Scholarly Research Journal for Interdisciplinary Studies,
Online ISSN 2278-8808, SJIF 2019 = 6.380, www.srjis.com
PEER REVIEWED & REFEREED JOURNAL, MAR-APR, 2020, VOL- 7/58

EFFECT OF ORGANIC AND INORGANIC FERTILIZERS ON YIELD AND QUALITY OF GINGER CV. NADIA

Rajesh Kishor Tripathi, Ph. D.

Associate Professor, Agriculture Chemistry, Narain College Shikohabad

Abstract

In different medicinal and aromatic plants the yield and the yield attributing character and quality parameter enhanced with application of organic manure, bio-fertilizers and inorganic fertilizers in combination. The other detailed literature has been also given in this project. Rudiyatno and Tri muji 2011 also reported similar response over yield and yield attributing characters and quality parameters of ginger. A .shapad et-al 2018 also reported similar response with organic and inorganic fertilizers in combination with bio fertilizers in ginger crop.

Keywords: *Yield, Natural farming, FYM, bio fertilizers*

DISCUSSION AND RESULTS:

Natural farming is self-sustaining but it is difficult to meet our requirement to feed the increasing population. On the other hand, chemical farming yields much but posses the serious problems for soil, environment and human health. Organic farming, ecological farming and biodynamic farming are the components of natural way of farming. In the modern agriculture, major inputs are- fertilizer, insecticide, pesticide and farm operation with heavy machinery developed by the middle of 20th century in Europe and USA.

Green manuring crops are generally leguminous crops helps in accumulation of atmospheric nitrogen and restore nitrogen in soil and also enhance the availability of other nutrients. The nutrients lying beneath the surface soil are also come out on the surface and utilized by the crop. Most of the experiments conducted on different sources of organic manures are with integrated nutrient management in response to medicinal and aromatic plants. **Chandra et al., 2003** on Safed musli (Chlorophytum borivilianum) responded well with sole application of 10-15 t ha^{-1} of FYM with respect to root yield. The macro and micro nutrients uptake by safed musli as well as soil properties also improved due to application of 10-15t FYM.

A field experiment was conducted during summer season at Narayan College of Science and Arts Alampur
Hauz Etawah Uttar Pradesh during 2015-19 in randomized block design. The soil had sandy foam texture with
ph 8, organic carbon 0.45 percent available N, P and S 192 10 and 16 kg/ha, respectively. Application of
Nitrogen and phosphorus @ 30 and 60 kg/ha, respectively through diammonium phosphate was given
uniformly at sowing time. Organic fertilizers given by different sources. The organic fertilizer sources were
green manure, farm yard manure, city and farm waste vermin compost and vermin wash crop residues which
apply @ 10 ton per hectare.
Plant samples were collected at the crop harvest, oven dried, ground and digested in HNO, HCIO, diacid
mixture (4:1) for the nutrients estimation. Total P & S was determined colorimetrically by vanadomolybdo
phosphate yellow colour method (Jackson, 1973), turbidimetrically method (Chesnin and Yien, 1951) and
thiocyanate method (Evans et al. 1962), respectively. Tota ICa was estimated according to Versenate
disodium dihydrogen ethylene diamine tetra acetic acid) titration method (Jackson, 1973). Plant nitrogen
estimated by method (Jackson, 1973) micro-kjeldahl's Other quality constituents like sugar, methionine and
cell content were determined by Johnson et al. (1966), Horn et al. (1946) and Van Soest and Wine (1967),
respectively. Crude protein was worked out by multi plying the total nitrogen content with the factor 6.25. Oil
content by Soxhalet's method Chopra and Kanwar 1986, essential oil (oleresin) AOAC 1975, Curcumin Content
by Sadasivam and manickam 1996.

There were 9 different treatments with control i.e.,

T_1 -> FYM + Azospirilium + NPK (100%)
T_2 -> FYM + Azospirilium + NPK (50%)
T_5 -> FYM + NPK (100%)
T_6 -> FYM + NPK (50%)
T_3 -> Compost + Azospirilium + NPK (100%)
T_4 -> Compost + Azospirilium + NPK (50%)
T_7 -> Compost + NPK (100%)
T_8 -> Compost + NPK (50%)
T_9 -> Control

Effect on yield and yield parameters of ginger

It has been observed from Table 1F that the maximum number of rhizome, girth of finger, length of finger, length of rhizome, breadth of rhizome were found in T5 treatment where compost as a organic matter apply with azospirilium and 100% NPK as inorganic fertilizer. The yield of ginger also found maximum 163.3 gram per rhizome in T5 treatment. The lowest number of rhizome 13.02, girth of finger, length of finger, length of rhizome and breadth og rhizome were found in T4 treatment where FYM apply with 50% NPK over control (T9). The application of FYM with azospirilium and 100% NPK gave more yield in term of Number of rhizome, girth of finger, length of finger, length of rhizome, width of rhizome, and yield per rhizome per gram over FYm treated plot.

Application of compost with Azospirilium and 100% NPK provided better response in all yield and yield parameters over other compost treated plots. Overall application of compost with other bio fertilizers and inorganic fertilizers provided better response then combination of FYM.

Effect on quality parameters of ginger

It has been stated in table 1F about quality parameter, the essential oil percentage oleoresin percentage increased with application of compost + Azospirilium + 100% NPK over all treatments. It was maximum in T5 treatment. The parameter of essential oil percentage and oleoresin percentage were 1.56 and 5.21 percentage respectively.

The lowest percentage of both parameters were in T4 treatment where NPK 50% mixed with FYM over control. Compost combination with bio fertilizers and inorganic fertilizers gave better response over FYM treated plots. The dry recovery of T5 treated plot was more

than other treatment over control it was maximum 23.74 percent over 21.22 percentage in T9 plot.

