of Analysis. 14th Edition, Association of Official Analytical Chemists, Washington DC, No. 43.292. 7.001, 7.009, 7.006.