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Research Article

Critical limit of sulphur for mustard in alfisols and ultisols of Jharkhand

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Summary

A green house experiment was carried out with surface soil samples (0-15 cm) collected in bulk from twenty different sites from plateau region of Jharkhand comprising the districts of Dhanbad, Giridih, Hazaribagh and Ranchi. Mustard was taken as a test crop. The dry matter yield and per cent relative yield were taken. To determine the critical limit of available S in soil for mustard using different extractants. The critical limit of available S for different extractants for mustard were 6.6 mg kg^{-1}(0.001 M HCl), 17.2 mg kg^{-1}(0.25 M HCl), 9.8 mg kg^{-1}(NaOAc+ CH_3COOH), 10.2 mg kg^{-1}(Water soluble),15.6 mg kg^{-1}(NH_4OAc+ CH_3COOH),15.6 mg kg^{-1}(0.15% $CaCl_2$), 13.2 mg kg^{-1}(1 % NaCl), 18.2 mg kg^{-1}(Heat soluble),38.6 mg kg^{-1}(CaH_2PO_4), 48.8 mg kg^{-1}(KH_2PO_4).

Key words : Sulphur, Critical limit, Alfisols, Ultisols, Extractants, Mustard

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Introduction

Oilseeds crops are energy rich crops and the requirement of major nutrients including secondary nutrients is very high. Mustard shows positive response to S application and optimum dose of S varied from 15 to 60 kg/ha. Aulakh and Pasricha (1988) reviewed the S response in mustard and observed that S application increased the yield of mustard by 12 to 48 per cent under irrigated and 17 to 124 per cent under rainfed conditions. Several pools of sulphur have been found out in soils. Sulphate S fraction extracted by 0.15 per cent $CaCl_2$ is considered to be the plant available S as it significantly correlates with S uptake by many crops (Barrow,1969). Inorganic S content of the soils has been extracted using a wide range of solutions such as various salt solutions, acidic solutions and even H_2O (Fox *et al*., 1964). Under agro climatic conditions of Jharkhand, mustard comes extremely well and various extractants have been tried in the past which correlate well with the crop. However, no such report about the critical limit of S in mustard for Dhanbad, Giridih, Hazaribagh has been reported. So the present investigation was carried out to determine the critical limit of S for mustard in the some soils of Jharkhand.

Resources and Research Methods

Surface soil samples (0-15 cm) were collected in bulk from twenty different sites from plateau region of Jharkhand comprising the districts of Dhanbad, Giridih, Hazaribagh and Ranchi. The collected samples were air-dried after mixing them thoroughly. The air-dried samples were used for filling the pots of 5 kg capacity. Green house experiment was carried out with those soils having 3 levels of S using mustard as test crop, the details for which is given below:

– Pot size : 5 kg capacity glazed pots
– Soil weight : 4 kg processed soil in each pot
– Levels of treatment : 3 (0, 30, 60 mg kg^{-1} S)
– No. of replications : 3