Determination of Nutrients in Composted Cattle Manure using Near-Infrared Spectroscopy. (S08-yesmin164128-Poster)

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Abstract:

Composting converts bio-wastes to useful fertilizers. A cost-effective, on-site method to monitor composition over time would be useful. Near-infrared spectroscopy (NIRS) is a cost-effective technique used widely for monitoring organic constituents and moisture in commodities. Samples consisting of beef cattle manure, straw, wood chips bedding at several decomposition stages were analyzed using conventional laboratory methods and scanned from 1100-2500 nm on a near-infrared scanning spectrophotometer. Calibrations using the spectral data and the chemical (reference) data for each constituent were developed and evaluated. The r2 between NIR-predicted data and reference data were >0.9 for pH and total C; 0.8-0.9 for conductivity, organic C, total N, and C/N; and 0.75-0.8 for total N, P2O5, and S. For organic N and total P, r2 were between 0.65-7. Available P and NO3+NO2 were not predictable. Results indicate that NIRS is potentially useful for rapid, inexpensive determination of C, N, P, and S during the composting process or for the final compost. Field-portable NIR technology to measure moisture, C, and N and other nutrients during composting is under study.

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