

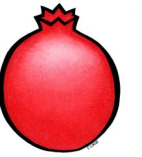


C. LORCA



It is the policy of the University of California not to engage in discrimination against or harassment of any person, employed by or seeking employment with the University, or in any of its programs or activities, on the basis of race, color, national origin, religion, sex, gender, gender expression, gender identity, pregnancy, physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services, as well as state military and naval service. This policy is intended to be consistent with the provisions of applicable state and federal laws and University policies. University policy also prohibits retaliation against any employee or person seeking employment for bringing a complaint of discrimination or harassment pursuant to this policy. This policy also prohibits retaliation against a person who assists someone with a complaint of discrimination or harassment, or participants in any manner in an investigation or resolution of a complaint of discrimination or harassment. Retaliation includes threats, intimidation, reprisals, and/or adverse actions related to employment or to any of its programs or activities.

In addition, it is the policy of the University of California to undertake affirmative action, consistent with its obligations as a Federal Contractor, for minorities and women, for persons with disabilities, and for covered veterans. The University commits itself to apply every good faith effort to achieve prompt and full utilization of minorities and women in all segments of its workforce where deficiencies exist. These efforts conform to all current legal and regulatory requirements, and are consistent with University standards of quality and excellence. In conformance with Federal regulations, written affirmative action plans shall be prepared and maintained by each campus of the University of California, by the Lawrence Berkeley National Laboratory, by the Office of the President, and by the Division of Agriculture and Natural Resources. Such plans shall be reviewed and approved by the Office of the President and the Office of the General Counsel before they are officially promulgated. Inquiries regarding the University's equal employment opportunity policies may be directed to the Affirmative Action Contact, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618 (530) 750-1318.



Produce Facts

Pomegranate

Recommendations for Maintaining Postharvest Quality

Carlos H. Crisosto, Elizabeth J. Mitcham, and Adel A. Kader
 Department of Plant Sciences, University of California, Davis

MATURITY INDICES

- External red color (depending on cultivar)
- Red color of juice (equal to or darker than Munsell color chart 5R-5/12)
- Acidity of juice below 1.85%

QUALITY INDICES

- Freedom from growth cracks, cuts, bruises, and decay
- Skin color and smoothness
- Flavor depends on sugar/acid ratio which varies among cultivars. A soluble solids content above 17% is desirable
- Tannin content below 0.25% is desirable

OPTIMUM TEMPERATURE

5°C (41°F) for up to 2 months; longer storage should be at 7.2°C (45°F) to avoid chilling injury.

OPTIMUM RELATIVE HUMIDITY

90-95%; pomegranates are very susceptible to water loss resulting in shriveling of the skins. Storing fruit in plastic liners and waxing can reduce water loss, especially under conditions of lower relative humidity.

RATES OF RESPIRATION

To calculate heat production multiply ml CO₂/kg·hr by 440 to get Btu/ton/day or by 122 to get kcal/metric ton/day.

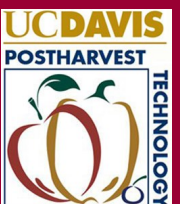
Temperature	5°C (41°F)	10°C (50°F)	20°C (68°F)
ml CO ₂ /kg·hr	2-4	4-8	8-18

RATES OF ETHYLENE PRODUCTION

Less than 0.1 µl/kg·hr at 10°C (50°F) or lower
 Less than 0.2 µl/kg·hr at 20°C (68°F)

RESPONSES TO ETHYLENE

Exposure to ethylene at 1 ppm or higher stimulates respiration and ethylene production rates, but it does not affect their quality attributes. Pomegranates do not ripen after harvest and must be picked fully ripe to ensure the best eating quality.



RESPONSES TO CONTROLLED ATMOSPHERES (CA)

Very few studies of the responses of pomegranates to CA have been conducted. Storage in 2% O₂ reduces chilling injury if pomegranates are kept below 5°C (41°F). In one study, pomegranates were stored successfully at 6°C (43°F) in 3% O₂ + 6% CO₂ atmosphere for 6 months. In another study a combination of 5% O₂ + 15% CO₂ was found to be effective in decay control and scald prevention for up to 5 months at 7°C (45°F).

PHYSIOLOGICAL DISORDERS

Chilling Injury. External symptoms include brown discoloration of the skin and increased susceptibility to decay. Internal symptoms include a pale color of the arils (pulp around the seeds) and brown discoloration of the white segments separating the arils. Chilling injury occurs if pomegranates are exposed for longer than one month at temperatures between their freezing point -3°C (26.6°F) and 5°C (41°F) or longer than two months at 5°C (41°F).

Husk Scald. Brown discoloration of the husk (without any internal symptoms on the arils or surrounding tissues) that occurs during storage for more than 3 months at 7°C (45°F) or lower temperatures.

PATHOLOGICAL DISORDERS

Gray mold. Caused by *Botrytis cinerea*, gray mold is the most important postharvest decay-causing fungus. Infection commonly begins in the orchard with spores of the fungus germinating and colonizing senescing blossom tissues in the calyx area. After harvest, the fungus grows into the pomegranate's rind which turns light brown, tough, and leathery. This is followed by the appearance of gray mycelial growth at advanced stages of fruit decay. Minimizing physical damage of the calyx (crown) and fruit during harvest and postharvest handling, plus maintaining optimal temperature and relative humidity throughout postharvest handling of pomegranates are very important decay control strategies. Sanitation washes of fruit, however, may activate established infections in blossom tissues. Use of fludioxonil (Scholar) as a postharvest fungicide dip or drench is effective in controlling this fungus and is approved by USEPA with a maximum residue limit of 5 ppm. Carbon dioxide enriched atmospheres are fungistatic and cold temperatures also inhibit growth of *Botrytis cinerea*.

Heart Rot. This may be caused by *Aspergillus* spp. and *Alternaria alternata*, and *Alternaria arborescens*. Affected fruit show a slightly abnormal skin color, and internally a mass of blackened arils. The disease develops while the fruit is on the tree. Affected pomegranates can be detected and removed by sorters in the packinghouse.

POSTHARVEST PHOTO GUIDE

DISORDERS



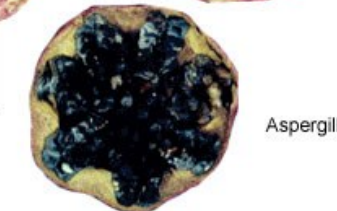
GREY MOLD



HUSK SCALD



Alternaria Rot



Aspergillus

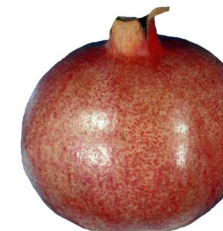
HEART ROT



8 Weeks at 5°C
and
3 Days at 20°C



8 Weeks at -1°C
and
3 Days at 20°C



8 Weeks at 10°C
and
3 Days at 20°C



8 Weeks at 2.2°C
and
3 Days at 20°C

CHILLING INJURY