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Effect of Application of FYM and Chemical Fertilizers on Yield and Proximate Analysis of Maize Green Fodder

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ABSTRACT: Worldwide there is growing interest in the use of organic fertilizer due to depletion in the soil fertility because continuous use of chemical fertilizers create potential polluting effect due to chemicals in the environment considering same the present investigation entitled "Effect of application of FYM and chemical fertilizers on yield and proximate analysis of maize green fodder" was conducted at Department of Animal Husbandry and Dairy Science, Post Graduate Institute, Dr PDKV, Akola for period 90 Days. Three treatments were studied namely T_1 – Nutrient management through organic manure and bio-pesticide for maize fodder, T_2 –Nutrient management through fertilizer and IPM for xv maize fodder and T_3 – Nutrient management through fertilizer and pesticide for maize fodder. After 90 days of experiment fodder grown were analyzed for yield and proximate composition of maize green fodder. The mean yield of maize green fodder under treatment T_1, T_2 and T_3 was 30.25, 31.29 and 31.39 ton respectively and yield results were significant at 5 % level of significance. The results revealed that Dry Matter value was 20.71, 20.63, 20.50 percent, Crude Protein value was 8.24, 8.13, 8.20 percent, Crude fiber value was 27.60, 27.55, 27.65, Ether Extract value was 4.31, 4.51, 4.42 percent, Total Ash value was 7.31, 7.52, 7.39 percent, Nitrogen Free Extract value was 52.53, 52.32, 52.32 percent respectively for T_1, T_2 and T_3 . For its proximate analysis the results were non- significant at 5 % level of significance.

Keywords : FYM, Chemical fertilizer, Maize green fodder, Yield, Chemical composition.

INTRODUCTION

Maize is a highly esteemed fodder, commonly grown in the winter season. The fodder is excellent, highly nutritive and sustainable either in green or dry condition and highly responsive to nitrogen fertilizer application. Nitrogen application directly contributes to the quantity and quality of forage production. Excessive and imbalanced use of chemical fertilizers has adversely affected the soil causing a decrease in organic carbon reduction by microbial flora of the soil, and increasing use of nitrogen fertilizer is contaminating water bodies thus affecting fish fauna and causing health hazards to human beings and animals (Begum, 2003). The recycle and use of nutrients from organic manure has been given more consideration for insuring sustainable land use and agricultural production development (Oad *et al.,* 2004).

MATERIAL AND METHODS

The present investigation was carried out in the Department of Animal Husbandry and Dairy Science, Dr. PDKV Akola, during the year 2019-20 for a period of 90 days. Treatment Details: T_1 – Nutrient management through organic manure and bio-pesticide for maize fodder, T_2 –Nutrient management through fertilizer and IPM for xv maize fodder and T_3 – Nutrient management through fertilizer and pesticide for maize fodder. The field with well fertile and good water holding capacity soil was selected followed by tillage operation i.e. ploughing operation was carried on before research work start. At that time applied FYM (Farm Yard Manure) @ 5 tonnes as per the treatment of research plot. Then other tillage operation was carried like harrowing on the ploughed plot. African tall variety was selected for sowing of maize fodder The sowing performed on 1 hectare field area required 75 kg seed of maize fodder. Application dose of fertilizer for particular treatment i.e 100: 50:50 kg NPK per hectare was applied for maize fodder. At the time of sowing applied half nitrogen, full phosphorus and potassium. Remaining nitrogen dose applied 40 days after sowing of maize fodder. The pest attack was observed on maize fodder after 60 days of sowing .The pheromone traps use at the time pest infestation in the maize fodder. Most of the seedling leaves and growing point infestation of armyworm pest observed. Therefore, applied the spray of metarhizum @ 4 ml per 10 litre of water on treatment plot T_1. Other spray the Neem Seed

Extract @ 4 ml per 10 litre of water, clean the weed and burned the plant debris on treatment plot T_2. Also spray the coragen @ 4 ml per 10 litre of water on treatment plot T_3. The yield of fodder obtained from cutting of fodder crop weight in ton. The sample was taken at 50 % flowering of green fodder. The green fodder seedling cut down and collected the sample of five seedlings of each treatment for chemical analysis. Chemical Analysis of collected fodder sample in the laboratory Dry matter, crude protein, crude fibre, ether extract, total ash and nitrogen free extract for the samples were determined as per procedure given for proximate principles analysis according to AOAC, (1990) and BIS, IS: 7874 (part-I) -1975. The data obtained was subjected to the statistical analysis by following the Randomized Block Design (RBD) for testing their difference as per procedure described by Amble, (1975).

