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Saccharide and Fructooligosaccharide Contents, and Invertase, 1-KHE, 1-SST, 1-FFT and 6G-FFT Activities in Green Asparagus Spears during Storage: Effects of Temperature and Spear Portion

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Fresh spears of asparagus were stored in the dark at 4, 10 or 20°C for 2 weeks. During storage contents of glucose, fructose, sucrose, 1-kestose, neokestose and nystose, and activities of invertase, 1-kestose hydrolyzing enzyme (1-KHE), sucrose: sucrose 1-fructosyltransferase (1-SST), fructan: fructan 1-fructosyltransferase (1-FFT) and fructan: fructan 6^G-fructosyltransferase (6G-FFT) were determined in the top, middle and bottom portions of the spears. A gradient was observed, from the bottom to the top, for glucose, fructose and sucrose which constitute the major proportion of carbohydrates, while fructooligosaccharides, neokestose and nystose, exhibited low levels. Glucose and fructose varied significantly during storage, while sucrose was stable. The average variations were from 7.8 to 12.21 mg/g FW in the middle portion and 7.88 to 13.52 mg/g FW in the bottom portion for glucose and fructose, respectively. 1-Kestose and nystose increased at the end of the storage period and this increase was more apparent at 20°C. Invertase activity showed similar variation at 4 and 10°C but increased sharply after 2 days, before decreasing abruptly after 1 week of storage, while 1-kestose hydrolyzing activity showed a similar pattern to that of invertase activity. 1-SST did not vary in the bottom portion but

initially increased in the middle and top portions. 1-FFT was high in the top portion and decreased during storage, while in the middle and bottom portions its activity varied slightly. The variation of 6G-FFT activity was similar to that of 1-FFT, however, the level of 6G-FFT was higher, and the 6G-FFT to 1-FFT activity ratio was temperature independent. These results suggest that short fructooligosaccharides and their metabolizing enzymes could play a role of balance between the hydrolysis and synthesis activities of carbohydrates. The high content of sugars may also extend the rapid decline of sugars in the top portion of the spears.

Key words: sugars, fructooligosaccharides, asparagus, storage

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