



Research Article

## Distribution of DTPA-extractable and total micronutrients in association with properties of some reclaimed salt affected soils of southwest Punjab, India

■ JAGMOHAN SINGH AND N.S. DHALIWAL

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MEMBERS OF RESEARCH FORUM:

Corresponding author :  
**JAGMOHAN SINGH**, Krishi  
Vigyan Kendra (P.A.U.),  
MUKTSAR (PUNJAB) INDIA  
Email: jagmohanpau@gmail.com

Co-authors':  
**N.S. DHALIWAL**, Krishi Vigyan  
Kendra (P.A.U.), MUKTSAR  
(PUNJAB) INDIA

### Summary

An investigation was carried out to study surface and profile distribution of total and diethylenetriamine penta acetic acid (DTPA) - extractable zinc, copper, manganese and iron in some reclaimed salt affected soils of southwest Punjab. The Southwestern zone of Punjab is deficient in available micronutrients, but has large reserve of micronutrients. These soils were originally salt affected and were found in relatively low-lying terraces at varying stages of deterioration. During the last 20-25 years, these soils have been reclaimed by the application of gypsum followed by heavy irrigation (flooding) to leach down soluble salts from the solum. In order to study DTPA-extractable and total micronutrients and their association with soil properties, four pedons representing different categories of reclaimed salt affected soils were taken from the Southwest Punjab. Total and DTPA-extractable micronutrients were higher in surface horizons and decreased in subsurface horizons. The total content varied from 26 to 76 mg/kg for zinc, from 9 to 42 mg/kg for copper, from 300 to 475 mg/kg for manganese and from 1.99 to 3.82 per cent for iron. The total content of micronutrients increased with increase in clay content and cation exchange capacity (CEC), whereas DTPA- extractable micronutrient increased with increase in organic carbon content and CEC, and decreased with increasing pH and sand content. The total reserve of Zn and Cu showed an influence on availability of these respective micronutrients.

**Key words** : DTPA-extractable, Micronutrients, Reclaimed, Solum, Leached.

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### Introduction

Micronutrient deficiency frequently occurs in arid and semi-arid regions of the Indo-Gangetic plains of India and is exhibited mainly in upland crops grown on soils with coarse texture, high pH, high calcium carbonate content and poor retention of water and nutrients (Katyal and Sharma, 1979). These soils are low in organic matter because of the prevailing arid and semi-arid climatic conditions and hence contribution of soil organic matter to available pools of micronutrients (Zn, Cu, Mn and Fe) is limited. Additionally, the emphasis on increasing the crop production using high yielding varieties along with intensive application of chemical fertilizers and limited use of organic manures has accentuated

the depletion of micronutrient reserves in the soils (Sharma *et al.*, 2004). In Punjab, it has been estimated that out of the total geographical area of 50362 sq. km, a sizeable area had been suffering from various land degradation problems such as soil salinity and sodicity, soil erosion (wind and water), flooding, water logging, shallow soil depth and sand dunes (Sidhu *et al.*, 1994). Salt-affected soils contain excess salts which impair their productivity.

The degree of adverse affects depends upon the type and quality of salts, soil texture, type of crop, variety, stage of growth, cultural practices and environment. Development of salinity and water logging is a serious problem in arid and semi-arid regions of the world and is threatening the