Table 1: Effect of application of FYM and chemical fertilizers on yield of maize green fodder (Ton).

Treatments	Replications				Mean
	R-I	R-II	R-III	R-IV	
T_1	30.14	30.12	30.28	30.47	30.25
T_2	31.34	31.23	31.48	31.13	31.29
T_3	31.47	31.50	31.35	31.22	31.39
F Test	Sig				
SE(m) ±	0.089				
CD at 5 %	0.315				

RESULTS AND DISCUSSION

Yield of green fodder: The green fodder yields obtained from different treatment were analyzed and presented in Table 1. It was recorded that yield of maize fodder at various treatments were 30.25, 31.29 and 31.39 ton in treatment (T_1), (T_2) and (T_5) respectively and results was found significant at 5% level of significance. The mean yield of green maize fodder treatment (T_3) was highest (31.39 ton) as compare to other treatment. However, the mean yield of green maize fodder treatment (T_1) was lowest 30.25 ton) as compare to other treatment.

The results recorded in the present investigation are also supported and in agreement with results recorded by Buriro *et al.,* (2014) revealed that cattle slurry applied maize fodder green fodder yield was between 31.530-31.880 ton /ha. Kanduri *et al*., (2016) concluded that maize green fodder yield by various nitrogen and phosphorus levels was between 27.02- 44.97 ton /ha.

Proximate composition of green fodder: The green fodder sample was taken from different treatment were analyzed for their chemical composition and presented in Table 2.

Table 2 Effect of application of FYM and chemical fertilizer on proximate analysis of maize green fodder.

Treatments	Chemical composition (% DM basis)					
	DM	CP	CF	EE	NFE	Total Ash
T_1	20.71	8.24	27.60	4.31	52.53	7.31
T_2	20.63	8.13	27.55	4.51	52.32	7.52
T_3	20.50	8.20	27.65	4.42	52.32	7.39
F Test	NS	NS	NS	NS	NS	NS
SE(m) ±	0.149	0.068	0.075	0.115	0.141	0.069

Dry Matter: The result show that dry matter content of maize fodder at various treatments was 20.71, 20.63 and 20.50 percent in treatment (T_1), (T_2) and (T_3) respectively and results was found non- significant at 5% level of significance. The results recorded in the present investigation are also supported and in agreement with results recorded by Ayub *et al.,* (2002) estimated that dry matter content of fertilizer applied maize fodder was between 14.29 - 21.39 percent. Rahman *et al*., (2008) showed that dry matter content in maize fodder by application of cattle slurry was between 19.44- 20.00 percent.

Crude protein: It was observed that crude protein content of maize fodder at various treatments were 8.24, 8.13 and 8.20 percent in treatment (T_1), (T_2) and (T_3) respectively and results was found non- significant at 5% level of significance. The results recorded in the present investigation are also supported and in agreement with results recorded by Ayub *et al.,* (2002) revealed that crude protein content of fertilizer applied maize fodder was between7.73-10.21 percent. Rahman *et al.,* (2008) observed that crude protein content by application of cattle slurry was between 10.21-11.90 percent. Kalra and Sharma (2015) estimated that crude protein content of FYM applied maize fodder was between 9-10.98 percent. Kanduri *et al.,* (2016) showed that crude protein content of fertilizer applied maize fodder was between 5.03-10.83 percent.

Crude fibre: It was revealed that crude fibre content of maize fodder at various treatments were 27.60, 27.55 and 27.65 percent in treatment (T_1), (T_2) and (T_3) respectively and results was found non- significant at 5% level of significance. The results recorded in the present investigation are also supported and in agreement with results recorded by Ayub *et al.,* (2002) the crude fibre content of fertilizer applied maize fodder was between 28.83-35.50 percent. Amodu *et al.,* (2014) the crude fibre content of fertilizer applied maize fodder was between 23-31 percent. Kalra and Sharma (2015) the crude fibre content of FYM applied maize fodder was between 33.31-34.54 percent.

