Development of Automatic Peach Grading System using NIR Spectroscopy

Kang J. Lee*, Kyu H. Choi, Dong S. Choi

National Agricultural Mechanization Research Institute, Suwon, 4410-100, Korea

The existing fruit sorter has the method of tilting tray and extracting fruits by the action of solenoid or springs. In peaches, the most sort processing is supported by man because the sorter make fatal damage to peaches. In order to sustain commodity and quality of peach non-destructive, non-contact and real time based sorter was needed.

This study was performed to develop peach sorter using near-infrared spectroscopy in real time and nondestructively. The prototype was developed to decrease internal and external damage of peach caused by the sorter, which had a way of extracting tray with it. To decrease positioning error of measuring sugar contents in peaches, fiber optic with two direction diverged was developed and attached to the prototype.

The program for sorting and operating the prototype was developed using visual basic 6.0 language to measure several quality index such as chlorophyll, some defect, sugar contents. The all sorting result was saved to return farmers for being index of good quality production. Using the prototype, program and MLR(multiple linear regression) model, it was possible to estimate sugar content of peaches with the determination coefficient of 0.71 and SEC of 0.42bx using 16 wavelengths. The developed MLR model had determination coefficient of 0.69, and SEP of 0.49bx, it was better result than single point measurement of 1998's.

The peach sweetness grading system based on NIR reflectance method, which consists of photodiode-array sensor, quartz-halogen lamp and fiber optic diverged two bundles for transmitting the light and detecting the reflected light, was developed and evaluated. It was possible to predict the soluble solid contents of peaches in real time and nondestructively using the system which had the accuracy of 91 percentage and the capacity of 7,200 peaches per an hour for grading 2 classes by sugar contents.

Draining is one of important factors for production peaches having good qualities. The reason why one farm's product belows others could be estimated for bad draining, over-much nitrogen fertilizer, soil characteristics, etc. After this, the report saved by the peach grading system will have to be good materials to farmers for production high quality peaches. They could share the result or compare with others and diagnose their cultural practice.