SUMMARY

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This investigation was carried out on balady Banzaheir lime fruits (*Citrus auranlifolia*) at the Faculty of Agriculture, Moshtohor, Zagazig University and the National Center for Radiation Research and Technology (NCRRT), in Nasr city, cairo-Egypt, during two successive seasons, 1999 and 2000.

Nearly similar balady lime trees (10 years old) grown in Meet Kinana, Kalubia governorate budded on sour orange rootstock were chosen. The selected trees were subjected to the normal horticultural treatments of the orchard.

In this respect, fruit samples were collected at maturity stage from labeled fruits at the Meet Kinana locations starting from the age of fruits 143-159 days from flowering when juice percentage reached 50-60%, acidity about 7% and T.S.S. was 7-8%. Anyhow, all lime fruits were transferred to the Agricultural Development Systems Project laboratory in the Faculty of Agriculture, Cairo, University then divided into samples of 500 g. each. Generally treatments used included:

- Control (untreated)

Irradiation

- 0.50 KGy
- 0.75 KGy

- Fungicides

Non traditional

- Garlic oil
- Pro-Gib plus
- Hot water
- Yeast

Waxing

- Control + wax
- 0.50 KGy + wax
- 0.75 KGy + wax

- Fungicides + wax
  - Garlic oil + wax
  - Pro-Gib plus + wax
  - Hot water + wax
  - Yeast + wax

Each treatment was subdivided into three packages; each package had 5 kg, which also subdivided into 10 replicates with 500g each (0.5 kg). The packages used i.e. polyethylene, carton and polyethylene plus carton packages were perforated.

The obtained results can be summarized as follow:

6.1. Physical properties :

6.1.A. Fresh appearance :

1- Under all treatments used, fresh appearance percentage in fruits decreased with increasing storage period.

2- Fruits storage under cold temperature had significantly the highest fresh appearance percentage as compared with fruits stored under room temperature. In the same time, fruit fresh appearance percentage decreased with the progress in storage period up to 90 days when fruits stored under cold temperature. Fruit fresh appearance was much lower under room temperature and became unacceptable when packed in carton boxes after 45 days.

3- Polyethylene plus carton package maintained better fresh appearance followed by polyethylene package as compared with carton package in a descending order.

4- High irradiation dose treatment (0.75 KGy) succeeded in maintaining better fresh appearance as compared with low irradiation treatment (0.50 KGy).

5- Only fruits treated with non traditional treatments and non traditional plus waxing treatments remained acceptable to consumer when packed in polyethylene plus carton boxes up to 195 days under cold temperature, while fruits stored at room temperature became unacceptable after 90 days when packed in polyethylene plus carton boxes.

6.1.B. Fruit juice percentage :

1- All the treated fruits showed considerable high juice percentage during the whole storage period as compared with the control (untreated) which showed high juice percentage till 90 days of stored lime fruits under cold temperature and 45 days under room temperature, then the loss of juice percentage decreased more quickly, till the end of their storage period (195) at cold temperature and 90 days at room temperature.

2- High irradiation treatment (0.75 KGy) induced decreasing juice percentage in fruits as compared with low irradiation treatment (0.50 KGy).

3- Polyethylene plus carton package decreased juice percentage under all postharvest treatments followed by polyethylene package as compared with carton package.

4- Fruits coated by wax after non traditional postharvest treatments had higher juice percentage than unwaxed fruits under cold temperature.

6.1.C. Fruit decay and weight loss :

1- Fruit decay and weight loss were increased by prolonging storage period for all postharvest treatments and different packages under study.

2- Fruits stored under cold temperature had significantly the lowest fruit decay and weight loss percentages as compared with fruits stored under room temperature. In the same time, fruit decay and weight loss percentages increased with the progress in storage period up to 90 days when fruits stored under cold temperature. Fruit decay and weight loss percentages were much higher under room temperature and became unacceptable to use after 45 days.

