

# Potential of ozonated-air (OA) application to reduce the weight and volume loss in fresh figs (*Ficus carica* L.)

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## Abstract

This study investigated the effect of ozonated air (OA) on weight loss, volume reduction (shriveling), and skin firmness on fresh figs and monitored the changes in the epidermis of OA-treated fruits within 14 d of storage at 4 °C and 65 % RH. In Phase 1 of the study, fresh Kadota figs at two different maturity levels, commercial-ripe and tree-ripe, were exposed to OA for up to 11 h at room temperature to find the optimum parameters for ozone treatment. The 3-h OA-treated (15 ppm) fig samples showed 10 % less weight loss, 16 % less shrivel, had a better appearance, showed fewer brown spots, and had less fungal growth than the control. In Phase 2, Kadota and Black Mission figs were treated with OA (15 ppm for 3 h) and their aging parameters were evaluated. The Mission figs in the control group showed the highest rate of weight loss (25.8 %) and volume reduction (32.5 %). Kadota figs had the lowest weight loss (18.8 %) and volume reduction (9.8 %) in 14 d. Due to the oxidation, the OA treatment resulted in a considerable decrease in skin firmness in both Kadota and Mission figs; however, the skin firmness increased in the Kadota samples on Day 7. The recovery of Kadota epidermises continued at a very slow rate until Day 14. However, Mission samples did not show any firmness increase on Day 7. Scanning electron microscopy showed the differences between the control and the OA-treated Kadota and Mission figs. Ozone treatment affected the epidermis of figs, specifically the stomata and epicuticular wax crystals, resulting in stomata blockage or deformation, and irregular shapes in the wax platelets. Although the fruit epidermis was affected by OA treatment, the self-assembly properties of the epicuticular wax layer helped the fruit to recover from the oxidative damage caused by ozone by Day 7. Small microcracks and cell wall disassembly were observed on the fruit surface after 14 d of cold storage; they were very noticeable in the control samples and resulted in considerable water loss and weight loss, decreased shelf life, and significant fungal infection. This study showed that OA treatment of fresh figs can be used to minimize the volume and weight loss and improve the overall quality of fresh figs.