

Title Non-destructive determination of nitrate ion in leaf stalk of Qing gin cai using visible (VIS)-near infrared (NIR) spectroscopy

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Abstract

Nitrate ion content of vegetables is of concern for food safety. Fifty to ninety percent of the nitrate ions that man intakes are derived from vegetables. As previously reported, VIS-NIR spectroscopy gave the possibility to estimate nitrate ion of Japanese radishes non-destructively and rapidly (Ito et al., 2003a). We selected the leaf stalk of Qing gin cai as the first target in leafy vegetables. A multiple linear regression (MLR) equation was developed to enable the non-destructive nitrate ion determination. The wavelengths (514, 902, 884, 906 nm) that relate to nitrate ion or carbohydrate content were included in the MLR equation as the independent variables for Japanese radishes. Then we found that a wavelength of 514 nm was proportional to nitrate ion content. Although chlorophyll and carotenoids are contained in leafy vegetables, their bands were not observed in the vicinity of the 514 nm wavelength. Nitrate ion content is related physiologically to carbohydrate content. This VIS-NIR determination had a higher correlation coefficient (R) than the determination using a colorimeter. R between actual and VIS-NIR calculated nitrate ion content of the third leaf stalk from the outside and whole nitrate ion content was high.