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Influence of organic liquid manures and bio fertilizers on yield and economic of finger millet (*Eleusine coracana* L.) under eastern UP condition

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Abstract

A field experiment was carried out during *Kharif* season 2020 at SHIATS Model Organic Farm (SMOF), Department of Agronomy, SHUATS, Prayagraj (UP) on sandy loam soil to investigate the influence of organic liquid manures and bio fertilizers and on yield and economic of finger millet. The treatments consisted of Liquid organic manures *viz.*, Jeevamrutha foliar spray at 500 l/ha, Panchagavya foliar spray at 3% and Vermiwash foliar spray at 3% and biofertilizers *viz.*, Azospirillum (seed inoculation @25 g/kg), PSB (Seed inoculation @25 g/kg) and Azospirillum + PSB (Seed inoculation @25 g/kg) whose effect was observed on finger millet (MR-1). The experiment was laid out in randomized block design with ten treatments replicated thrice. Study revealed that treatment with application of Jeevamrutha FS 500 l/ha + Azospirillum + PSB was recorded significantly higher grain yield (2.82 t/ha) and stover yield (4.62 t/ha) as compared to all the treatment combinations. The economic analysis clearly indicates that higher B:C ratio (1.89) recorded the treatment with application of Jeevamrutha FS 500 l/ha + Azospirillum + PSB as compared to all treatment combinations.

Keywords: Finger millet, biofertilizer, jeevamrutha, organic farming, yield, economic

Introduction

Among the small millets grown all over the world, finger millet (*Eleusine coracana* L.), holds number one position with respect to coverage 50% area and contributes 2/3rd production (2.8 m). Finger millet (*Eleusine coracana* L.), also known as ragi, marua, mandua, nagli, kapi, nachni in different Indian languages, belongs to family Poaceae. The crop is well adapted to very poor and marginal uplands where other crops cannot be grown successfully (AICSMIP, 2014). It is the most important small millet in tropics covered 12% of global millet area (ICRISAT, 2011) and cultivated in more than 25 countries in Africa and Asia. Among small millets, it ranks first in India by considering its nutritional value. It is staple food crop in many hilly regions and important food grains for tribal house-holds in the central region of India. Total carbohydrate content of finger millet has been reported to be in the range of 72% to 79.5%.

The second major component of finger millet is protein and it contains nearly 7% of it, but large variations in protein content from 5.6 to 12.70% was reported. Finger millet grains contain 9.2% protein, 1.29% fat, 2.24% minerals, 3.90% ash and 0.33% calcium. The discovery of a new food does more for the happiness of mankind than the discovery of a new star. Perhaps that's why the word organic-food has become so popular in recent years across the world. The holistic system which produces the organic-food is called by many synonyms; organic farming, organic agriculture, traditional farming, classical farming, natural farming, Vedic farming, Jaivikakrishi, Jeevanthakrishi etc.

Organic farming is "a production system that sustains soil health, ecosystem and people, by relying on ecological processes, biodiversity and natural cycles and adapted to local conditions than use of inputs with adverse effects". Organic farming is gaining importance in view of sustained agriculture and maintaining ecological balance. It lies in a simple principle of utilizing cheap and local inputs with zero utilization of chemicals in any form like fertilizer, herbicide, pesticide, antibiotic, hormone etc.

Apart from using conventional farm-based products there is an increasing demand for improvised materials like *Jeevamrutha*, *Panchagavya*, *Beejamruth*, *Amruthpani*, *Sanjivak*, *fish amino acids*, *fermented plant juices*, etc. which not only enrich the soil with indigenous microorganisms but also decrease the incidence of diseases in many crops. (Devakumar *et al.*, 2008) [6] Bio fertilizers are being essential component organic farming are the preparations containing live or latent cells of efficient strains of nitrogen fixing, phosphate solubilising or cellulolytic micro-organisms used for application to seed, soil are composting areas with the objective of increasing number of such micro-organisms and accelerate those microbial process which augment the availability of nutrients that can be simulated by plants. PSB plays an important role in dissolving phosphorus present in soil that is environmentally friendly and sustainable. PSB with multiple beneficial traits are important to increase the growth and yield of plants. Hence the present study aims at evaluating the impact of precise organic liquid manure and biofertilizer on yield finger millet.

