

DEVELOPMENT OF SUGAR-MEASURING INSTRUMENT IN APPLES BY NEAR INFRARED SPECTROSCOPY

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Recently the instrument to measure the sweetness of fruits (such as peach, pear, orange, melon, apple and so on) by near infrared (NIR) spectroscopy [1] has been developed vigorously by many companies in Japan. This NIR measurement is a non-destructive inspection for the internal quality and a rapid detection with high accuracy, so that farm producers have strongly desired to develop the fruits' sweetness sorting system for its sugar content degree. Some companies have developed rather big sorting system to use in the sorting place.

In the first stage of the research, we investigated the fundamental spectroscopic research of the apples to develop the sorting machine and obtained the basic know-how to determine the sweetness of apples. In the second stage, we focused our target of the development to the portable instrument that can be used in the outdoors.[2]

In this work we have to develop the down sizing of the measurement such as optical system, detection system, calculation system, display system and so on by ourselves. This development carried out with our joint research company.

We report the application using NIR method to determine the quantitative sugar content of apples and the development of a portable NIR sugar-measuring instrument. As the result the measurement on the each sugar

content for four kinds of apples, we obtained the good correlation coefficient of 0.94 or more with the standard errors of prediction (SEP) of

0.546 Brix at most. We also obtained good result for apple juices too. The portable NIR instrument has been developed using polychromator, which is composed of the concave diffraction grating and multichannel detector, and the optical fiber. This portable NIR instrument is found that the measurement value has a high correlation with Brix. Now, our joint research company makes monitor instruments to complete the operation of the instrument and tests in the outdoors. We would like to further continue our efforts to make better use of the NIR method.

- [1] K.Norris, Near Infrared Technology in Agricultural and Food industries, ED by Williams and K.H.Norris, American Association of Cereal Chemists, St Paul, MN (1987)
- [2] T.Temma, M.Chiba, K.Hanamatsu, F.Shinoki and T.Tsushima, 7th International Conference on Near-Infrared Spectroscopy, Montreal, CANADA (1995)