https://doi.org/10.29321/MAJ.10.A02424

Madras Agric. J. 72 (12) : 701—705 December, 1985

EFFECT OF APPLICATION OF PRESSMUD, $ZnSO_4$ AND $FeSO_4$ ON YIELD AND QUALITY OF SUGARCANE

K. R. KUMARESAN,[1] P. SAVITHRI,[2] T. S. MANICKAM,[3] G. V. KOTHANDARAMAN,[4] and CHARLES DANIEL[5].

Seven field experiments were carried out in EID Sugar Factory area in South Arcot district to find out the effect of Zinc and iron application on sugarcane Significant increase in cane yield was obtained at four locations. The yield increase varied from 1.75 to 11.93 tonnes/ha. Besides the cane yield, the Pol % was significantly increased (18.86 %) with the application of 37.5 kg $ZnSo_4$ and 100 kg $FeSo_4$ /ha alone over the NPK treated plot (17.42%). The results also suggested that application of prssmud at 5 tonnes/ha with 37.5 kg. $ZnSo_4$ and 100 kg $FeSo_4$ /ha significantly increased the sugarcane yield (109.68 tonnes/ha) over the NPK control (102.68 tonnes/ha)

In order to maximise sugar output, the scientific methods of farming and utilizing the latest agricultural technology are popularised on an ever widening scale. In recent years, emphasis have been given to produce good quality cane per unitarea within short time and also economise the cost of the production. To increase the sugar production and quality of sugar, proper nutrient management is needed. Significance of the micronutrients is felt because of their widespread deficiencies in soils A survey conducted on sugarcane growing soils of Tamil Nadu indicated the deficiencies of Zn and Fe (Anon., 1984). Futher Zn and Fe play a vital role in improving the sugar recovery. The organic manures like pressmud alone and in combination with the chemical micronutrient fertilisers relatively have higher efficacy in increasing the cane yield and the quality. Therefore, present investigation was initiated to assess the response of different cane varieties to organic and chemical sources of micronutrient fertilizers.

MATERIALS AND METHODS

Field experiment at seven locations were laid out in the farmers' fields in sugarcane growing area of EID parry (India) Ltd., Nellikuppam. The soils of the experimental sites were deficient in DTPA extractable Zn and Fe status (Nagarajan *et al*, 1983).

1, 3 and 4 — Department of Soil Science & Agricultural Chemistry, TNAU, Coimbatore-641 003.
2 Tamil Nadu Rice Research Institute, Aduthurai.
5 EID Parry (India) Ltd . Nellikuppam

able 1. Particulars of experimental locations and initial soil analysis

S. No	Location	Variety	Available DTPA extractable micronutrients (ppm)			
			Zn	Cu	Fe	Mn
1.	Nesanur	COC 671	0.50	3.33	3.0	10.7
2.	Chitraisavadi	COC 671	0.79	1.20	5.0	40.0
3.	Kandrakottai	COC 8001	0.95	0.66	2.5	13.0
4.	Sornavoor	COC 8201	0.47	2.50	3.5	31.0
5.	Sornavoor	CO 16304	0.82	1.30	4.0	18.0
6.	Edayanvelly	CO 6304	1.20	2.25	1.50	8.4
7.	Narayanapuram	CO 62198	0.68	0.66	2.00	12.4

Table 2. Soil taxonominic classification of the experimental sites

S. No	Locations	Order	Soil Sub Group	Soil Texture
1.	Nesanur	Vertisol	Udorthentic Chromusterts	Silty clay loam
2.	Chitraisavadi	Alfisol	Udic Rhodustalf	Loamy sand
3.	Kandrakottai	Alfisol	Udic Haplustalf	Sandy clay loam
4.	Sornavnor	Inceptisol	Vertic Ustocrepts	Sandy clay
5.	Sornavoor	,,	,,	,,
6.	Edayanvelly	,,	,,	,,
7.	Narayanapuram	Alfisol	Typic Haplustalf	Sandy clay loam

The details of locations and initial soil Zn, Cu, Fe and Mn are furnished in Table 1. The soil taxonomical classification was given in Table 2. A simple RBD experiment was laid out with three replication and 12 treatments comprising 0, 18.75, 25 and 37.5 kg zinc sulphate/ha, 0, 50, 67.5 and 100 kg ferrous sulphate/ha with and without pressmud (5 tonnes/ha). A normal dose of N:P_2 0_5 : K_2 0 of 275: 62.5 : 112 kg/ha was given for control. Phosphorus was applied at the time of planting, N and K were applied in two equal splits at 45th and 90th day, after planting. The pressmud, $ZnSO_4$ and $FeSO_4$ were applied in the furrows before planting. The varieties tested were COC 671 (short duration) COC.8001, COC 8201 (Early maturing), CO 6304 (mid late) and CO 62198 (late).

