

Lime

Recommendations for Maintaining Postharvest Quality

Mary Lu Arpaia¹ and Adel A. Kader²

¹Department of Botany and Plant Sciences, University of California, Riverside, CA 92521

²Department of Pomology, University of California, Davis, CA 95616

Maturity Indices

Juice content by volume of 30% or higher and color (mature-green limes have a much longer postharvest-life than those picked when yellow; the latter must be marketed soon after harvest).

Quality Indices

Color (most consumers in the USA prefer green limes but in some other countries consumers prefer yellow limes because of their greater juice content); size; shape; firmness; smoothness; freedom from decay; and freedom from defects including bruises, oil spotting, dryness, freezing injury, and stylar-end breakdown.

Optimum Temperature

10-13°C (50-55°F) depending on cultivar, maturity-ripeness stage at harvest, and duration of storage + transport (up to 6-8 weeks).

Optimum Relative Humidity

90-95%

Rates of Respiration

Temperature	10°C (50°F)	15° (59°F)	20° (68°F)
ml CO ₂ / kg·hr	3-5	5-8	6-10

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.

Rates of Ethylene Production

< 0.1 µl/kg·hr at 20°C (68°F)

Responses to Ethylene

Ethylene causes limes to lose their green color and unmask their yellow pigments, which is undesirable for marketing green limes. Removal of ethylene from lime storage facilities can be beneficial in retarding loss of green color and delaying decay incidence.

Responses to Controlled Atmospheres (CA)

A combination of 5-10% O₂ and 0-10% CO₂ retards senescence (loss of green color) of limes, but is inadequate for decay control. Exposure to > 10% CO₂ and/or < 5% O₂ can result in scald-like injury, decreased juice content, off-flavors, and increased susceptibility to decay. Commercial use of CA on limes is very limited.

Physiological Disorders

Chilling injury. Symptoms include pitting, and brown discoloration. Pits Disorders may coalesce and form leathery, brown, sunken areas on the rind. Severity increases with lower temperature below 10°C (50°F) and longer durations of exposure to these temperatures.

Oil spotting (Oleocellosis). Harvesting and handling turgid limes may result in breakage of oil cells in the flavedo and release of the oil that damages surrounding tissues.

Stylar-end Breakdown. This disorder results from rough handling during harvesting and handling. Its severity varies among cultivars and harvest seasons.

Pathological Disorders

Important Diseases:

- Green mold (*Penicillium digitatum*)
- [Blue mold](#) (*Penicillium italicum*)
- Stem-end rot (*Lasiodiplodia theobromae*)
- [Phomopsis stem-end rot](#) (*Phomopsis citri*)
- Alternaria stem-end rot (*Alternaria citri*)

Control Strategies:

- Minimizing abrasions, cuts, and bruises during handling.
- Treating limes before harvest with gibberellic acid to delay senescence.
- Dipping in hot water (50-53°C = 120-125°F) for 2-3 minutes.
- Using chlorine in wash water, postharvest fungicides, and or biological antagonists.
- Cooling to optimum temperature and subsequent maintenance of optimum temperature and relative humidity.

- Avoiding exposure to ethylene.