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Changes in Microbial Biomass and Nitrogen Mineralization Rate in Soil Incorporated Wheat Residue with Cow Slurry after Harvesting Wheat

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Summary

Cow slurry application is expected to increase soil microbial biomass and nitrogen (N) release in wheat harvest fields. I evaluated changes in microbial biomass and gross N mineralization rate as N release activity in soil incorporated cow slurry after harvesting wheat.

The microbial biomass N was larger in soil incorporated wheat residue with 5L m^{-2} slurry (R+S treatment) than in soil incorporated only wheat residue (R treatment) or only slurry (S treatment). The gross rate of N mineralization, which was measured by ^{15}N dilution technique, was larger in R+S treatment than in R treatment in the autumn, but the difference in the rate among treatments was not detected in the next crop growing season.

In the next early spring, just after snow and frozen soil melting, the inorganic N content was larger in soils with slurry application treatment than in soil with R treatment, and the microbial biomass N was larger in soil with R+S treatment than in soil with S treatment. However, the increase in inorganic and microbial biomass N by slurry application was considerably small, compared to ammonium N content in the slurry applied. Water soluble N in slurry was not successfully held in soil till the next spring.

The slurry incorporation with wheat residue hardly increased N uptake and yield of sugar beet, which was planted in the next April.

The present trial of slurry application on a wheat field after harvesting is not yet a practical technique and needs much improvement for preventing N leaching and promoting proper N release.

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