The cane was harvested and the

Table 3. Cane yield (tonnes/ha) Mean of three replications)

Sl. No.	Treatments	Locations: Nesanur	Chitrai-savadi	Kandra-kottai	Sorna-voor	Sorna-voor	Edayan velly	Naraya-napuram
		Varieties: COC671	COC671	COC8001	COC8201	CO6304	CO6304	CO62198
	N : P_2O_5 : K_2O (kg/ha)							
1.	NPK Control 275 : 62.5: 112	103.4	104.3	100.7	105.2	97.2	92.6	115.4
2.	NPK + Pressmud 5 t/ha	108.5	105.6	100.0	106.5	102.3	93.9	117.8
3.	NPK + ,, + 37.5 kg $ZnSo_4$	109.9	106.6	101.5	109.8	106.5	102.5	121.3
4.	NPK + ,, + 100 $FeSO_4$	112.3	107.6	102.3	110.2	107.0	103.6	121.8
5.	NPK + ,, + 37.5 $ZnSO_4$ + 100 kg $FeSO_4$	110.3	108.2	102.4	111.4	107.8	104.6	123.1
6.	NPK + 37 5 $ZnSO_4$	112·5	106.2	100.5	106.9	102.8	96.3	119.4
7.	NPK + 100 kg FeSO	111.2	106.5	101.0	107.7	103.1	97.6	121.7
8.	NPK + 37.5 $ZnSO_4$ + 100 $FeSO_4$	109.9	106.5	101.0	107.7	104.4	98.8	122.0
9.	NPK+Pressmud 5 t/ha +25 $ZnSO_4$	110.2	104.9	101.0	108.4	104.6	100.0	119.9
10.	NPK+Pressmud+67.5 $FeSO_4$	109.6	106.9	99.3	108.9	105.3	100.0	119.5
11.	NPK+Pressmud+25 $ZnSO_4$/+67.5 $FeSO_4$	110.7	107.5	101.4	109.8	105.4	101.3	120.2
12.	NPK+Pressmud+18.75 $ZnSO_4$ + 50 $Feso_4$	111.8	106.7	101.7	109.4	105.5	98.8	121.0
	C. D. (0.05%)	1.97	NS	NS	NS	3.46	4.59	1.40

Table 4. Sucrose content (Pol %) (Mean of three replications)

Sl. No.	Treatments	Locations						
		Nesanur	Chitrai-savadi	Kandra-Kottai	Sorna-voor varieties	Sorna-voor	Edayan velly	Narayana-puram
		COC671	COC671	COC8001	COC8201	CO6304	CO6304	CO62198
	N : P_2O_5 : K_2O (kg/ha)							
1.	NPK Control 275 : 62.5 112	18.7	19.3	18.3	17.6	16.1	17.1	14.9
2.	NPK+Pressmud 5 t/ha	18.8	19.7	19.0	18.8	17.1	18.4	15.3
3.	NPK+ " 37.5 $ZnSO_4$	19.8	20.8	20.8	19.1	16.5	18.4	15 7
4.	NPK+Pressmud 100 $FeSO_4$	20.0	20.8	19.8	18.5	16 8	17.6	16.0
5.	NPK+Pressmud 37.5 $ZnSO_4$ +100 $FeSO_4$	19.9	20.7	20.0	18.7	16.5	18.2	16.4
6.	NPK+37.5 $ZnSO_4$	19.8	20.1	19.8	17.9	16.3	17.7	15.1
7.	NPK+100 $FeSO_4$	19.3	19 9	20.2	19.0	16.8	17.9	15.4
8.	NPK+37 5 ZnSO+100 $FeSO_4$	20.0	20.6	19.9	19.2	17 5	18.3	16.6
9.	NPK+Pressmud 5 t/ha+25 $ZnSO_4$	19.5	19.7	19.6	17.9	16.4	18.1	15.7
10.	NPK+Pressmud+67.5 $FeSO_4$	20.2	20.5	20.4	18.7	17.1	81.5	15.9
11.	NPK+Pressmud+25 $ZnSO_4$ 67.5 $FeSO_4$	19.9	20.7	19.9	18·7	16.7	18.3	16.6
12.	NPK+Pressmud+18.75 $ZnSO_4$+50 $FeSO_4$	20.0	20.5	20.2	18.3	16.7	1 .1	15.5
	C. D. (0.05%)	0.61	NS	1.07	NS	0.59	NS	0.47

