



Tropentag, September 14-16, 2010, Zurich

“World Food System —
A Contribution from Europe”

Effect of Composted and Vermicomposted Cotton Residue on Ryegrass (*Lolium Perene L.*) Growth

SULIEMAN ALI¹, CHRISTIAN AHL²

¹*Georg-August-Universität Göttingen, Crop Science - Agricultural Pedology, Germany*

²*Georg-august-universität Göttingen, Crop Science - Agricultural Pedology,*

Abstract

Unrestrained use of synthetic fertilisers can lead to economic and environmental difficulties. Alternatively, agricultural wastes for instance, can be recycled to provide a source of plant nutrients and improving soil health. The study was aimed at understanding the effect of different amendments to soil on the plant growth and to test the reliability of the N fate predicted by incubation experiment, simultaneously performed with the same materials, to assess potentially mineralisable nitrogen from the organic wastes. Cotton straw was used as compost and vermicompost corresponding to 4 and 8 g N/pot in addition to the control in different pots planted with ryegrass. Plant biomass was highest in compost treated pots followed by vermicompost and lowest in control ($p < 0.0001$).

The results showed that the attributes of the tested materials in providing nitrogen to a ryegrass crop can be predicted by investigating their performance through aerobic incubations. The encouraging experimental results despite the fact that, cotton residue is a lignocellulosic residue with slow nutrients release, which obtained from the pot trails were in accordance with nitrogen net mineralisation trend observed in the mineralisation incubations.

The significant positive correlation between biomass accumulation and nutrient mineralisation pattern ($r = 0.6$ and $p < 0.0001$) and significant positive correlation between nitrogen uptake and available nitrogen ($r = 0.4$ and $p = 0.005$) was observed. The work unveiled that amendments differ in their composition affected crop differently and the processing of cotton residue like for instance, composting and vermicomposting are obviously of great beneficial effects and contributed to crop growth and soil productivity.

Keywords: Biomass and ryegrass, compost, cotton residue, N incubation, vermicompost