

Radicchio

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Scientific Name and Introduction: Radicchio (*Cichorium intybus*, L.) is a member of the Asteraceae (Compositae) family. Plants are characterized by variegated leaves (variety *silvestre* Bishoff) or red leaves (consequence of spontaneous crossings). Plant shape also differs among varieties, including: long conical shape with tight red leaves; completely open with red or green-red leaves; or ball-shaped with red leaves. Head and leaves are crisp with a bittersweet flavor similar to Belgian endive and escarole. Some varieties, eg., di Treviso and Verona, are held in the dark for 7 to 15 days at 10 to 15 °C (50 to 68 °F) after harvest to promote production of new, very tender leaves, ie., whitening (Pimpini, 1990). Radicchio is available year-round from California, New Jersey, Mexico and Italy.

Quality Characteristics and Criteria: Plants and leaves should be very turgid and crisp, with bright white midribs. There should be no cracking, splitting, dark spots due to mechanical damage, or necrosis on the leaf margins. Compactness is important, but depends on the variety. For example, 'Treviso' and 'Chioggia' should have a compact head and very tight leaves, whereas 'Verona' and 'Castelfranco' should have an open, regularly-shaped head. The root must be cleanly cut with no secondary roots or evidence of decay, and cannot exceed 4 cm (1.5 in).

Horticultural Maturity Indices: Plants are hand-harvested when they reach appropriate size or when the center of the plant has formed a compact "grumolo" (Pimpini, 1990). The same variety can be harvested very early (45 days), early (75 to 90 days) or late (120 to 150 days). Varieties that need whitening are harvested with their roots.

Grades, Sizes and Packaging: There are no USDA grades. Head size is based on weight: 30 g (1 oz) for forced radicchio and 60 g (2 oz) for normal production. Extra fancy radicchio has the quality criteria listed above. Fancy radicchio can have some light browning on leaves due to freezing or forcing treatment. Packing can be in trays with shrinkable plastic film or in corrugated containers with plastic liners to avoid water loss (Suslow and Cantwell, 1999).

Pre-cooling conditions: Radicchio is usually placed directly in a cold room before shipping.

Optimum Storage Conditions: Radicchio can be stored for 20 to 30 days at 3 to 5 °C (37 to 41 °F) with 90% RH. Varieties that are whitened can only be stored 1 to 2 weeks under these conditions. Storage-life is reduced to 11 days at 6 °C (43 °F) (Botondi et al., 1996), while storage at -2 to -3 °C (27 to 28 °F) can prolong storage to 3 mo by controlling decay (Bertolini and Pratella, 1993).

Controlled Atmosphere (CA) Considerations: Good results were obtained with 3% O₂ + 5% CO₂. Low O₂ promotes internal browning (Suslow and Cantwell, 1999), and high CO₂ controls decay (Foschi and Mari, 1987).

Retail Outlet Display Considerations: Display like lettuce. Water sprays are acceptable, but water remaining on the leaves at elevated temperatures promotes bacterial growth.

Chilling Sensitivity: Radicchio is not chilling sensitive. However, there have been reports of metabolic disorders after storage at 0 °C (32 °F) (Botondi et al., 1996)

Ethylene Production and Sensitivity: Radicchio produces very low amounts of ethylene at 0.1 to 0.3 $\mu\text{L kg}^{-1} \text{h}^{-1}$ at 0 to 6 °C (32 to 43 °F) and 0.6 to 1.0 $\mu\text{L kg}^{-1} \text{h}^{-1}$ at 20 °C (68 °F). Exposure to 10 $\mu\text{L L}^{-1}$ ethylene for 6 days at 7.5 °C (45.5 °F) with 95% RH increased leaf browning, decay, and pigmentation of midribs (Botondi et al., 1996; Suslow and Cantwell, 1999).

Respiration Rates:

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
0 °C	6 to 10
6 °C	10 to 16
7.5 °C	23
25 °C	45

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.

Physiological Disorders: Desiccation can lead to necrosis of the leaf margins. Wilting can occur after a few days of display if plants are not misted. Leaf abscission is common for some varieties and reconditioning is often required. Rough handling during the harvest or packing causes cracking of leaves or, in the case of abrasion, appearance of browning stains on the white midribs.

Postharvest Pathology: Radicchio is susceptible to bacterial soft rot caused by *Erwinia carotovora* at warmer temperatures and pectolytic *Pseudomonas* at lower temperatures. *Botrytis cinerea* can be frequent, even with good temperature control (Suslow and Cantwell, 1999)

Quarantine Issues: None.

Suitability as Fresh-cut Product: There is growing interest for fresh-cut lettuce/radicchio mixes.

References:

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