

Title Leucadendron 'Safari Sunset': carbohydrates supply prevents leaf blackening in cut branches during prolonged sea shipment

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Abstract

One of major export cut foliage crops cultivated by the Israeli growers for export to Europe and USA is the Leucadendron 'Safari Sunset' which belongs to the Proteaceae family. The decorative value of this branch, originated from South Africa, is gained by its red 'head' which comprises of red bracts surrounding a small and insignificant inflorescence. However, the profitable marketing of these branches is dependent on their sea transport from Israel, which imposes some restrictions, mainly due to the prolonged shipment (8 days to Europe and 21-28 days to USA). The main problem which limits the quality of L. 'Safari Sunset' cut branches is leaf blackening and foliage desiccation, which is a physiological disorder typical to many other Proteaceae species. Our analysis of carbohydrates balance in 'Safari Sunset' cut branches shows that the carbohydrate depletion in leaves, occurred after harvest and following prolonged storage, and was caused by the sugar demand of the developing inflorescence. This carbohydrate depletion was found to initiate leaf blackening in 'Safari Sunset' branches, as found for various other protea cultivars. Our results show that the use of exogenous sugars (sucrose or glucose) supplementation in 'Safari Sunset' reduced this postharvest leaf blackening. Thus, 'Safari Sunset' stems pulsed with either 5% sucrose or glucose before storage followed by inclusion of 2% sucrose or glucose in the vase solution, displayed a reduced incidence of leaf blackening and desiccation, resulting in a significantly longer vase life. However, the presence of glucose in the vase solution after prolonged transport was mostly significant in reducing leaf blackening. Additional treatments were combined with sugars in the pulsing or vase solution, including: dipping in fungicides (Sportak or Octav), pulsing the branches in the preservative TOG-3 (containing thiabendazole, 8-hydroxyquinoline citrate and benzolconium chloride), and application of a controlled atmosphere (CA) composed of 15% O₂ and 5% CO₂ during the sea transport to USA. All these combined treatments improved significantly the quality of L. 'Safari Sunset' branches and enabled their prolonged sea shipment to Europe or USA .