

Title Studies on skin blackening disorder in harvested fruits of Japanese pear ‘Shinsetsu’ (*Pyrus pyrifolia* Nak. var. Shinsetsu) grown in Taiwan

Author Chun-The Kuo and Jinn-Chin Yiu

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Abstract

After stored at 1°C for 30 weeks, percent decay and weight losses in fruits were below 5% and 7%, respectively. However, skin blackening developed in epidermal tissue after 2 and 4 weeks storage at 1 and 5°C, and this reduced commercial value. This disorder occurred only on the skin; the flesh was remained normal throughout storage. As temperature decreased; the black scald development occurred to a greater extent and it was concluded that skin blackening of pear was a chilling injury. As fruit weight loss increased the less skin blackening occurred when pears were stored at 13°C. Therefore weight loss had no direct effect on scald development in fruit. Firmness and sugar content of fruit flesh both slowly decreased, as temperature increased and duration extended to 14 weeks. The occurrence of skin blackening was promoted by wrapping fruit in sealed PE bags as well as by chilling temperature. Relative humidity had no direct effect on blackening scald development. A microscopic observation of free-hand cross-sections of normal skin tissue showed transparent, turgid parenchyma cells in sub-epidermal tissue in a regular arrangement. In contrast, parenchyma cells in sub-epidermal tissue of pears with blackening scald were pinched and heteromorphous, and turned brown, which were considered as the causes or results of skin blackening disorder. Paraffin section showed a direct relationship between degrees of temperature and the extent of blackening scald. Clearly sub-epidermal parenchyma cells are extremely susceptible to chilling. Although blackening scald occurred in the skin, it did not affect the flesh collenchyma cells. These results indicated a close relationship between chilling that induced the skin-blackening disorder and the type of cells in the pear flesh.