

Relative performance of different water soluble phosphatic fertilizers on nutrient uptake and soil fertility status in sugarcane

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ABSTRACT

Field experiment was conducted at Mahatma Phule Krishi Vidyapeeth, Rahuri, to evaluate effect of different water soluble phosphatic fertilizers viz. 30%, 50%, 60% and 100% WSP on nutrient uptake and soil fertility status in sugarcane cultivar CO-86032. Differences in nutrient uptake and available nutrient in soil at harvest were found to be non significant among different solubility of phosphatic fertilizers but significant over the control. The relative efficiency of P sources were in the order of 30% > 50% > 60% > 100% WSP with sugarcane.

Key words : Sugarcane, Uptake of nutrient, Sources of phosphatic fertilizers.

INTRODUCTION

Sugarcane (*Saccharum Officinarum* L.) is one of the important cash crops and plays pivotal roles in Indian agricultural and industrial economy. Sugarcane takes 12-18 months for maturity and requires heavy doses of NPK fertilizers. Fertilizers are the basic important input to get the potential yield from improved varieties. Out of the major plant nutrients, phosphorus is one of the major nutrients required in huge amounts for best development of sugarcane and quality of sugar. The presence of phosphorus in available form in the soil is essential for normal growth and timely maturity of sugarcane.

The phosphorus availability in Indian soil is low to medium (Rammooorthy and Bajaj, 1969). The black soils of Maharashtra are mostly calcareous and alkaline in nature where the availability of phosphorus is a serious problem. The soluble phosphorus added to such soils get converted into less soluble form (Zende, 1983). Hence, the present investigation was carried out to study the effect of different water soluble phosphatic fertilizers on nutrient uptake and soil fertility status in sugarcane.

MATERIALS AND METHODS

The experiment was laid out in Randomized Block Design with five treatments and four replications to find out an appropriate water soluble source of phosphatic fertilizers viz., 30%, 50%, 60% and 100% WSP through different sources of commercial phosphatic fertilizers for sugarcane. Recommended dose of fertilizer was applied and compared with the absolute control. The soil of the experimental field was well drained, taxonomically classified as fine clayey in texture, low in available N (176 kg/ha, moderate in available phosphorous (18.7 kg/ha) and high in potassium (496 kg/ha). The soil was moderately alkaline in reaction (pH 8.2).

The soil samples were drawn before commencement and on harvest of the experiments were analysed for available nitrogen (Subbaih and Asija 1956), phosphorus (Olsen, et al. 1954) and potassium (Knudsen et al. 1982). Whole cane samples were drawn and analysed for N by Kejedahl's method, potash by flame photometer

method (Jackson 1967) and P by molybdovanado phosphate yellow colour method. The values obtained were used to workout N, P and K uptake by following formula

$$\text{Uptake kg ha}^{-1} = \frac{\text{Dry matter yield (t ha}^{-1}) \times 1000}{100} \times \text{X-\% nutrient content}$$

The fertilizer use efficiency was worked out from the value obtained by nutrient uptake using following formula. (Singh *et al*, 1991).

$$\text{FUE} = \frac{\text{Uptake in treated plot} - \text{Uptake in control plot}}{\text{Amount of nutrient applied}} \times 100$$

RESULTS AND DISCUSSION

Effect on uptake of NPK

The data pertaining to uptake (Table 1) indicated that the sources of phosphorus significantly increased uptake of NPK by preseasonal sugarcane over control. Significantly maximum NPK uptake was observed with 30% WSP than control. However, it was on par with the all other sources of phosphorus. Uptake of NPK was significantly lower in control.

Application of phosphorus through different water soluble sources improved the total uptake of the nitrogen, phosphorus and potassium but all sources were at par. These findings are in accordance with those of the Desai *et al.* (1988) and Singh *et al.* (1991). Khurana *et al.* (2003) also made similar observation and reported that the three water soluble carriers of P (DAP, NNP and Suphala) did not differ significantly for total P uptake in long term experiments on potato sunflower pearl millet sequence. However, water insoluble source like rock phosphate favored the uptake of phosphate than soluble source like SSP in the later stage of the crop growth is also reported by Minhans *et al.* (1974)

Effect on available NPK in soil

The maximum available P and K in soil was recorded

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