

Postharvest Handling of Citrus Fruit



Dept. of Postharvest Science of Fresh Produce
ARO, The Volcani Center, Bet Dagan, Israel



The Orange Family



Shamouti

The famous Shamouti has been Israel's best-selling citrus due to its sweet-tangy taste, distinctive aroma and appearance, seedlessness and peeling ease. December to April.



Valencia Late

Late orange, round and dark orange, sweet taste and high juice content; thin skin and long cold-storage life. March to July.



Navel

The Washington Navel and other new varieties named for their navel-shaped bottom. Sweet-tangy taste, extremely juicy. October to December.



Winnola

Late mandarin, deep orange color, seedless, firm and very juicy. February to April.



Mor

A seedless blend of the Murcott's excellent qualities. February to March.



Temple

Very rich in vitamin C, strong, sharp aroma, high juice content. January to March.



Topaz

Excellent quality fruit with a delicate sweet taste. March to May.



Suntina

New variety. Smooth skin, with dark orange peel and flesh. High sugar content and very sweet taste. December to February.



Or

A new late seedless mandarin, strong sweet taste and a very unique sugar-acid balance. January to May.

Jaffa Easy-Peelers



Minneola

Dark orange with smooth skin and a papilla. Tangy-sweet taste, high juice content. December to February.

Murcott (Honey Tangerine)

Very sweet taste and distinctive aroma. February to March.

The Grapefruit Family



White Grapefruit

Seedless, very juicy, unique tangy taste, long cold-storage life and beautiful outside appearance. September to July.



Sweetie

New variety, a cross between grapefruit and Pomelo. Juicy, sweet-tasting and low in acidity. The Sweetie's skin is green at the season's start and gradually turns yellow. September to January.



Sunrise

Sunrise features flawless red skin and juicy red flesh. Sweeter and fast replacing the traditional white grapefruit. November to May.

Red Blush

Pink skin and juicy, sweet and slight tangy taste. September to December.



Limquat

A cross between lime and kumquat. Extremely juicy and sour taste. September to April.



Pomelo

Thick skinned, sweet, low in acidity, available in red and white. December to May.



Lemon

Several lemon varieties with high juice and acidity content are available most of the year. New seedless lemons are currently being developed.



Kumquat

Juicy, tangy-sweet taste and eaten with the skin. December to March.

And More Exotic Fruit!



Ethrog (Citron)

A variety used in the Jewish Festival of Succot.



Lime

Distinctive aroma, very rich in vitamin C, high acidity, dark green skin and green flesh. July to September.

Advanced Research & Development

The Board is an active partner in:

- Developing new easy-peeler varieties featuring fewer seeds, superior taste, excellent appearance, longer shelf life and extended marketing seasons;
- Developing and introducing new varieties of oranges, grapefruit and exotic citrus;
- Cultivating citrus with little or no chemical intervention, with the aim of all Jaffa citrus becoming environmentally friendly in the near future;
- Revolutionizing biological pest-control techniques;
- Supervising citrus nurseries towards eliminating the spread of disease and improving the quality of young plants;
- Planting new orchards throughout Israel.

Physiological characteristics of citrus fruit:

- 1. Non-climacteric (slow ripening)**
- 2. Subtropical (chilling-sensitive)**

Perishability and potential storage life of horticultural crops

Relative perishability	Potential storage life (weeks)	Commodities
Very high	<2	Apricot, blackberry, blueberry, cherry, fig, raspberry, strawberry; asparagus, bean sprouts, broccoli, cauliflower, cantaloupe, green onion, leaf lettuce, mushroom, peas, spinach, sweet corn, tomato (ripe); most cut flowers and foliage; minimally processed fruits and vegetables
High	2 to 4	Avocado, banana, grape (without SO ₂ treatment), guava, loquat, mandarin, mango, melons (honeydew, crenshaw, Persian), nectarine, papaya, peach, pepino, plum; artichoke, green beans, Brussels sprouts, cabbage, celery, eggplant, head lettuce, okra, pepper, summer squash, tomato (partially ripe)
Moderate	4 to 8	Apple and pear (some cultivars), grape (SO ₂ treated), orange, grapefruit, lime, kiwifruit, persimmon, pomegranate, pummelo; table beet, carrot, radish, potato (immature)
Low	8 to 16	Apple and pear (some cultivars), lemon, potato (mature), dry onion, garlic, pumpkin, winter squash, sweet potato, taro, yam; bulbs and other propagules of ornamental plants
Very low	>16	Tree nuts, dried fruits, and vegetables

