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Measurement of Lipid Content of Compost in the fermentation Process using Near-Infrared Spectroscopy

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Near infrared spectroscopy (NIRS) was applied to determination of the lipid content of compost during compost fermentation of tofu(soybean-curd) refuse. The reflected rays in the wavelength range between 800 and 2500 nm were measured at 2 nm intervals. The absorption of lipid observed at 4 wavelengths, 1208, 1712, 2312 and 2352 nm on the second derivative spectra.

To formulate a calibration equation, a multiple linear regression analysis was carried out between the near-infrared spectral data and on the lipid content in the calibration sample set (sample number, n=60) obtained using a Soxhlet extraction method. The calibration equation for prediction of lipid, the value of the multiple correlation coefficient (R) was 0.975 when using the wavelengths of 1208 and 1712nm.

To validate the calibration equation obtained, the lipid content in the validation sample set (n=35) not used for formulating the calibration equation were calculated using the calibration equations, and compared with the values obtained using the Soxhlet extraction method. Good agreement were observed between the results of the Soxhlet extraction method and those values of the NIRS method. The simple correlation coefficient (r) and standard error of prediction (SEP) were 0.964 and 0.815 %, respectively. Then, the NIRS method was applied to a compost fermentation in which the time course the lipid content were measured and good results were obtained. The study indicates that NIRS is a useful method for process management of the compost fermentation of tofu refuse.

[Key words: compost, near-infrared spectroscopy (NIRS), lipid content, process management]