

Efficacy of Cake-O-Meal—an Organic Manure on Sugarcane Yield

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ABSTRACT

A trial was carried out on the efficacy of Cake-O-Meal—an organic manure on yield and its components in sugarcane at Patuadangi farm, RSRS, Thakurgaon. Significantly higher yield was obtained in the plots where Cake-O-Meal was applied in combination with full recommended rate of fertilizers than yields from the plots received fertilizers alone, or in combination with proportionate press mud. It was also found that Cake-O-Meal combined with a half recommended rate of fertilizers produced slightly higher cane yield than the only use of full recommended rate of fertilizers; however, the yield difference was statistically similar. The plots treated with Cake-O-Meal combined with full recommended rate of fertilizers produced the highest cane yield of 57.45 t ha⁻¹ where the control plot resulted the lowest yield of 35.80 t ha⁻¹. Significant differences were also obtained among treatments in producing the number of tillers and millable cane per hectare.

Key words : Organic manure, Cake-O-Meal, sugarcane.

INTRODUCTION

Sugarcane is a long duration exhaustive crop. It has a high nutritional demand. The continuous use of commercial fertilizers alone for a long period causes deterioration of physical condition, lowers the organic matter status of soil and reduces the yield. Use of organic manures also supplement the usage of chemical fertilizers. Many important soil properties are dependent to some degree on the quantity of organic matter (Black, 1965). Parthasarathy (1972) reported that if a field receives adequate or optimum quantities of organic matter, such fields rarely deteriorate in productivity of any crop. Recently, an organic manure, a soil conditioner, named Cake-O-Meal has been introduced by Kishan Brother's Pvt. Ltd. (India). It is the perfect blend of organic minerals and nutrients, scientifically formulated and found as an effective rich meal for the soil of India. In Nigeria, another soil conditioner named Agromax has been found to increase the yield of sugarcane (Oworu, 1987). However, no work with Cake-O-Meal has been done on sugarcane in Bangladesh. The present investigation was undertaken to evaluate the efficacy of Cake-O-Meal as an organic manure on yield and yield contributing parameters of sugarcane.

MATERIALS AND METHODS

The experiment was conducted at Regional Sugarcane Research Station (RSRS), Bangladesh Sugarcane Research Institute, Thakurgaon during 1994-95 cropping season in Patuadangi farm under Old Himalayan Piedmont Plain. The variety of sugarcane used in the study was Isd 16. Two eyed soil bed settings were transplanted in the field during last week of December, 1994 and the crop was harvested 12 months after transplanting. The experiment was laid out in randomized complete block design replicated four times in 50 m² plots with the following treatments.

- T₀ - Control (No fertilizer)
 T₁ - Cake-O-Meal @ 494 kg ha⁻¹
 T₂ - Proportionate press mud @ 3811 kg ha⁻¹
 T₃ - Half recommended rates of NPKS fertilizers+Cake-O-Meal @494 kg ha⁻¹
 T₄ - Half recommended rates of NPKS fertilizers+Proportionate press mud@3811 kg ha⁻¹
 T₅ - Full recommended rates of NPKS fertilizers+Cake-O-Meal @494 kg ha⁻¹
 T₆ - Full recommended rates of NPKS fertilizers+Proportionate press mud@3811 kg ha⁻¹
 T₇ - Full recommended rates of NPKS fertilizers

The composition of Cake-O-Meal as stated by the manufacturer is given below :

Nitrogen as N : 5.40%	Phosphorus as P : 0.90%
Phosphorus as P ₂ O ₅ : 225%	Potassium as K ₂ O : 0.95%
Magnesium as Mg : 0.40%	Zinc as Zn : 0.08%
Copper as Cu : 0.04%	Iron as Fe : 0.30%
Molybdenum as Mo : 1.30 mg	Boron as B : 9.00 mg

The entire amount of Cake-O-Meal, press mud, P from triple super phosphate (TSP) and S from calcium sulphate (gypsum) were applied at the time of transplanting. One third of K from muriate of potash (MP) and 1/3 rd of N from Urea were also applied at transplanting. The rest two splits of N and K were applied at 90 days and 140 days after transplanting as top dressing. Intercultural operations were done when required. Initial and post harvest soil status was determined and presented in Table 2. All recorded data are presented in Table 1 and statistically analysed using "Analysis of Variance" technique where differences among treatment means are compared by means of DNMR test.

RESULTS AND DISCUSSION

The effect of Cake-O-Meal an organic manure, on yield and its components of sugarcane are presented in Table 1. It is evident from the results that single application of Cake-O-Meal has no significant influence on yield and its contributing factors of sugarcane, though slightly yield was increased. The combined application of Cake-O-Meal along with full recommended rate of NPKS fertilizers (T₅) significantly produced the highest cane yield of 57.45 t ha⁻¹ among all other treatments while the control plots had the lowest cane yield of 35.80 t ha⁻¹. This was in agreement with the findings of Hossain *et al.* (1989) who reported that the application of a similar fertilizer Vesimax combined with full recommended rate of NPK produced higher yield over single application of full recommended rate of fertilizers, and also superior to all other treatments. Evaluating the data presented in Table 1. It is also found that Cake-O-Meal combined with half recommended rate of NPKS (T₃) gave little higher yield of 50.70 t ha⁻¹. The use of full recommended rate of NPKS along with proportionate pressmud (T₆) were 52.40 t ha⁻¹. Nevertheless, the yields produced by the treatments T₃, T₆ and T₇ were statistically similar. It is revealed from Table 1 that only application of both these organic manures significantly suppressed the number of tillers, millable cane and yield per hectare compared to the plots treated either with inorganic fertilizers alone, or in combination with organic manures at the rates used in the study. The highest sugarcane yield due to the application of a soil conditioner, Agromax was also reported by Oworu (1987) in Nigeria. Khondaker *et al.* (1987) found that higher rate of NPK failed to increase the yield level indicating that organic manuring should be an integral part of nutritional management of organic matter deficient soil for higher yield of sugarcane which is supported by the results obtained from this trial. It is also seen from this that the recommended rate of NPKS fertilizers alone failed to produce the highest cane yield.

