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EFFECT OF A BIOLOGICAL COMPOSTING ACCELERATOR ON MAIZE GROWTH

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A biological decomposter received from Agrochemical and Inorganics Division, Ameropa AG, Basal, Switzerland was tested on maize growth during the spring of 1985. Its soil application with rice straw plus 150 kg N ha^{-1} as urea was found to be superior to straw plus fertilizer without decomposter for maize growth. It appears from the data that soil application of this product has a yield increasing effect explanable to rapid nutrient recycling in a high intensity agricultural production system when crops follow in quick succession.

INTRODUCTION

Application of raw farm yard manure, strawy materials and crop stubbles left after harvesting a crop have frequently created unfavourable growth enviroment for the following crop resulting primarily from microbial immobilization of plant nutrients (Pinck *et al.*, 1946; Hussain *et al.*, 1978). In order to eliminate such unfavourable condition, incorporation of nitrogen fertilizer in soil is practised which helps in biochemical degradation of organic materials and eventually release of N and other nutrients for optimum plant growth (Pinck *et al.*, 1946).

A product named decomposter consisting of pure bred bacteria and fungi for rapid decomposting of all organic materials into natural fertilizer was received for testing from Agrochemical and Inorganics Division, Ameropa AG, Basal, Switzerland. The efficiency of this product was evaluated in a field experiment on maize during 1985.

MATERIALS AND METHODS

The experiment consisted of the following treatments :

T_1 = Control

T_2 = Rice straw

T_3 = Rice straw + fertilizer
T_4 = Rice straw + decomposter
T_5 = Rice straw + fertilizer + decomposter

Chaffed rice straw was applied at the rate of 6 tonnes ha^{-1}, nitrogen fertilizer at the rate of 150 kg N ha^{-1} as urea and decomposter at the rate of 2.727kg ha^{-1}. All materials were incorporated into the soil by thorough cultivation. The experimental layout was randomized complete block design with four replications and a plot size of 2m x 5½m. Chaffed straw soaked in decomposter water solution was broadcast and incorporated on 19.2.1985 followed by soaking irrigation on 26.2.1985. Half of the N was applied at planting and half on 24.4.1985 when the crop was half a meter high.

After preparation of seed bed, soil samples were drawn from 0-15 cm depth, dried, processed and analysed by methods as outlined by Jackson (1962). Maize as spring fodder was planted on 9.3.85. In all 8 irrigations of 5 cm each were applied as and when required. Granular Diazinon in two splits was soil applied to control borer attack which was more severe under the treatments straw and straw plus decomposter. Plant height and fresh yield of maize fodder were recorded on 30.5.1985 after attaining maximum growth. Data were statistically analysed to evaluate the significance of treatment means.

RESULTS AND DISCUSSION

Data on the analyses of field soil (0-15 cm depth) appear in Table 1 which depict the soil to be a normal, productive, alkaline in reaction, low in nitrogen and organic matter and medium in available P and K.

Observations on plant height and fresh weight of maize are presented in Table 2. Maximum plant height and fresh weight were recorded in the case of straw plus fertilizer application alongwith decomposter. Straw plus fertilizer gave lower values and straw plus decomposter followed by straw alone, were the least effective in increasing plant height and plant growth as reflected by fresh yield of maize plant. These results are in line with those of Pinck *et al.*, (1946) who found that addition of straw to a sandy loam soil low in organic matter, decreased the yield of wheat and sudan grass markedly attributable to nutrient immobilization.

According to U. S. Soil Taxonomy, these soils belong to Aridisols, characteristically deficient in organic matter and nitrogen, whereas, phosphorus and potash contents of field soil were not as critical to produce a normal crop of maize. The nitrogen deficiency of the field soil (Table 1) was further intensified by the rice crop preceding maize which was harvested in November of the previous year, thus leaving little time for the decomposition and release of inorganic nitrogen through decomposition of rice stubbles during low winter temperature.

Table 1. *Physical and chemical characteristics of the field soil (surface 15 cm)*

Soil characteristics	Unit	Value
Sand	%	70.4
Silt	%	14.0
Clay	%	15.6
Textural class	—	Sandy clay loam
Organic matter	%	0.40
pHs	—	7.8
ECe at 25°C	dS/m	1.22
Nitrogen	%	0.038
Available P	ppm	10.22
Available K	ppm	140.20
CEC	me/100g	9.20
Water soluble cations & anions		
Cations		
Ca^{++} + Mg^{++}	me/l	8.20
K^{+}	me/l	0.42
Na^{+}	me/l	3.60
b) *Anions*		
CO_3^{-}	me/l	—
HCO_3^{-}	me/l	4.60
Cl^{-}	me/l	3.52
SO_4^{-}	me/l	4.18

The superiority of straw plus fertilizer with the application of decomposter compared to straw plus fertilizer alone suggests effectiveness of decomposter in rendering nitrogen and other essential nutrients available to plants. The lowest fresh matter yield by straw treatment even in relation to control, reflects restricted plant nutrition explanable to severe N or other nutrient deficiency caused by rice straw of wide C-N ratio as explained in literature (Tisdale and Nelson, 1966). It appears from the results that decomposter may be used with advantage under high intensity cropping system to keep nutrients bound in plant residues, mobile and available for plant use.

Table 2. *Plant height and fresh weight of maize as affected by treatments*

Treatments	Height (cm)	Maize fodder (t/ha)
T_1 — Control	106 25 b	23.437 c
T_2 — Straw	82.25 e	11.805 e
T_3 — Straw+fert.	142.5 a	37.500 b
T_4 — Straw+decomposter	83.0 c	16.493 d
T_5 — Straw+fert.+decomposter	158.0 a	41.667 a

Figures followed by the similar letter are not statistically different at P=5%.

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