

**Nondestructive determination of physico-chemical properties in compost by
NIRS**

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The purpose of this research was to develop a the reflection technique with near infrared(NIR) radiation for estimating physico-chemical properties in compost.

The composts (cattle, pig, chicken and waste composts) were air dried and then ground to pass through a 0.5 or 2mm sieve for the physico-chemical properties and spectroscopic determinations.

The physico-chemical properties of compost were shown high values ; moisture(30 – 60%), T-N(0.8 - 2.9%), organic matter(29 – 89%), pH(5.89 – 9.60) K₂O(0.27 – 5.66%), P₂O₅(0.07 – 2.62%), CaO(0.03 – 4.80%), MgO(0.09 – 1.56%), NaCl(0.01 – 1.13%), EC(1.41 – 13.76dS/m)

Generally, we should select a simple calibration and prediction method for determining physico-chemical properties in compost under similar accuracy and precision of prediction. It should be remembered that the NIRS approach will never replace the traditional methods. However, NIRS technique may be an effective method for rapid and nondestructive measurements of a large number of compost samples. Near infrared reflectance spectra of composts was obtained by InfraAlyzer 500 scanning spectrophotometer at 2-nm intervals from 1100 to 2500nm. Multiple linear regression(MLR) or partial least square regression (PLSR) was used to evaluate a NIRS method for the rapid and nondestructive determination of physico-chemical properties and humic acid contents in composts. The standard error of prediction(SEP) for finely sized sample(<0.5mm) and coarsely sized sample(<2mm) did not show much difference. The NIR instrument of filter type showed the same accuracy of the monochromator scanning type to estimate the compost properties. The results summarized that NIR spectroscopy can be used as a routine testing method to determine quantitatively the OM, moisture, T-N, color, pH, cation content in the compost samples nondestructively.