STUDIES ON SOME CHEMICAL AND MECHANICAL PROPERTIES OF SALT-AFFECTED RICE SOILS OF KERALA

The saline rice soils of Kerala are those which have access to salt water ingress from sea and back waters. During rainy season (June-July), these lands are swept by floods and the surface soil get partly desalinised. After the cropping season (August-December) the water channels become salinised by the tides entering from sea or back waters and this water entering the fields salinise the soil. Money (1947, 1960) showed that the high acidity of the salt-affected soils of Kuttanad (*kari* soils) was due to the production of sulphuric acid by the sulphur reducing bacteria. Nambiar *et al* (1966) and Varghese (1970) reported the chief characteristics of saline measured as electrical conductivity, with the n correlate and mechanicial properties of the salt affected rice soils of Kerala.

Fourteen typical soil samples representing the salt-affected rice soils of Kerala were used in these studies. Samples were collected from West Kallada (Quilon District), Thottappally (Alleppey District) Vechoor, Vaikom and Murinjapuzha, (Kottayam District) North Parur, Thiruppunithura and Vyttilla (Ernakulam District) Thalikulam (Trichur District) Cheruvannur (Kozhikode District) Kattampally, Tellicherry, Payyannur and Irikur (Gannanore District). The methods of analyses employed were that of Piper (1950) and Richards (1954).

Results show that all the soils had high conductivity ranging from 4.2 to 14 m.mhos/cm. Eventhough the conductivity was very high, the soils were acidic in reaction, their pH ranging from 3.0 to 6.8. The correlations between conductivity on the one hand and the important chemical and mechanical characteristics are presented in Table 1. There existed a high negative correlation between pH and sulphate content of the soils. This suggests that the main cause of acidity was the production of mineral acids such as sulphuric acid as reported by Subramoney (1947, 1960).

Table 1

Correlation between conductivity, physical and chemical characteristics of saline soils

Factors correlated	Correlation coefficient
Conductivity vs. chloride	+ 0.68
Conductivity vs. sulphate	+ 0.82
Conductivity vs. silt+clay	+ 0.77
Conductivity vs. sesquioxides	+ 0.62
pH vs. sulphate	- 0.56

It is also observed that a high degree of positive correlation existed between the conductivity on the one side and sulphate, chloride and sesquiozide contents on the other. Conductivity was again correlated positively with the combined percentage of silt and clay. This may be because of soils containing more of finer fractions the salts were not freely washed away as in the case of sandy soils as observed by Lunin and Gallatin (1960).

The results also revealed that the saline soils were fairly rich in total nitrogen (0.05-0.38%) and high in organic carbon (1.20 - 6.20%). All the fourteen samples were acidic (pH ranging from 3.00 to 6.80) and contained high amounts of soluble salts (electrical conductivity ranging from 4.20- 14.00 m.mohs/cm. and sulphate and chloride contents ranging from 0.20-0.52% and 0.10-0.28% respectively). The P_2O_5 and K_2O contents of these soils ranged from 0.038-0.166% and 0.087-0.286% respectively. The percentage of CaO and MgO were found to be 0.050-0.210 and 0.098 - 0.315 respectively.

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