Similar results as we found in NCSA, Etawah in Alluvial soil also revealed with different researchers in different locations. There may be different causes by which the crop yield, yield parameters and quality attributing characters improved with different fertilization pattern. The improvement of quality may be attributed to the organic imports with inorganic fertilizer due to improved the physiochemical and the biological properties of the soil which enables root activation in better utilization and absorption of plant nutrients required for enhancing the quality of rhizome of ginger similar results also observed by Rana and Korla, 2010, Jana 2006, Dash et-al 2008, with application of bio-fertilizers mixing with inorganic fertilizers in turmeric. The positive response in quality of ginger also reported by Sanwal et-al 2007, with organic fertilizer application Sadanandh et-al 2002, also found increasing trend in Oleoresin content in ginger with the application of organic manure and bio fertilizers. Singh et-al 2007, also found increasing trend in growth, yield and quality of ginger with application of organic manure combine with Nitrogen. In different medicinal and aromatic plants the yield and the yield attributing character and quality parameter enhanced with application of organic manure, bio-fertilizers and inorganic fertilizers in combination. The other detailed literature has been also given in this project. Rudiyatno and Tri muji 2011 also reported similar response over yield and yield attributing characters and quality parameters of ginger. A .shapad et-al 2018 also reported similar response with organic and inorganic fertilizers in combination with bio fertilizers in ginger crop.

Effect of organic and inorganic fertilizers on yield and quality of ginger cv. Nadia

Treatments	Number of rhizome or clump	Girth of fingers (cm)	Length of Finger (cm)	Length of rhizome (cm)	Breadth of rhizome (cm)	Yield / rhizome (gm)	Essential oil (%)	Ole oresin (%)	Dry recovery (%)
T_1- FYM + Azos. + NPK 100%	16.63	2.26	9.51	20.01	10.9	158.26	1.48	5.09	23.76
T_2- FYM + Azos. + NPK 50%	15.19	2.15	8.79	18.24	8.39	118.67	1.42	4.83	22.67
T_5-FYM + NPK (100%)	15.96	2.21	9.17	19.04	9.17	126.13	1.34	4.56	22.6
T_6- FYM + NPK (50%)	13.02	2.06	8.09	15.06	7	73.25	1.27	3.85	21.75
T_3-Compost + Azos. + NPK 100%	17.03	2.32	9.85	20.91	11.56	166.3	1.56	5.21	23.74
T_4-Compost + Azos. + NPK50%	15.37	2.17	8.73	18.31	8.8	113.85	1.45	4.96	22.68
T_7- Compost + NPK (100%)	16.31	2.25	9.47	19.75	9.22	140.7	1.37	4.69	22.66
T_8-Compost + NPK (50%)	13.47	2.09	8.13	15.25	7.19	73.14	1.28	4.06	21.65
T_9-Control	9.55	1.68	7.33	12.59	6.11	54.27	1.19	2.99	21.22
S.E.m.(±)	0.41	0.035	0.21	0.5	0.27	3.1	0.02	0.1	0.45
C.D.(P=0.05)	1.13	0.13	0.6	1.43	0.73	8.8	0.05	0.3	1.29

Reference

Aishwath, O.P., Chandra, R., Kumar, D. and Jha. B.K. (2003). Influence of farmyard manure on yield, nutrient content and uptake by Chlorophytum borivilianum (Safed musli). In: Proceeding of National Seminar on Developments in soil science, from 4-8 Nov. 2003 at C.S.A.U. Agriculture and Technology, Kanpur. pp. 135.

Aishwath, O.P. (2004a). Growth yield and mineral composition of Withania somnifera grown on saline black soil. Indian Journal of Agricultural Chemistry 37: 1- 8.

Aishwath, O.P., 2004b, Mineral Nutrition and growth of Withania somnifera Journal of Tropical Medicinal Plants (Malaysia) 5: 111- 118.

Aishwath, O.P. (2005a). Appraisal of underground water in four consecutive years at NRC MAP, Boriavi (Gujarat) and impact of its irrigations on medicinal and aromatic plants. Ecology, Environment and Conservation 11: 373-380.

Aishwath, O.P. (2005b). Coefficient of variation and correlation coefficient in underground water quality parameters in and adjoining municipal area of Boriavi, Gujarat. Pollution Research 24: 9-17.

Aishwath, O.P., Chandra, R., Kumar, D. and Jha, B.K. (2005). Yield and uptake of macro- nutrients by isabgol (Plantago ovata) with N and P under medium soil fertility. Journal of the Indian Society of Soil Science 53: 410 – 412.

Arumugam, T., Doraipandian, A., Premalakshmi, V. and Vijayakumar, M. (2001). Studies on the effect of biofertilizer on biomass production in senna (Cassia angustifolia Vahl.) Changing scenario in the production systems of horticultural crops. In: Proc. Natal. Sem. held at Coimbatore, Tamil Nadu, India, (28-30 August 2001). South-Indian- Hort., 2001, 49: 178-180.

Chandra, R., Kumar, D., Aishwath, O. P. and Jha, B.K. (2003). Response of Chlorophytum borivilianum to organic manure. Journal of Tropical Medicinal Plants 4: 261-264.

Dahama, A.K. (1996). Organic farming: An overview. In: Organic farming for sustainable agriculture. Agro

Botanical Publishers, India.

Dash, D.K., Mishra, N.C. In addition, Sahoo, B.K. 2008. Influence of nitrogen, Azospirillum sp and farn yard manure on yield, rhizome rot and quality of ginger (Zingiber officinale Rosc.). J. Spices Aromatic Crops, 15:115-117.