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Status of iron chlorosis in groundnut (*Arachis hypogaea* L.) of Jaipur region and its remedy

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ABSTRACT

Survey of iron chlorosis problem in Jaipur region was done after 35 days of emergence of groundnut crop. It was observed that groundnut crop suffered from iron chlorosis.Iron status in most of the soil samples were below the critical limit (4.5 mg Kg^{-1}). Field trial was conducted for iron chlorosis remedy with the treatment of foliar application (i) control (ws) (ii) 0.5% $FeSO_4$ (iii) $FeSO_4$ + 0.1% citric acid (iv) 0.5% $FeSO_4$ + 0.1%Thiourea (v) 0.1% H_2SO_4. The results showed that the treatments of 0.5% $FeSO_4$ with 0.1% citric acid cured iron chlorosis and significantly increased pod and haulm yield over control. Oil and protein content also increased significantly in this treatment.

Key words : Iron, Chlorosis, Foliar spray, Ferrous sulphate, Groundnut, Citric acid.

Iron is the second micronutrient after zinc whose deficiency is generally encountered in crops grown on soils having coarse texture, high pH, high calcium carbonate and low organic carbon content (Nayyar, 1999) Iron chlorosis in groundnut is further aggravated when the crops are irrigated with well water containing appreciable quantity of bicarbonate ion. Out of the different materials carrying Fe, ferrous sulphate ($FeSO_4$. 7 H_2O) is the most commonly used inorganic carrier for correcting Fe deficiency in groundnut. Ferrous sulphate mixed with citric acid has been found to increase the groundnut yield by 16-24 per cent over that obtained with $FeSO_4$, Fe-citrate and Fe-DTPA (Singh and Dayal, 1992). In the present study a survey of groundnut area of Jaipur region in semi arid eastern plain zone was done to evaluate effect of foliar application of Iron and Sulphur to overcome iron chlorosis and its effect in yield and quality of groundnut.

MATERIALS AND METHODS

Survey on iron chlorosis problem in groundnut in Jaipur region was done during *kharif* 2004. Soil and groundnut plant samples were collected from farmers fields of Bagru, Kotputali, Chomu, Govind garh and Dausa area of Jaipur region after 35 days of emergence of the crop.

Soil samples were ground, passed through 2 mm sieve and analysed for EC, pH (1:2 soil water suspension), macronutrient (N, P, K) and organic carbon by using standard procedures (Jackson 1973). DTPA extractable micronutrients (Fe, Mn, Zn and Cu) were analysed as per the method proposed by Lindsey and Norvell (1978) and concentration of Fe, Mn, Zn and Cu were determined using atomic absorption spectro photometer.

Groundnut plant samples collected after 35 days of emergence of the crop were washed successively with tap water, 0.1 N HCl, distilled water and di-ionized water. The samples were dried in hot air oven at 70 $\pm$ 2^0C and ground in a stainless steel mill and stored for analysis. Plant samples were digested in di-acid mixture (Nitric acid and perchloric acid in the ratio 3:1) and the concentration of Fe, was determined using atomic absorption spectrophotometer. Chlorophyll content was determined by Arnon (1949) method.

On the basis of the above survey a field study was conducted in *kharif* 2004-05 in loamy sand soils (Silt 8.90, clay 7.82 and sand 83.20%) having pH and EC (1:2 soil water suspention) 8.2 and 0.18 dSm^{-1}, respectively. Organic carbon, available nitrogen, phosphorus and potash were 0.2%, 158, 30 and 166 kg ha^{-1}, respectively. Soils were deficient in available sulphur (5.58 mg kg^{-1}).The DTPA extractable micronutrients *i.e.* Zn, Fe, Mn and Cu were 0.7, 3.02, 3.14 and 0.32 mg kg^{-1}, respectively. Groundnut variety TAG 37 was sown as test crop. There were five treatments with four replications in randomized block design. Oil content was determined using Soxhlet apparatus.

RESULTS AND DISCUSSION

Range of important characteristics of soils:

Data presented in the Table 1 revealed that pH and EC (1:2) ranged from 7.9 to 8.9 and 0.04 to 0.3 dSm^{-1}. The soils were alkaline to alkali in nature and low in organic carbon content (0.14 to 0.3 %). As regards available