

Grape (Muscadine)

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Scientific Name and Introduction

Muscadine grapes (*Vitis rotundifolia* Michx.) are grown primarily in the Southern United States (Olien 1990). Unlike *V. lambrusca* and *V. vinifera*, muscadines are borne singly or in small clusters of 3 to 10 berries and detach from their pedicels when ripe. *V. rotundifolia* is more resistant to disease than bunch grapes. Muscadines are often separated into types based on color. Most commercially important fresh or processed grapes are of the bronze type. Several new varieties are of the black (dark purple) type. 'Fry,' 'Noble,' and 'Granny Val' are the most common bronze cultivars used for fresh market; 'Carlos' (bronze) is used for juice and some fresh markets. Other promising black cultivars are 'Nesbitt' and 'Black Beauty.'

Quality Characteristics and Criteria

High-quality muscadines are free of injury, decay, and sunscald; appear and feel turgid; have a dry stem scar; and are fully black or bronze in color.

Horticultural Maturity Indices

For fresh market, muscadines are mature when berries can be detached from their stems or when SSC is between 14 and 18% (Smit et al. 1971, Ballinger and McClure 1983).

Grades, Sizes, and Packaging

No standard packaging exists; quart size is most commonly used. Grapes are generally packaged as single or small clusters of berries in plastic, vented clamshells.

Precooling Conditions

Use forced-air to lower the temperature to 2 °C or below within 12 h of harvest.

Optimum Storage Conditions

Muscadine grapes can be held at -0.5 to 0 °C with over 90% RH for 1 to 4 weeks (Lutz 1939, Ballinger and McClure 1983). Temperatures of 20 °C for 2 days after any cold storage interval shortens subsequent shelf-life by less than 1 week (Ballinger and McClure 1983).

Controlled Atmosphere (CA) Considerations

Preliminary data indicate that 'Fry' muscadines have reduced decay when held in 10% O₂ combined with 10 to 15% CO₂ (Perkins-Veazie, unpublished).

Retail Outlet Display Conditions

Muscadines should be stored and displayed at the coldest refrigeration temperature possible without freezing. As little as 2 days at room temperature can stimulate growth of molds, especially ripe rot.

Chilling Sensitivity

Muscadines are not known to be chilling sensitive.

Ethylene Production and Sensitivity

Stimulation of *Botrytis cinerea* (gray mold) growth can occur on grapes and stems in the presence of ethylene. Ethylene production from muscadines is less than $0.1 \mu\text{L kg}^{-1} \text{h}^{-1}$ (Perkins-Veazie, unpublished).

Respiration Rates

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
2 °C	6 to 14
5 °C	8 to 18
20 °C	33 to 68

Data from Perkins-Veazie (2002, unpublished).

To get mL CO₂ 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 tonne per day.

Physiological Disorders

Sunburn, bleaching, or stipple from SO₂ (Ballinger and Nesbitt 1982) are possible.

Postharvest Pathology

Muscadine grapes are susceptible to botrytis, yeasts, ripe rot (*Colletotrichum gloesporioides*), macrophoma rot (*Botryosphaeria dothidea*), and blue mold (*Penicillium*) (Ballinger and McClure 1983, Pearson and Goheen 1988).

Quarantine Issues

None.

Suitability as Fresh-Cut Product

Unknown. Processing work with juice and jellies indicates that unstable pigments may cause

browning problems if used for minimal processing (Flora 1977).

Special Considerations

Sodium metabisulfite pads and generators (12 to 21 $\mu\text{L L}^{-1}$ SO_2) have been used to extend shelf-life of muscadines from 2 to 8 weeks (Smit et al. 1971, Ballinger and Nesbitt 1982, James et al. 1997).

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