Materials and Methods

The experiment was carried out during *Kharif* season of 2020 at SMOF (SHUATS Model Organic Farm), Department of Agronomy, Naini Agricultural Institute, SHUATS, Prayagraj (UP). The SMOF is situated at 25.75° N latitude, 87.19° E longitude and at an altitude of 98m above mean sea level. The soil of the experimental plot was sandy loam in texture, nearly neutral in soil reaction (pH 7.1), low in organic carbon (0.28%), medium in available N (225 Kg/ha), medium available P (19.50 Kg/ha) and low indicate available K (92.00 Kg/ha). The treatment consisted of Liquid organic manures *viz.*, *Jeevamrutha* foliar spray at 500 l/ha, *Panchagavya* foliar spray at 3% and *Vermiwash* foliar spray at 3% and *biofertilizers viz.*, *Azospirillum* (seed inoculation @25 g/kg), PSB (Seed inoculation @25 g/kg) and *Azospirillum + PSB* (Seed inoculation @25 g/kg). The experiment was laid out in Randomized Block Design. The experiment comprising ten treatment possible combination of above factor, *viz.*, T₁: *Jeevamrutha* FS 500 l/ha + *Azospirillum*, T₂: *Panchagavya* FS at 3% + *Azospirillum*, T₃: *Vermiwash* FS at 3% + *Azospirillum*, T₄: *Jeevamrutha* FS 500 l/ha + PSB, T₅: *Panchagavya* FS at 3% + PSB, T₆: *Vermiwash* FS at 3% + PSB, T₇: *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB*, T₈: *Panchagavya* FS at 3% + *Azospirillum + PSB*, T₉: *Vermiwash* FS at 3% + *Azospirillum + PSB*, T₁₀: Control field observation regarding yield was recorded after harvesting of

crop, While on that basis economic evaluation in terms of net return also find out according the technique and analysis of variance.

Results and Discussions

Yield

Treatment with application of *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB* was recorded maximum grain yield (2.82 t/ha) and which was significant over all the treatments. However, treatment with application of *Panchagavya* FS at 3% + *Azospirillum + PSB* and *Vermiwash* FS at 3% + *Azospirillum + PSB* were statistically on par with treatment of *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB*. Treatment with application of *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB* was recorded maximum stover yield (4.62 t/ha) and which was significant over all the treatments. However, treatment with application of *Vermiwash* FS at 3% + PSB and *Vermiwash* FS at 3% + *Azospirillum + PSB* were statistically on par with treatment with application of *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB*. Treatment with application of *Panchagavya* FS at 3% + *Azospirillum + PSB* was recorded maximum Harvest index (38.56%) and the minimum harvest index (34.20%) was recorded with control plot and there was no significant difference among treatment. The highest grain yield and straw was recorded with application of *Azospirillum+PSB+ Jeevamrutha* FS 500 l/ha might be attributed to better supply of 22 of nutrients along with conducive physical environment leading to better root activity and higher nutrient absorption, which resulted in more plant growth and superior yield attributes responsible for higher yield. The application of biofertilizers (*Azospirillum*) increased the efficiency of chemical fertilizers due to control release of nutrients in the soil through microbial activity which might have facilitated better crop growth. The present findings are in accordance with findings of Abbasi and Yousra (2012) [1], Acharya *et al.*, (2012) [3] and Anand *et al.*, (2018) [4].

Economics

Gross returns (INR 90,661.30/ha) and Net returns (INR 59,276.30/ha) was found to be highest in treatment with application of *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB* as compared to all the treatments. Benefit cost ratio (1.89) was found to be highest in treatment with application of *Jeevamrutha* FS 500 l/ha + *Azospirillum + PSB* and the minimum Benefit cost ratio (1.01) was found to be in treatment with control plot as compared to other treatments.

Table 1: Yield attributes and Yield of Finger millet as influence by Organic Liquid Manures and Biofertilizers

Treatments	Grain yield (t/ha)	Stover yield (t/ha)	Harvest index (%)
<i>Jeevamrutha</i> FS 500 l/ha + <i>Azospirillum</i>	2.51	4.22	37.31
<i>Panchagavya</i> FS at 3% + <i>Azospirillum</i>	2.36	4.24	35.78
<i>Vermiwash</i> FS at 3% + <i>Azospirillum</i>	2.58	4.27	37.70
<i>Jeevamrutha</i> FS 500 l/ha + PSB	2.16	4.15	34.25
<i>Panchagavya</i> FS at 3% + PSB	2.62	4.36	37.60
<i>Vermiwash</i> FS at 3% + PSB	2.41	4.53	34.70
<i>Jeevamrutha</i> FS 500 l/ha + <i>Azospirillum + PSB</i>	2.82	4.62	37.92
<i>Panchagavya</i> FS at 3% + <i>Azospirillum + PSB</i>	2.74	4.37	38.56
<i>Vermiwash</i> FS at 3% + <i>Azospirillum + PSB</i>	2.69	4.50	37.45
Control (FYM)	2.15	4.14	34.20
S.Em(±)	0.06	0.08	1.0981
CD (p=0.05)	0.18	0.24	NS

