

Ameliorating soil with paper pulp residues to improve soil chemical and physical properties

Damianos Damianidis
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Paper production processes generate large amounts of byproducts. The pollutants from the paper pulp industry are classified as gases, effluents, and solid wastes. The last category includes residual paper pulps (Levy and Taylor, 2003). Disposal of paper pulp residues is a serious challenge to pulp and paper industry. In the United Kingdom alone, the pulp and paper industry produces 250,000 dry Mg of sludge per year (Phillips et al., 1997). In Canada, 1.7 million dry Mg of paper sludges are generated every year (Bostan et al., 2005). Pulp and paper wastes can be disposed in several main ways (Curnoe et al., 2006): i.e. landfilling, incineration, and land application. Direct land application of paper pulp sludge (primary, secondary, or de-inked) is an attractive alternative for disposing of residual paper pulp. Mediterranean soils tend to be low in organic matter content due to climatic conditions, and past bad management practices. Macedonian Paper Mills S.A., located at Kato Gefyra in Greece, generates 20 dry Mg of residual paper pulp per day (S. Karapatakis, personal communication). This research will evaluate this sludge as a soil conditioner in two fields with different soil textural classes: 1) a clay loam located at American Farm School at Thermi, Thessaloniki and 2) a loamy sand located at Kolchiko near Lagada. The objective of this study is to determine the effect of various application rates of residual paper pulp on a) the chemical and physical properties of two soils (a clay loam and a loamy sand), and b) the productivity of *Brassica oleracea*, *Lactuca sativa* and *Zea mays* var. *saccharata* grown on these soils. Plant properties and agronomic characteristics measured are: 1) leaf chlorophyll level, using a Minolta DAP 502 leaf chlorophyll meter 2) yield (fresh weight of lettuce, cabbage, and corn ears). Soil properties measured are: 1) pH, 2) saturation electrical conductivity, 3) bulk density and porosity, 4) volumetric water content, 5) apparent electrical conductivity, 6) temperature, 7) organic carbon, 8) Potential nitrogen mineralization with 0, 1, 2, and 4% by weight of residual paper pulp. Preliminary results show a positive response of yield and an increase in soil carbon % from the application of residual paper pulp.

Literature Cited

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