

PERFORMANCE OF SOME SELECTED SOLID ORGANIC WASTE MATERIALS ON
WATER RETENTION CHARACTERISTICS OF SANDY REGOSOLS

By

PERMANENT REFERENCE

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ABSTRACT

A field experiment was conducted during July - October 2001 at the Agronomy farm of Eastern University, Vantharumoolai, to evaluate the effect of adding locally available organic waste materials on moisture retention characteristic of sandy regosols. Five kinds of organic waste materials were used in this study namely; partially burnt paddy husk (50%), sawdust, coir dust, mixture of partially burnt paddy husk, sawdust and coir dust (PSC) and the mixture of leaf waste at the ratio of 1:1 and 2:1 (soil: waste). Soil samples were taken daily at the depth of 15 - 30cm for water retention measurements after each irrigation because the 40% total water uptake is at first 25cm rooting depth of the 100cm total rooting depth. The samples were used to determine the bulk density, soil micro porosity, organic matter content, nitrogen, phosphorus and potassium of treated plots at regular intervals. Guelph permeameter was used to estimate saturated hydraulic conductivity *insitu*. The soil temperature was taken in each plot at two hours interval from morning to evening along with respective environment temperature.

The results indicated that the moisture retention increased significantly with the addition of organic waste materials throughout the experimental period. The moisture retention capacity of mixture of PSC treated plots was increased by 400% over control. Sawdust treated plot showed 3 folds increase in moisture retention after 6th week of application.

Saturated hydraulic conductivity (Ks) was found to decrease as the decomposition continued. At the beginning(4 weeks after application) of this study, none of the treatments showed significant decrease in Ks. In proceeding weeks all the

treatments showed consistent decrease in Ks showing, there is a further chance to decrease in Ks. Partially burnt paddy husk showed highest decrease (6.6×10^{-4} cm/sec) and mixture of PSC showed the lowest decrease (5.5×10^{-3} cm/sec) in Ks.

The bulk density was decreased significantly in plots where organic waste materials were added. The addition of coir dust at the ratio of 2:1 decreased the bulk density by 22%. With increase in amount of organic waste materials, soil micro porosity was increased and addition of coir dust increased the micro porosity by 57%.

The soil temperature was reduced by 4 – 5 °C from the control with the application of organic waste materials in all treatments with respect environmental temperature.

The total organic matter content was increased significantly in all treatments. Partially burnt paddy husk showed the highest (2.08%) amount. The nutrients such as nitrogen, phosphorus and potassium were increased with the addition of organic waste materials compared to control.

When comparing all the treatments, the mixture of PSC showed highest moisture retaining ability. However, partially burnt paddy husk showed 3 folds increase in moisture retention, reducing the Ks to 6.6×10^{-4} , increasing the micro porosity by 40% and providing highest percentage of organic matter content and NPK. In addition, paddy husk is highly available in Eastern region. Therefore, partially burnt paddy husk can be used to improve the water retention of sandy regosols effectively without any side effects.

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