Title Exposure to direct sunlight during the growing season delays postharvest softening of 'Williams' pears and improves their response to 1-methylcyclopropene

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Abstract

An experiment was performed on pears cv. Williams/seedling rootstock to evaluate the effect of intercepted PAR on fruit firmness and color, upon harvest and subsequent response to postharvest application of 1-methylcyclopropene (1-MCP). Four treatments were applied 30 days after full bloom, each treatment covering the harvest on 4 trees: (T1) sun pears (fruit located in the outer canopy, fully exposed to sunlight); (T2) +UV pears (a polyester film cover, with high transmittance over the UV waveband, was placed on top of the northern side of the canopy); (T3) –UV pears (a polyester film cover, which cuts off all UV radiation below 310 nm, was applied on top of the northern side of the canopy); (T4) shaded pears (fruit located in the inner canopy, a low radiation zone). Data loggers were placed on random fruits to measure temperature over the growing season. At harvest, 75 pears per treatment were picked and firmness and color were measured on 25 randomly selected fruit. The remaining 50 pears were split in two equal batches, one of them being exposed to 400 µl L^{-1} 1-MCP. 1-MCP-treated and untreated fruit were stored at 18°C for 23 and 13 days respectively. At harvest, sun pears, +UV pears and –UV pears were firmer than shaded pears. Also, sun pears showed higher firmness values after 13 days. Response to 1-MCP was significantly different ($P<0.05$) between treatments. After a 23-day storage, 1-MCP-treated sun pears showed the highest firmness (36 N), followed by +UV and –UV pears (17 N) and shaded pears (7 N). L, C and h° values (fruit color) were the highest in shaded pears, while fruit fully exposed to sunlight showed the lowest values. Fruit response variability to the various postharvest treatments is a major problem for the fresh-fruit industry nowadays. According to our results, the different preharvest light and/or temperature exposures may be a possible reason for the variability of the response to 1-MCP treatments.