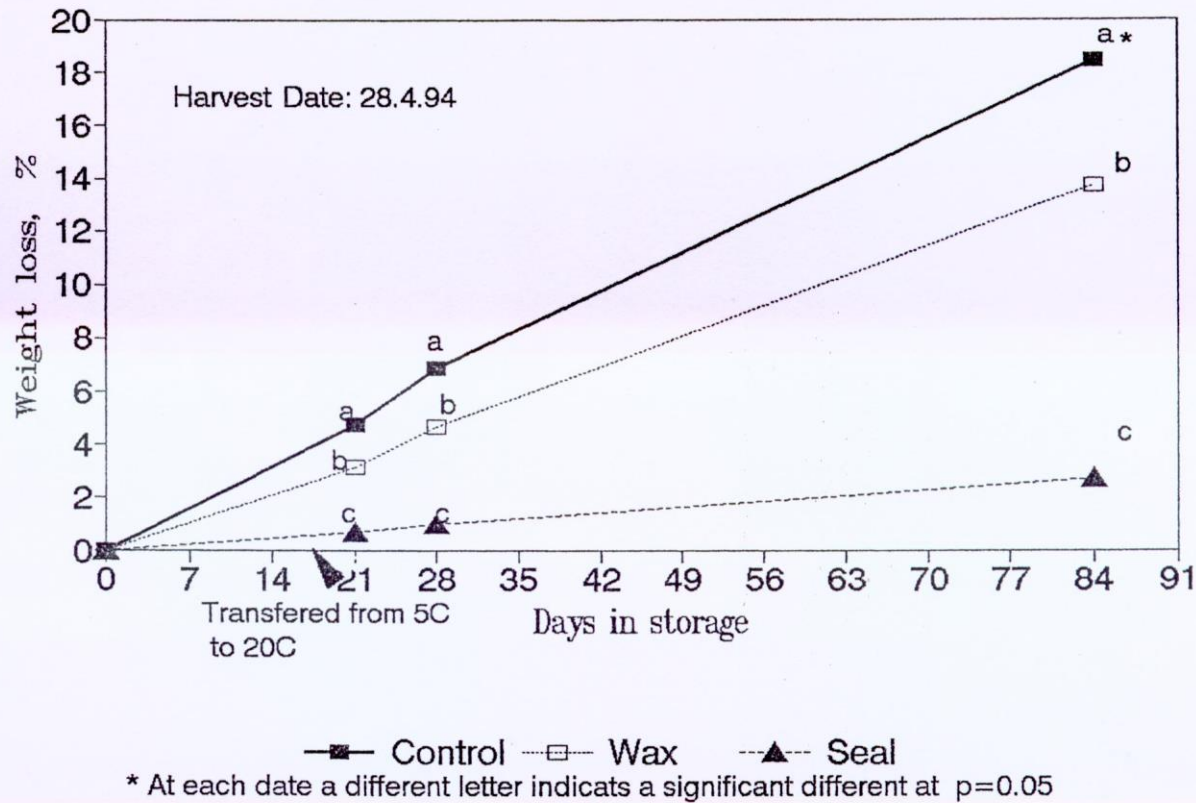
Postharvest of citrus fruit

Main problems:

1. Weight loss
2. Decay
3. Peel disorders
4. Taste

Effects of wax and seal packaging on weight loss of mandarins

Figure 9. The effect of sealing and waxing on Hadas mandarins in storage.



