



Suitability of sulphur extractants and its availability to mustard and safflower in Alfisols and Ultisols of Jharkhand

BRAJENDRA*, L.M.SHUKLA¹, B.S. KHERAWAT² AND MUNNA LAL³

Division of Soil Science, ICAR Research Complex for NEH Region,
UMIAM (MEGHALAYA) INDIA (Email : braj_2222@rediffmail.com)

Abstract : Ten extractants were tested in surface soil samples (0-15 cm) collected from plateau region of Jharkhand comprising the districts of Dhanbad, Giridih, Hazaribagh and Ranchi falling under Alfisols and Ultisols soil order. The commonly used extractant, 0.15% CaCl_2 extracted S in the range of 13.00 (in case of Alfisol from Ranchi) to 26.50 mg kg^{-1} (in case of Alfisol from Dhanbad), with a mean value of 19.26 mg kg^{-1} . The lowest amount of S (mean value of 8.21 mg kg^{-1}) has been extracted by 0.001 M HCl with a range of 3.75 to 14.25 mg kg^{-1} , while highest (mean value 53.95 mg kg^{-1}) by KH_2PO_4 – 500 ppm P, ranging from 31.00 to 81.50 mg kg^{-1} . The soil S extracted by different extractants had shown positive and significant correlation with dry matter yield, S concentration and its uptake by mustard. and safflower.

Key Words : Extractant, Mustard, Alfisols, Ultisols, Jharkhand

View Point Article : Brajendra, Shukla, L.M., Kherawat, B.S. and Lal, Munna (2013). Suitability of sulphur extractants and its availability to mustard and safflower in Alfisols and Ultisols of Jharkhand . *Internat. J. agric. Sci.*, 9(1): 121-125.

Article History : Received : 19.06.2012; Revised : 09.09.2012; Accepted : 03.11.2012

INTRODUCTION

Usually on the basis of S removal, soil S extractants can be categorized into 3 groups, those that remove readily soluble sulphate, those that remove readily soluble plus portions of adsorbed sulphate and those that remove the readily soluble and adsorbed sulphate, plus portions of the organic S. All of the procedures have been found to be significantly related to crop response to S fertilization or uptake of the element by the crop.

Numerous procedures have been proposed for evaluating the S status of soils, which include extraction of soil sulphate with water, various salt solutions, the release of sulphate upon incubation, microbial growth and growth and S uptake, by plants (Freney, 1961; Ensminger and Freney, 1966). Inorganic S content of the soils has been extracted using a wide range of solutions including H_2O (Fox *et al.*, 1964), salt solutions such as CaCl_2 , LiCl , MgCl_2 and NH_4Cl (Maynard *et al.*, 1983; Roberts and Koehler, 1968; Tabatabai, 1982; Williams and Steinbergs, 1959) and acidic solutions

such as NH_4OAc + acetic acid and Bray 1 (Rehm and Caldwell, 1968). For soils of diversified physical and chemical characteristics, a common extractant cannot be advocated for predicting the S supplying power of all the soils and there is great need to find out the promising extractants which may give dependable results for a definite group of soils (Sharma *et al.*, 1988). The present study aimed for selection of a promising extractant for Alfisols and Ultisols of Jharkhand.

MATERIALS AND 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 passed through 2 mm sieve. Four kg of these processed samples were used for filling the pots of five kg capacity. Three levels of S (0, 30, 60 mg kg^{-1}) applied through K_2SO_4 in various treatments and

* Author for correspondence:

¹Division of Soil Science and Agricultural Chemistry, Indian Agricultural Research Institute, NEW DELHI (INDIA)

²Division of Crop Improvement, Central Soil Salinity Research Institute, KARNAL (HARYANA) INDIA

³Division of Resource Management, CRIDA, HYDERABAD (A.P.) INDIA