This could be attributed to some potential deficiency apparently taken care of by organic manuring and other minor essential elements which are duly accommodated in the product Cake-O-Meal used in the experiment.

Table 1. Effect of organic manure (Cake-O-Meal) on yield and its components of sugarcane.

Treatments	Tiller ($\times 10^3 \text{ ha}^{-1}$)	Millable cane ($\times 10^3 \text{ ha}^{-1}$)	Average height (m)	Girth (cm)	Brix (%)	Yield of cane (t ha^{-1})
T ₀ - Control	65.10 b	36.60b	1.69bc	2.05 cd	20.43b	35.80e
T ₁ - Cake-O-Meal 494 kg ha^{-1}	71.80b	41.55b	1.73bc	1.91de	20.73ab	37.55e
T ₂ - Proportionate Press mud 3811 kg ha^{-1}	68.50b	40.95b	1.55c	1.86e	20.92ab	43.15d
T ₃ - Half recommended rates of NPKS+Cane-O-Meal 494 kg ha^{-1}	133.10a	59.80a	2.08a	2.11bc	21.83ab	50.70bc
T ₄ - Half recommended rates of NPKS+Proportionate Press mud 3811 kg ha^{-1}	138.50a	56.20a	1.93ab	2.09bc	22.30a	44.60d
T ₅ - Full recommended rates of NPKS+Cake-O-Meal 494 kg ha^{-1}	159.90a	66.75a	2.10a	2.15abc	21.15ab	57.45a
T ₆ - Full recommended rates of NPKS+Proportionate press mud 3811 kg ha^{-1}	155.80a	64.95a	2.09a	2.23ab	21.92ab	52.40b
T ₇ - Full recommended rates of NPKS fertilizers	130.90a	61.30a	2.14a	2.30a	20.77ab	49.00c

Figures followed by the same letter are not significantly different as per DNMR test at 5% level of probability.

Table 2. Initial and post-harvest nutrient status of experimental soil under different treatments.

Physico-chemical Properties of soil	pH	Organic C (%)	Total N (%)	Available P (ppm)	Exchangeable K (meq%)	Available S (ppm)
Initial status of soil	4.60	1.16	0.070	17.00	0.14	16.00
Post harvest status of soil						
T ₀ - Control	4.65	1.05	0.065	16.00	0.12	14.00
T ₁ - Cake-O-Meal 494 Kg ha^{-1}	4.80	1.08	0.070	18.00	0.14	16.00
T ₂ - Proportionate Press mud 3811 Kg ha^{-1}	4.85	1.09	0.070	18.00	0.15	16.00
T ₃ - Half recommended rates of NPKS+Cane-O-Meal 494 kg ha^{-1}	4.82	1.10	0.075	20.00	0.16	18.00
T ₄ - Half recommended rates of NPKS+Proportionate Press mud 3811 kg ha^{-1}	4.83	1.10	0.075	19.00	0.16	19.00
T ₅ - Full recommended rates of NPKS+Cake-O-Meal 494 kg ha^{-1}	4.87	1.14	0.080	22.00	0.17	21.00
T ₆ - Full recommended rates of NPKS+Proportionate press mud 3811 kg ha^{-1}	4.85	1.15	0.075	21.00	0.16	20.00
T ₇ - Full recommended rates of NPKS fertilizers	4.75	1.12	0.075	20.00	0.15	18.00
Method used for the above analysis	Glass elect. pH meter	Wet Oxi. method,	Kjeldhal method	0.5M NaHCO ₃ extraction method.	1M NH ₄ -acetate extraction method.	Turbidimet. Spectropho. (Black, 1965)

Thus, it could be concluded that Cake-O-Meal has the properties and essential nutrients to increase sugarcane yield, but it could not be used as a total substitute of any of the fertilizers recommended for sugarcane. Complementary, use of Cake-O-Meal @ 494 kg ha⁻¹ along with recommended rates of NPKS has proved its beneficial effect and may be recommended in future for successful cultivation of sugarcane in Old Himalayan Piedmont Plain soils. However, further study is necessary to confirm the findings.

REFERENCES

- Black, C.A. 1965. Organic matter in methods of soil analysis (Part-2). American Society of Agronomy, Inc. Madison, Wisconsin. pp. 1397-1408.
- Hossain, A.H.M.D.; Ali, M. and Shaheen, M. 1989. Effect of vesimex on sugarcane yield. *Bangladesh J. Sugarcane*, 11 : 109-111.
- Khondaker, M. Rahman, M.H. ; Chowdhury, M.K.A. and Hossain, A.H.M.D. 1987. Influence of different organic manures on sugarcane productivity. *Bangladesh J. Sugarcane*, 9 : 48-52.
- Oworu, O.O. 1987. The efficacy of a liquid fertilizer (Agromax) on yield and its components in sugarcane, *Bangladesh J. Sugarcane*, 9 : 36-32.
- Parthasarathy, S.V. 1972. Organic matter in Sugarcane in India. The K.C.P. Ltd. Madras. pp. 332-333.