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Status of soil organic matter in the rice growing soils of Thamirabarani ayacut area of Tamil Nadu, India

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ABSTRACT

Soil organic matter has a vital role in soil fertility. The major effect of soil organic matter on fertility is due to its influence on the reservoir of plant nutrients; supplying N, P and S as a result of microbial activity; influencing the buffering capacity of the soil. The organic matter status was estimated in terms of organic carbon in the surface soil samples collected from different rice growing soils of Thamirabarani ayacut areas of parts of southern zone comprising Thirunelveli and Thoothukkudi districts of Tamil Nadu. Among 75 samples collected, one soil was high, 15 soils were medium and the remaining 59 soils were low in organic carbon content. The sample collected from Anandapuram of Thoothukkudi district was the only sample recorded with highest organic carbon content (9.0 g kg^{-1}) and the sample collected from Ilappaikurichi of Thirunelveli district recorded the lowest organic carbon content of 1.6 g kg^{-1}. Delineation of soils of Thirunelveli and Thoothukkudi districts, Tamil Nadu for their organic matter status indicated low status of organic matter in most of the areas and warrants the essential need for the huge external addition of organics to boost the organic carbon status and for sustaining the soil fertility. A breakthrough in improving the soil properties has been well documented through humic acid application. The use of humic acid engraves soil and site specific optimization of nutrients in order to override the normal yield potential of the crops grown. Hence, the influence of lignite humic acid on soil organic carbon status in Manakkarai series of alfisols of Thoothukkudi district in Tamil Nadu was carried out.

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Organic matter is the elixir of crop nutrition. The functions of organic matter in the soil are manifold. Its direct role is concerned with the supply of plant nutrients through decomposition and mineralization and it is also indirectly associated through its effect on soil physico-chemical properties. A soil with good organic matter content can be easily cultivated, has good tilth and aeration, and facilitates root and moisture penetration. So we must keep a wary eye on the organic matter content of the soil to envisage higher crop yields.

Humic acid, a component of soil organic matter has the ability to complex with metal ions and to interact with clay minerals. Indiscriminate use of chemical fertilizers has depleted the soil organic matter and humus content. Humic acid, extracted from lignite can be added externally as a source of organic matter which will help to improve the organic carbon status of the soil. The present study was taken up with a view to evaluate the influence of humic acid applied as K – humate on the soil organic carbon status in the rice growing soil of thamirabarani ayacut area.

MATERIALS AND METHODS

The study was taken up in two steps, first to delineate the soils of the study area for organic carbon followed by the evaluation of the influence of humic acid as K – humate to the soil organic carbon status in the rice soil. To delineate the rice growing soils of Thamirabarani ayacut areas comprising of the major soil series of Thirunelveli and Thoothukkudi districts (parts of southern zone) for the organic carbon content, surface soil samples, upto a depth of 15 cm were collected. Forty representative surface soil samples were collected from different parts of Thoothukkudi district and thirty five representative surface soil samples were collected from different parts of Thirunelveli district. The samples collected were processed and analysed for the organic carbon content by chromic acid wet digestion method outlined by Walkley and Black (1934).

An incubation experiment was conducted at Agricultural College and Research Institute, Coimbatore with humic acid and fertilizers to study the influence of humic acid as K – humate on the soil organic carbon status in the soil that belonged to Manakkarai series under Alfisol soil order. The soil belongs to Manakkarai series with fine, non acid, kaolinitic, isomegathermic family of