

Comparison of fruit attributes of 'Fuji' apple strains at harvest and after storage

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Abstract

Commercial apples are graded primarily by appearance and many new 'Fuji' apple strains have been planted in commercial orchards because of the enhanced red color of their skin. The fruit of most apple strains selected for skin color do not differ; however, some apple strains may produce fruit with different firmness and soluble solid content (SSC). This study compared the fruit quality and maturity of three 'Fuji' apple strains ('Fuji Suprema', 'Mishima', and 'Fuji Select') grown in experimental orchards in southern Brazil. Fruit were harvested at two maturity stages: early, which were stored in air; and advanced, which were stored in a controlled atmosphere (CA). Storage conditions were selected to induce the development of different physiological disorders. Fruit quality was assessed one day after harvest and after 210 days of storage at 0.8 °C plus seven days at 22 °C, over three growing seasons. Skin color was the main variable that distinguished fruits of the three strains. The extent of red coloration was greater on the surface of 'Fuji Suprema' apples than on 'Mishima' or 'Fuji Select', especially for early-harvest fruit. The pattern of fruit maturation on the tree was the same for the three strains and they showed similar starch index, SSC, and titratable acidity; flesh firmness was slightly (<2.5 N) lower in 'Fuji Select' for both maturity stages. At harvest, fruits of the three strains were also similar in terms of fruit weight and development of russeting disorder. 'Fuji Select' apples were least affected by watercore. The three strains showed similar rates of loss of firmness and were equally affected by fungal decay, core rot, superficial scald, calcium deficiency disorders, shrivel, and diffuse flesh browning during storage, indicating that they did not differ in terms of storability. 'Fuji Suprema' had the lowest susceptibility to CO₂ injury, suggesting that distinct CA protocols could be applied for the different 'Fuji' strains. The results show that planting of 'Fuji Suprema' could increase fruit production of high quality grades based on red skin color and reduce the expenses associated with CO₂ removal from storage facilities.