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Phytotoxicity by Essential Oil May Play a Role in Postharvest Browning Disorder of Cinnamon Myrtle (*Backhousia myrtifolia*) Tissues

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Abstract

Cinnamon myrtle (*Backhousia myrtifolia*) is an Australian native ornamental that has a strong potential to Japanese cut flower market. However, cut stems of this flower are easily susceptible to postharvest discolouration (browning), which generally becomes a hurdle to its export industry. Temperature stress was suggested to be one of the possible causes of the disorder. However, the descriptions of browning symptom varied from one flowering season to another. There is therefore a need to understand what may involve in the browning process and later to develop treatments that ideally could eliminate the problem. To initially elucidate the mechanism, leaf and floral tissues were heat treated at 60°C for 30 min to induce browning. Light (LM) and scanning electron microscopes (SEM) were used to follow up physiological changes of cell structures. The oil gland structure was well characterised by SEM. LM images suggested that browning was initiated around cells surrounding tissue oil gland. Also, upon exogenous treatment with *B. citriodora* leaf oil, young *B. myrtifolia* leaves showed greater susceptibility to browning than did mature leaves. However, no such effect was observed on treated floral tissue. Discolouration caused by oil released upon cell rupture was also monitored. Tissue disruption by abrasion caused less tissue discolouration than did essential oil application and is possibly due to the epidermal and hypodermal cells acting as barriers. This is the first report on the evidence of essential oil damage that may involve in tissue browning of *B. myrtifolia*. Further investigations are on physiological and biochemical responses of the plant tissues during browning process.

Keywords: Australian native cut flower, cell structures, discoloration, oil glands