Main sources of decay in citrus fruit



Green mold

Caused by *Penicillium digitatum*



Blue mold

Caused by *Penicillium italicum*



Brown rot

Caused by *Phytophthora cytophthora*



Stem-end rot

Caused by *Diplodia natalensis*

Main rind disorders in citrus fruit



Chilling injury



Rind breakdown



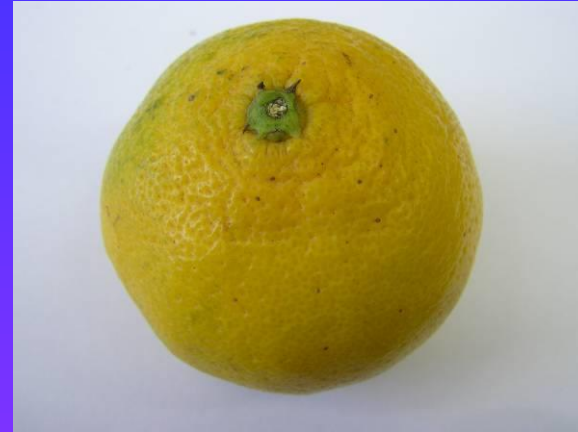
Aging

Degreening of citrus fruit

Minimum color
Local market



Minimum color
Export



De-greening of citrus fruit

Time zero

5 days in ethylene

Degreening + simulated marketing

Okitzu



Mihu
vasa



Time zero

5 days in ethylene

Degreening + simulated marketing

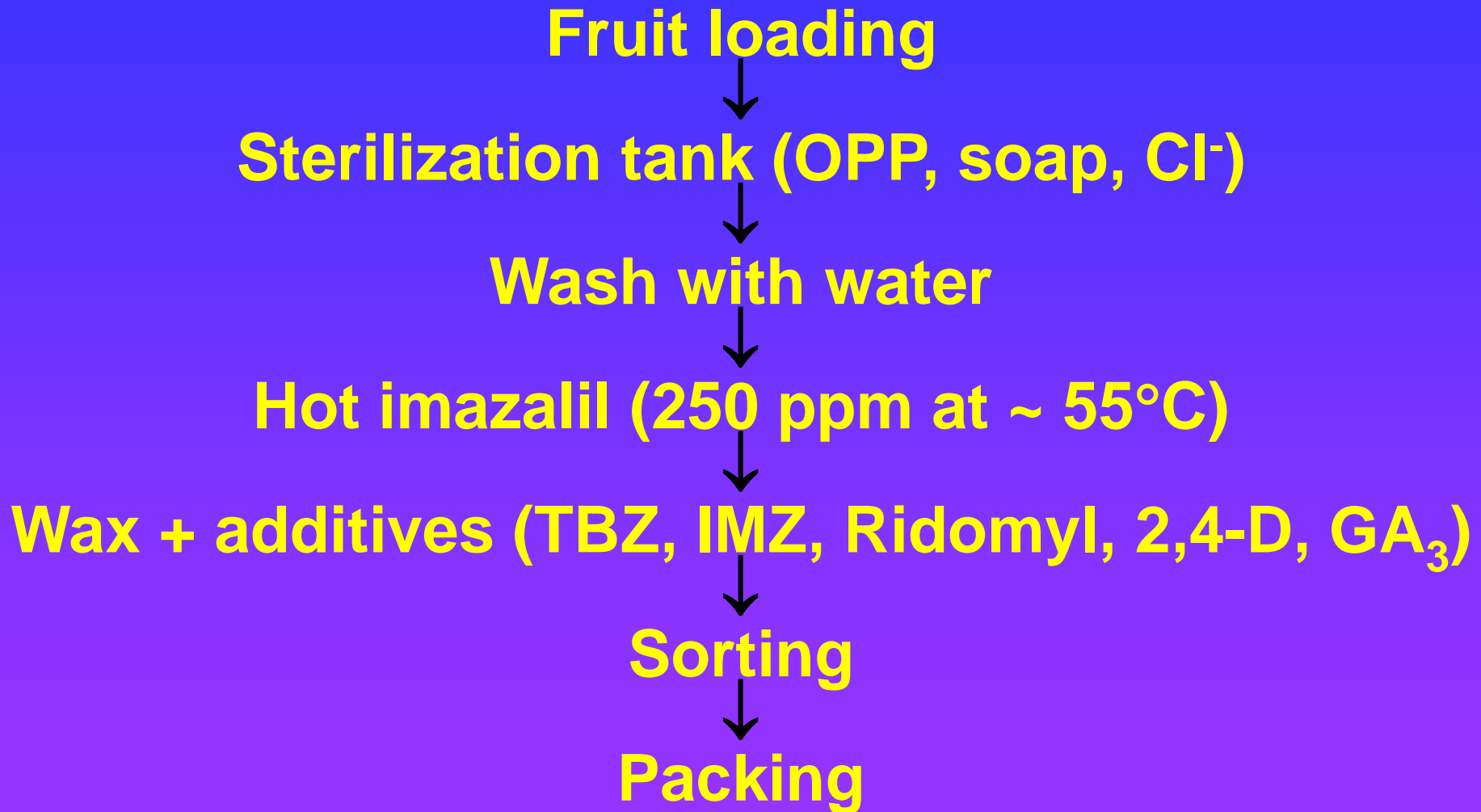
Okitsu



Mihu
vasa



Diagram of citrus packing house sorting line



Virtual tour

**in a commercial citrus
packinghouse in Israel**

The packinghouse building



Quality check



Unloading containers



Loading area outside the packing building



Loading containers into packing line



Dumping the fruit



Sterilization tank



Sterilization tank



Detergent wash



First sorting



Sorting



First sorting





Inferior fruit



Hot imazalil



Hot imazalil



Hot imazalil



Drying and waxing



Waxing



Drying and waxing tunnel



Second sorting



Sizing



Sizing



Sizing



Labeling



Collecting fruit for packaging



Collecting fruit for packaging



Hand packaging



Preparing pallets by hand



Preparing pallets by robot



Preparing pallets for shipment



Pallets ready for shipment



Loading pallets on trucks



Check out



Thank you for your attention!