Table 2: Total cost of cultivation Gross returns, Net returns and B:C ratio of Finger millet as Influence by organic liquid manures and Biofertilizers

Treatment	Total cost of Cultivation (INR/ha)	Gross return (INR/ha)	Net return (INR/ha)	B:C Ratio
Jeevamrutha FS 500 l/ha + Azospirillum	30905	80932.6	50027.6	1.62
Panchagavya FS at 3% + Azospirillum	31155	76554	45399	1.46
Vermiwash FS at 3% + Azospirillum	31505	83042.7	51537.7	1.64
Jeevamrutha FS 500 l/ha + PSB	31065	70678.5	39613.5	1.28
Panchagavya FS at 3% + PSB	31315	84415.7	53100.7	1.70
Vermiwash FS at 3% + PSB	31665	78460.7	46795.7	1.48
Jeevamrutha FS 500 l/ha + Azospirillum + PSB	31385	90661.3	59276.3	1.89
Panchagavya FS at 3% + Azospirillum + PSB	31635	87852	56217	1.78
Vermiwash FS at 3% + Azospirillum + PSB	31985	86674	54689	1.71
Control (FYM)	34985	70338	35353	1.01

Conclusion

It can be concluded that for obtaining higher yield components with better quality of finger millet crop has higher with application of Jeevamrutha FS 500 l/ha + Azospirillum + PSB was found more productive yield (2.82 t/ha) and high net returns (INR 59,276.30/ha).

References

1. Abbasi MK, Yousra M. Synergistic effects of biofertilizer with organic and chemical N sources in improving soil nutrient status and increasing growth and yield of wheat grown under greenhouse conditions. *Plant Biosystems* 2012;146:181-189.
2. Abdullahi R, Sheriff HH, Buba A. Effect of biofertilizer and organic manure on growth and nutrients content of pearl millet. *APRN Journal of Agricultural and Biological Science* 2014;9(10):351-355.
3. Acharya R, Dash AK, Senapati HK. Effect of integrated nutrient management on microbial activity influencing grain yield under rice-rice cropping system in an acid soil. *Asian Journal of Microbiology, Biotechnology and Environmental Sciences* 2012;14:365-368.
4. Anand MR, Sharanappa, Kalyana Murthy KN. Impact of organic nutrient management on productivity, Nutrient uptake and economics of Finger millet in ground nut cropping system. *Int. J. Curr. Microbiol. App. Sci* 2018;7(11):1000-1008.
5. Anil Kumar BH. Integrated use of organic and inorganic manures on growth and yield of finger millet under rainfed conditions, M.Sc., (Agri.) Thesis, Submitted in UAS, Bangalore 2000.
6. Devakumar N, Rao GGE, Shubha S, Imrankhan N, Gowda SB. *Activates of Organic Farming Research Centre*. Navile, Shimoga, University of Agriculture Sciences Bangalore 2008, 12 p.
7. Govindappa M, Vishwanath AP, Harsha KN, Thimmegowda P, Jnanesh AC. Response of finger millet (*Eleusine coracana* L.) to organic and inorganic sources of nutrients under rainfed condition. *J Crop Weed* 2009;5:291-293.
8. Jayaprakash TC, Nagalikal VP, Pujari BT, Setty RA. Effects of organics and inorganics on yield and yield attributes of maize under irrigation. *Karnataka J. Agric. Sci* 2003;16:451-453.
9. Reddy VC, Jayaram Reddy M, Shivandam VN, Yogananda SB, Govindaraju C, Jagadeesh BR, *et al.* Developing package of practices for production of finger millet through compost and bio digester liquid manure. *Ann. Prog. Report, Research Institute on Organic Farming*. Univ. Agric. Sci., Bangalore 2011, pp13-21.
10. Senapati HK, Padhihari HK. Effect of organic, inorganic fertilizers and liming on persistence and degradation of phorate in acid laterite soil of Orissa. *J. Indian Soc. Soil Sci* 2002;50(2):168-171.