weight of the cane was recorded. The sucrose content was estimated by *sucrolyser*. The juice samples were clarified as per Horne's dry lead sub-acetate method (Meade-Chen, 1977) before feeding to the instrument.

RESULTS AND DISCUSSION

The pooled analysis of the data revealed that the application of pressm -ud 5 tonnes/ha along with 37.5 kg $ZnSO_4$ +100kg $FeSO_4$ /ha significantly increased the su garcane yield (109.67 tonnes/ha) over the NPK control (102.68 tonnes/ha). Significantly higher cane yield was obtained at four locations viz. Nesanur. Sornavoor, Edayanvelly (Farm) and Narayanapuram. The yield increase varied from 1.75 to 11. 93 tonnes/ha. At all locations higher values for cane yield was recorded for the application of pressmud 5 tonnes/ha + 37.5 kg zinc sulphate/ha + 100kg ferrous sulphate/ha

except at Nesanur, where the ndividual, application of 37.5 kg $ZnSO_4$ /ha significantly increased the cane yield (119 5 tonnes/ha) over the NPK control (103.39 tonnes/ha). This might be due to the chelation effect of the pressmud in the micrountrient nutrition. The maximum cane yield increase was recorded (11.93 tonnes/ha) in Co 6304 at Edayanvelly. The cane yieldincreased with the application of pressmud 5 tonnes/ha + 100 kg $FeSO_4$ in six locations next to the pressmud+$ZnSO_4$ +$FeSO_4$ application The response for $ZnSO_4$ and $FeSO_4$ along with pressmud might be due to the favourable influence of pressmud on the micronutrient nutrition. The cane yield increase was least (1.75 tonnes/ha) in COC 8001 at Kandrakottai when compared to all other locations and even a slight reduction in yield was observed for the pressmud and $ZnSO_4$ applications inspite of the deficient level of Zn+Fe in this soil.

Unlike the cane yield, the Pol % (sucrose content) was significantly increased (18.86%) with the application of 37.5 kg zinc sulphate/ha+100kg ferrous sulphate/ha alone over the NPK control (17.42%). The range of increase was from 1.35 to 2.42% Among the locations the sucrose content did not show a regular trend. However, the significant increase in sucrose content was observed at four locations viz, Nesanur, Kandrakottai, Sornavoor and Narayanapuram in the varieties of COC 671, COC 8001, CO 6304 and CO6 2198. It is interesting to note that the variety COC 8001 showed lowest increase in cane yield (1.75 t/ha) and highest increase in sucrose content (2.42%) for the application of pressmud + $ZuSO_4$ +$FeSO_4$. This might be due to the type and nature of the early maturing variety which responded well in improving the quality of sugarcane. Further the balanced nutrition of Zn, Fe and Mn was created in the plant itself due to the availability of these nutrient element in proper proportion in the soil

At Chitraisavadi and Sornavoor the sucrose as well as the cane yield was not found to be significant in COC 671 and CO 6304 varietes. In contrary to the findings of Singh and Singh (1973) and subba Rao (1978), the response for the combined application of $ZnSO_4$ + $FeSO_4$ and pressmud was marked in increasing the cane yield and quality of sugarcane.

REFERENCES

ANONYMOUS. 1984. ICAR Annual Report of All India Co-ordinatod Scheme on Micronutrients in soils and plants (1983-84) TNAU, Coimbatore.

MEADE-CHEN. 1977. Cane sugar Hand Book (X Edn.). John Wiely and Sons, New York. p. 788.

SINGH, R. P. and P. P. SINGH. 1973. Effect of micronuntrients on performance of sugarcane. Indian J. Agron. 18 : 124-136.

SUBBA RAO. 1978. Guidelines for use of micronuntrients in sugarcane. SISITA Sug. J. 4 : 9-2.