

Leek

Jennifer R. DeEll
Ontario Ministry of Agriculture and Food
Simcoe, Ontario, Canada

Scientific Name and Introduction: The leek, *Allium porrum* L. (syn. *Allium ampeloprasum* L. var. *porrum*), is an onion-like plant, belonging to the Liliaceae family. The edible portion consists of the elongated bases of the foliage leaves (a false stem) and the lower parts, blanched white from being underground. There are three major types of leeks; European leek which develops a short and thick pseudostem, Turkish leek which develops a relatively long and thin pseudostem, and Kurrat which does not produce a pseudostem. This latter type is grown in the Mediterranean and the Middle East for its leaves.

Quality Characteristics and Criteria: Good quality leeks are firm and smooth, free of blemishes, and have characteristic white stems with dark green leaves. The cut bottoms should be flat, as rounded bottoms may indicate prolonged storage.

Horticultural Maturity Indices: Leeks can grow from 50 cm to 1 m (20 to 39 in) in height, and are harvested when the base diameter is ≥ 2.5 cm (1 in).

Grades, Sizes and Packaging: There are no established USDA quality standards for leeks. Leeks are commonly trimmed so that only a 30.5 cm (12 in) portion of the green top remains. They can, depending on diameter, be bunched in groups of three and placed in polyethylene film bags to prevent moisture loss. They are usually packaged in 4.5 kg (10 lb) cartons or wire-bound crates, holding ten 0.45 kg (1 lb) film bags. Some crates may be packed with 18 to 24 bunches, with a net weight up to 13.6 kg (30 lb).

Pre-Cooling Conditions: Hydro-cooling, crushed ice, and vacuum-cooling are the most common methods to promptly cool harvested leeks to 0 °C (32 °F).

Optimum Storage Conditions: Leeks can be stored for 2 to 3 mo at 0 °C (32 °F) with 95 to 100% RH. High RH is essential to prevent wilting. Good refrigeration retards elongation and curvature that develops in leeks at 10 to 21 °C (50 to 70 °F). Leeks held in polyethylene lined crates remain saleable for 5 to 6 weeks at 0 °C (32 °F) under crushed ice, 4 weeks at 0 °C without ice, > 2 weeks at 4.4 °C (40 °F), and 13 days at 10 °C (50 °F). Leeks stored in non-lined crates keep for 3 weeks at 0 °C, 8 days at 4.4 °C and 1 week at 10 °C, with or without crushed ice (Hruschka, 1978). Freshly harvested leeks held naked, in consumer-unit perforated polyethylene bags, or in non-perforated (sealed) polyethylene bags remain attractive and saleable for 5, 6 or 10 weeks, respectively, under crushed ice at 0 °C (32 °F); for 1.5, 4 or 10 weeks, respectively, without ice at 0 °C; for 6, 8 or 12 days, respectively, at 10 °C (50 °F); and for 4, 3 or 6 days, respectively, at 21 °C (70 °F).

Controlled Atmosphere (CA) Considerations: Storage for 4 to 5 mo at 0 °C (32 °F) is possible with CA, although there will be some loss of quality. Recommended CA conditions are 1 to 3% O₂ + either 2 to 5% CO₂ (Saltveit, 1997) or 5 to 10% CO₂ (Kurki, 1979). Such CA retards yellowing and decay development. Levels of 15 to 20% CO₂ cause tissue injury.

Retail Outlet Display Considerations: Leeks should be held as close to 0 °C (32 °F) as possible, and preferably away from products that produce ethylene.

Chilling Sensitivity: Leeks are not sensitive to chilling temperatures and should be stored as cold as possible without freezing.

Ethylene Production and Sensitivity: Leeks produce very low levels of ethylene at $< 0.1 \mu\text{L kg}^{-1} \text{h}^{-1}$ and are moderately sensitive to ethylene. Detrimental effects include softening and increased decay.

Respiration Rates:

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
0 °C	10 to 20
4.4 °C	20 to 29
10 °C	50 to 70
15.6 °C	75 to 117
21 °C	110
26.7 °C	107 to 119

To get mL kg⁻¹ h⁻¹, divide the mg kg⁻¹ h⁻¹ rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg⁻¹ h⁻¹ by 220 to get BTU per ton per day or by 61 to get kcal per metric ton per day. Data are from Hruschka, 1978.

Physiological Disorders: Slight elongation and geotropic curvature may occur, even at 0 °C (32 °F). Leeks held in polyethylene-lined crates elongate $< 1\%$ per week at 0 °C under crushed ice, 3% per week at 0 °C without ice, 13% per week at 4.4 °C (40 °F), and 22% per week at 10 °C (50 °F) (Hruschka, 1978). No attempt has been made to establish a relation between elongation and curvature, although varying degrees of curvature have been observed in such treatments. Senescent yellowing develops more rapidly at warmer temperatures, and moderate wilting is apparent when leeks lose about 15% of their weight.

Postharvest Pathology: Most diseases that attack onions may also affect leeks.

Quarantine Issues: None.

Suitability as Fresh-cut Product: No current potential.

Special Considerations: Cultivar, pre-harvest and postharvest conditions, degree of trimming, and method of packing will all influence the storage-life of leeks.

References:

- Hruschka, H.W. 1978. Storage and shelf-life of packaged leeks. USDA Marketing Res. Rpt. No. 1084.
Kurki, L. 1979. Leek quality changes during CA storage. Acta Hort. 93:85-90.
Saltveit, M.E. 1997. A summary of CA and MA requirements and recommendations for harvested vegetables. Proc. 7th Intl. Contr. Atmos. Res. Conf. 4:98-117.

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