



Distribution of different forms of sulphur in soil of Banaskantha district of Gujarat

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ABSTRACT

Four hundred eighty soil samples from Banaskantha district were collected and analyzed to study the different forms of sulphur in soil. On an average, different forms of sulphur viz., total, organic, non-sulphate, sulphate, water soluble and heat soluble sulphur varied from 32.72 to 346.83, 11.05 to 266.90, 15.59 to 203.26, 1.64 to 48.68, 4.09 to 50.71 and 5.24 to 62.17 mg kg⁻¹, respectively in surface soil (0-15 cm depth), while 34.36 to 307.57, 11.90 to 202.30, 10.85 to 185.70, 3.27 to 32.31, 3.27 to 40.80 and 3.93 to 50.29 mg kg⁻¹, respectively in subsurface soil (15-30 cm depth). In general, different forms of sulphur showed decreasing trend with soil depth. In the soils of district, the forms of sulphur followed the following trend: non-sulphate > organic > heat soluble > water soluble > sulphate sulphur. The soils of Banaskantha district had the highest fraction of non-sulphate sulphur (50.76 per cent) followed by organic sulphur (36.74 per cent) and sulphate sulphur (12.49 per cent) of the total sulphur.

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Key words : Sulphur fraction, Soil properties

INTRODUCTION

Sulphur recognized as fourth important plant nutrient after N, P and K and is gaining considerable importance in quality crop production in context of Indian agriculture, particularly when there is more and more use of non-S containing fertilizers as well as less use of organic manures. In India, nearly, 57 m ha of arable land suffers from various degree of sulphur deficiency (Tripathy, 2003). The availability of sulphur is largely dependent on its fractions. Sulphur exists in the soil as free and adsorbed sulphate and in diverse organic and inorganic compounds. In humid region, sulphur is largely present in organic form, while in arid soils, the sulphate salts of calcium, magnesium, sodium and even potash predominant (Kanwar, 1976). No detailed information is available on the status and distribution of various forms of sulphur. The present investigation was undertaken to study the distribution of different forms of sulphur in Banaskantha

district of Gujarat.

MATERIALS AND METHODS

Four hundred eighty soil samples were collected from 0-15 cm and 15-30 cm depth from 12 talukas (20 villages in one taluka) of Banaskantha district during 2009. The soil samples were air dried, sieved through 2 mm sieve and analysed for important physico-chemical properties viz., particle size distribution, EC, pH, organic carbon, CaCO₃ and available N, P and K using standard chemical procedures. The soil samples were analysed for total sulphur (Chaudhary and Cornfield, 1966), organic sulphur (Bardsley and Lancaster, 1965), sulphate sulphur, water soluble sulphur and heat soluble sulphur (Williams and Steinbergs, 1959). The soil samples were analysed for various forms of sulphur by adopting standard methods by Chesnin and Yien (1950) as suggested by Ensminger (1954). The non-sulphate sulphur was obtained by

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