3- The higher dose of irradiation (0.75 KGy) reduced fruit decay and weight loss percentages as compared with the lower dose of irradiation (0.50 KGy).

4- Polyethylene plus carton package reduced fruit decay and weight loss percentage in relation to polyethylene and carton packages.

5- Fruits treated by pro-Gib plus waxing had lowest fruit decay and weight loss percentages after 195 days of storage under cold temperature.

6.2. Chemical properties :

6.2.A. Total soluble solids :

1- Total soluble solids percentage increased in fruits by prolonging the storage period under all postharvest treatments and different packages under study.

2- Fruits stored under cold temperature had the highest increase in fruit T.S.S. percentage during storage as compared with fruits stored at room temperature.

3- Polyethylene plus carton package augmented total soluble solids percentage followed by polyethylene package as compared with carton package in a descending order.

4- The lower dose of irradiation (0.50 KGy) surpassed the higher one (0.75 KGy) in increasing total soluble solids percentage in all different packages and storage temperatures under study.

5- Total soluble solids percentage, of all treatments used, increased with prolonging period of fruit storage. Fruits of the control became unacceptable to the consumer after 45 days of storage under room temperature and 90 days under cold temperature. Fruits treated with pro-Gib and garlic oil treatments plus waxing were acceptable to consumption up to the end of cold storage period (175days) while irradiation treatments failed in realizing such success.

6.2.B. Total acidity :

1- Fruit juice acidity values under different treatments decreased during prolonged storage either under room or cold temperatures as well as under different package types under study.

2- Fruits stored under cold temperature produced the highest juice acidity values as compared with fruits stored under room temperature.

3- Fruits packed in polyethylene plus carton boxes had higher total acidity values followed by polyethylene package as compared with carton package in a descending order.

4- Higher dose of irradiation (0.75 KGy) was,more effective in all different packages under study.

5- After 195 days of storage period under cold temperature, pro-Gib plus waxing as well as garlic oil plus waxing treatments succeeded in maintaining acceptable total acidity values.

6.2.C. T.S.S. / acid ratio :

1- T.S.S. / acid ratio increased by increasing storage period in all storage treatments and different packages under study.

2- Fruit storage under cold temperature produced the highest ratio of T.S.S. / acid ratio as compared with fruits stored under room temperature.

3- After 165 days of stored lime fruits under cold temperature, control plus waxing succeeded in increasing T.S.S. / acid ratio followed by yeast as well as yeast plus waxing as compared with the other used treatments and the control. At the end of storage period (after 195) T.S.S. / acid ratio was not affected statistically by the different treatments used in this study.

4- Fruits packed in polyethylene plus carton boxes had higher T.S.S. / acid ratio (after 165 days) of stored lime fruits under cold temperature followed by polyethylene package as compared with carton package. On the other hand, no statistical difference was noticed between the two remaining packages after 195 days of stored lime fruits under cold temperature.

6.2.D. Acorbic acid content :

1- Ascorbic acid content in fruit juice decreased by the advance in storage period. The drop in ascorbic acid content during

storage was at a higher rate in fruits under room storage than those under cold storage.

2- High irradiation treatment (0.75 KGy) succeeded in maintaining higher ascorbic acid content as compared with low irradiation treatment (0.50 KGy).

3- Polyethylene plus carton package reduced the drop in ascorbic acid content followed by polyethylene package, while fruits packed in carton boxes increased the drop in ascorbic acid content.

4- Ascorbic acid content of different treatments decreased with increasing the period of storage. At 165 days of cold storage fruits treated with control plus waxing were inferior in ascorbic acid content as compared with other treatments. At the end of cold storage (195 days), fruits treated with pro-Gib plus waxing surpassed fungicides in fruit ascorbic acid content.

I recommend using a 500 ppm Garlic oil + wax packed in polyethylene + carton package stored under cold storage (10C). Also, proGib plus + 150 ppm + wax and irradiation treatment at 0.75 Kgy dosage + wax packed in polyethylene + carton stored under cold gave the best results.