Title Comparison of hydro-cooling and forced-air cooling on stomata closing at the pedicel of red hot chili cv. 'Superhot'

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Abstract

Red hot chili cv. 'Superhot' is widely produced in Thailand and exported to many regions. The exporting value of red hot chili increases year by year and rises over 100 million baht per year. However, the problem during the export of red hot chili is darkening at the pedicel area due to water loss from stomata opening. Pre-cooling has been introduced for keeping the quality in various commodities. The purpose of this research was to investigate the effect of different pre-cooling techniques on stomata closing. Red hot chili were purchased from an exporting company in Nakornrachasima Province, Thailand then pre-cooled by using hydro-cooling at 0, 2 and 4°C or forced-air cooling at 4°C with various air velocities (1, 3 and 5 m/s). Control treatment was performed with non-pre-cooled chili. Stomata of red hot chili were monitored under scanning electron microscopy. Stomata apertures were observed only at the pedicel surface and were absolutely absent on the fruit surface. Hydro-cooled chili at 0 and 2°C resulted in significantly closing stomata while the same process at 4°C was only partially closing them. In contrast, forced-air cooled chili at all air velocities did not close stomata apertures in comparison with the control treatment. Hydro-cooled chilies maintained a better external quality than forced-air cooled fruit judged by the degree of pedicel darkening. The darkening was significantly reduced by hydro-cooling whereas slightly decreased by forced-air cooling. These results suggest that hydro-cooling is a suitable technique for keeping the quality of red hot chili after harvest.