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Influence of Sources and Levels of Potash in Combination with N Levels on Sweet-Potato

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Sweet potato was grown in a sandy loam soil with three levels in each of N and K and two sources of Potash namely, muriate of potash and schoenite. The results indicated that nitrogen application had significantly increased the tuber yield over control but the yield difference between 50 and 100 kg N/ha was not appreciable. Potash levels though did not have any significant effect on the tuber yield, had increased the starch content. Schoenite source of K had similar influence on the yield and starch content of sweet potato tuber as that of muriate of potash.

Sweet potato is a good starchy and forager of nutrients as compared with other crops. Among the three major fertilizer nutrients, K exerts the greatest influence on yield. Adequate use of mineral fertilizers is indispensable for sweet potato cultivation It had been reported that on fertile soil, the application of little N with much K is desirable while on infertile or sandy soil, the total quantity of fertilizers should be increased (Tsuno,1970). So the response was mostly depend upon the available soil nutrient status. The increasing demand for potassic fertilizers for fruit and tuber crops and for other K loving crops had necessiated the possibilities of exploring the availability of cheap indigenous sources of K fertilizer. Moreover, India largely depends upon the import of potassic fertilizers at the expense of heavy foreign exchange. Schoenite, a salt of potassium magnesium sulphate containing 23 percent K_2O with traces of Zinc, Manganese and Iron is obtained as a byproduct from sea water. The process of its recovery from sea-water was developed by Central Salt and Marine Chemicals. Research Institute, Bhauanagar, India. The influence of this indigenous source of K on crops particularly on the potash loving tuber crops was not studied in detail. So with a view to get information on the above lines this study was planned and reported.

MATERIAL AND METHODS

A field study was taken up during September-October 1978 season with Sweet Potato variety IB 81 as a test variety. The following were the treatments tried.

Sources of K	Levels of K_2O (kg/ha)	Levels of N (kg /ha)
1. Schoenite	K_0 : Control	N_0 : Control
2. Muriate of potash	K_1 : 100	N_1 : 50
	K_2 : 200	N_2 : 100

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The resulting 18 treatment combinations were laid out in a randomised block design. All the plots received a blanket application of 75 kg P_2O as superphosphate at the time of planting. The entire quanrity of N and K as per the treatment was also applied at the time of planting to study the levels and sources of K.

Starch: Half kg of fresh sweet potato tuber was chopped into small pieces and macerated well in the waring blender with a small quantity of water. The finely divided and pulped sample was washed quantitatively on to the 190 mesh nylon cloth, sieved and filtered. The starch present in the filtrate was allowed to settle down by gravitational force, removed and dried. The weight of the starch was expressed as per cent on fresh weight basis of the tuber.

RESULTS AND DISCUSSION

The tuber and vine yields, tuber to vine ratio and starch content are presented in table. 1.

The results of initial soil analysis indicated that it was sandy loam in texture (sand fractions 78.9%, Clay 14.9% and silt 3.9%) low in available N (82 ppm), medium in available P.(6.0 ppm) high available K (215 ppm) The soil had CEC of 15.3 me/100 g without any salinity or alakalinity problems.

The yield of tuber among the different treatments ranged from 16.9 to 24.4 t/ha. The results of statististical analysis of the tuber yield data indicated that only nitrogen application had significantly increased the yield trom 19.15 in the control to 22.55 t/ha in 100 kg N/ha, But the yield difference between 50 and 100 kg N/ha was not appreciable, Badillo and Lugo (1976) and Nair *et al* (1976) also obtained similar increased tuber yield due to N application. The response to N application was mainly due to its low available status in the soil. Potash application was found to incrcase tuber yield from 20.12 in the control to 21.73 t/ha in 200 kg K O/ha, But however the mean yield difference between the levels of K failed to reach the level of significance. The lack of response to K fertilization might be due to high K status of the initial soil. Although, at the level of probability tested, the mean differences are not significant, there was an increasing trend in tuber yield with increasing K levels upto 100 kg/ha. The two sources of K recorded similar tuber yield indicating the usefulness of schoenite source of K fertilizer along with muriate of potash for sweet potato. However Bruchholz (1971) and Kemmler (1971) reported superiority of schoenite over other potassic fertilizers, Govinda Iyer *et al* (1970) and Natarajan *et al* (1973) in groundnut and Helkiah *et al* (1978) in ragi found that schoenite was more beneficial in increasing the yield.

The yield of vine was significantly increased by nitrogen fertilization but among the added N levels there was not appreciable yield difference. Thus every increase in N levels had increased the growth of vine as well as yield of tuber. Neither levels nor sources of K had any significant influence on the vine yield. The tuber to vine ratio was decreased by N fertilization which was due to increased vegetative growth.

There was an increasing trend in the starch content of the tuber due to N application but it had not reached the level of significance. Potash fertilization was found to have beneficial effect on the starch content of the tuber. The value of 15.12 per cent in the control was increased to 16.00 in 100 kg K_2O/ha. But the starch content between 100 kg and 200 kg K_2O/ha did not differ significantly. The effect of K in increasing the starch content of the tuber was attributed to its role as a cofactor for number of enzyme reactions in carbohydrate metabolism particularly polymerization of glucose to starch (Obigbesan 1973; Kumar *et al* 1976). The sources of potash did not have any appreciable variation on the starch content of tuber.

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TABLE 1 *Results of Statistical Analysis*

Treatment	Tuber yield (t/ha)	Vine yield (t/ha)	Tuber fo vine ratio	Starch content (% on fresh weight basis)
Nitrogen level (kg/ha)				
0	19.5	18.92	1.04	15.78
50	21.82	27.81	0 81	15.89
100	22.55	28.80	0.79	16.32
C. D. at 5%	2.32	2.97	0.10	N.S.
Potash levels (Kg/ha)				
0	20.12	24.49	0.85	15.12
100	21.67	24.67	0.94	16.05
200	21.73	26.37	0.86	16.83
C. D. at 5%	N. S.	N. S.	N. S.	N. S.
Source of Potash				
Muriate of Potash	21.60	25.98	0.88	15.81
Schoenite	20.74	24.37	0.89	16.18
C. D. at 5%	N.S.	N.S.	N.S.	N.S.
Mean	21.17	25.18	0.88	16.0

N. S. Not significant.