Application of electrostatic atomized water particle suppresses calyx discoloration in relation to postharvest quality of mangosteen (*Garcinia mangostana* L.)

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Abstract

Commercial exporting of mangosteen (*Garcinia mangostana* L.) is faced with rapid discoloration by degreening of calyx in relation to the loss of postharvest quality. Utilization of electrostatic atomized water particles (EAWPs) has been shown to reduce the chlorophyll (Chl) degradation of green calyxes and postharvest quality during storage. Fruit were treated with EAWPs for 0, 10, 20, 30, 40, 50 and 60 min, and then kept in the dark at 20 °C and 90 ± 5% RH. Treatments with EAWPs for 40 min were found to be appropriate treatments to maintain green calyx freshness by suppressing color change in the calyx and peel of mangosteen fruits, and produced hue angle and a* value higher than that of the control. This treatment efficiently delayed the reduction of Chl *a* and *b* contents, and Chl degrading enzyme activities in the calyx. Production of Chl derivatives including chlorophyllide *a*, pheophorbide *a*, 13^2-hydroxychlorophyll *a* and pheophytin *a* were detected during storage in the calyx of mangosteen treated with EAWPs for 40 min and were higher than that of the control. Hydrogen peroxide content in EAWPs-treated calyxes was detected at a high level at day 0 of storage and was lower than that of the control. Total anthocyanin content, cyanidin-3-sophoroside and cyanidin-3-glucoside were lower in the treated peel than in the control. SEM observation revealed that treatment of mangosteen with EAWPs for 40 min may induce closing stomata, and reduced guard cells shriveling in the mangosteen calyx. The results obtained in this study suggested that treatment with EAWPs for 40 min could delay degradation of Chl by controlling its catabolites, inhibited Chl degrading enzyme activities, and positively affected the calyx and peel quality of mangosteen in storage.