The Effect of Different Maturity Stages on Non-structural Carbohydrate Metabolism of Asian Pear Cultivars

Bok-Rye Lee, Won-Il Jung, and Sang-Hyun Lee

Asian Pear Research Institute, Chonnam National University, Gwangju 61186, Korea; Institute of Environmentally-Friendly Agriculture (IEFA), Chonnam National University, Gwangju 61186, Korea, Department of Agricultural Chemistry, Chonnam National University, Gwangju 61186, Korea, Department of Horticulture, Chonnam National University, Gwangju 61186, Korea

The aim of this study was to investigate changes of non-structural carbohydrates in three Asian pear cultivars having different fruit maturity. Three Asian pear cultivars including ‘Wonhwang’ (early-season), ‘Hwangkeumbae’ (early-to-mid-season) and ‘Niitaka’ (mid-season) were selected. Non-structural carbohydrate compounds such as sucrose, glucose, fructose, and starch content and activities of sucrose synthesis related enzymes in fruit were measured during the different fruit development stages. The content of all soluble sugars gradually increased during fruit development in three cultivars. Glucose content was higher than that of fructose and sucrose. Glucose and fructose contents were similar in ‘Wonhwang’ and ‘Hwangkeumbae’ which were higher than ‘Niitaka’. Starch content was accumulated after 20th July in three Asian pear cultivars. Starch content in ‘Wonhwang’ was the highest, followed by ‘Hwangkeumbae’ and ‘Niitaka’. Starch content was relatively high during early fruit development. A significant decline in starch contents was observed in ‘Wonhwang’ and ‘Hwangkeumbae’ after 20th August and in ‘Niitaka’ after 20th July. Sucrose phosphate synthase (SPS) activity was gradually increased during the fruit development in all three cultivars. SPS activity was the lowest in ‘Hwangkeumbae’. Similar levels of SPS activity were observed in both ‘Niitaka’ and ‘Wonhwang’. Overall our results provide information about non-structural carbohydrate metabolism during fruit development in three Asian pear cultivars. (This work was supported by a grant from the Korea Institute of Planning & Evaluation for Technology in Food, Agriculture, Forestry and Fisheries (IPET) through the Export Promotion Technology Development Program, funded by the Ministry of Agriculture, Food and Rural Affairs (MAFRA) (No. 617075-55).)