Ether Extract: It was recorded that ether extract content of maize fodder at various treatments were 4.31, 4.51 and 4.42 percent in treatment (T_1), (T_2) and (T_3) respectively and results was found non- significant at 5% level of significance. The results recorded in the present investigation are also supported and in agreement with results recorded by Amodu *et al.,*

(2014) observed that ether extract content of fertilizer applied maize fodder was between 6.2-7.2 percent.

Nitrogen free extract: The result revealed that nitrogen free extract content of maize fodder at various treatments were 52.53, 52.32 and 52.32 percent in treatment (T_1), (T_2) and (T_3) respectively and results was found non significant at 5% level of significance. The results recorded in the present investigation are also supported and in agreement with results recorded by Amodu *et al.,* (2014) reported that nitrogen free extract content of maize fodder was between 51.71-56.6 percent.

Ash : It was observed that the ash content of maize fodder at various treatments were 7.31, 7.52 and 7.39 percent in treatment (T_1), (T_2) and (T_3) respectively and results was found non- significant at 5% level of significance. The results recorded in the present investigation are also supported and in agreement with results recorded by Ayub *et al.,* (2002) observed that ash content of fertilizer applied maize fodder was between 8.17-10.17 percent. Rahman *et al.*, (2008) revealed that ash content by application of cattle slurry was between 7.54-10.20 percent. Kanduri *et al.,* (2016) evaluated the ash content of fertilizer applied maize fodder was between 7.16-10.02 percent.

Nasab (2015) also highlighted the importance by reporting Maize (Zea mays L.) is in the third rank after wheat and rice and is grown all over the world in a wide range of climatic condition. Excessive use of chemical fertilizers, decline in soil and food quality due to loss of soil organic matter is the main characteristics of the conventional farming systems which are more pronounced in arid and semi-arid areas. Vermicompost is a good substitute for commercial fertilizer and has more N, P and K than the normal heap manure. The use of vermicompost appears to affect plant growth in ways that cannot be directly linked to physical or chemical properties. However, the improvements in physical and chemical structure of the growth media are attributed to the increase in plant growth. The field experiment was laid out in split plot design with factorial design with four replications. Treatments included levels of vermicompost (0, 4, 8 and 12 t/ha) as main plot and variety (700 and 704) as sub plot. Analysis of variance showed that the effect of vermicompost and variety on all characteristics was significant. It is argued that growth promotion may be due to micro flora associated with vermicomposting that induce hormone like activity on the production of metabolites (Tomati *et al.,* 1987; Atiyeh *et al.,* 2002). Decomposition of organic matter and recycling of carbon have substantial effect on the activity of enzyme evolved in mineralization of nutrients. soil enzymes significantly contribute to soil health. Use of vermicomposting is being advocated for sustaining soil fertility in various field crops (Senthil Kumar and Surendran, 2002). Chemical and manure fertilizer combinations could be decreased chemical fertilizer utilization without any considerable reduction in forage quality (Ebrahim- Ghoshchi *et al*., 2012). Fateh *et al.,* (2009) with the survey of various systems of soil fertility (chemical, organic and chemical × organic) on the quantity and quality of artichoke reported that except for ash percentage, soil fertility system had significant effect on quantitative and qualitative traits of artichoke and the combined fertilization of chemical × manure treatments produced the highest dry and crud protein.

In contrast to this Allahdadi *et al.,* (2016) reported that seed inoculation with biofertilizer in the integration with chemical fertilizers improved forage yield and quality of artichoke. The application of bio fertilizers alone could not fulfill the nutritional requirements of artichoke. It seems that it could be used as a complementary fertilizer with chemical fertilizer in sustainable agricultural practices.

CONCLUSION

From the results obtained in present study it is concluded that the effect of FYM and chemical fertilizer application on yield and proximate composition of maize green fodder was found statistically significant and non significant, respectively.

FUTURE SCOPE

Such type of research studies will help for proper application of fertilizer and its better effect on production of good quantity and quality green fodder. Green fodder is an important part of livestock diet, proper feeding defiantly affects positively on heath and productivity of livestock.

Conflict of Interest: None

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