RESEARCH ARTICLE

Effect of weed green manure, compost manure and vermicompost on productivity of Spinach

Parbhankar RL and Mogle UP

Department of Botany JES, R. G. Bagdia Arts S. B. Lakhotia Comm. and R. Bezonji Sci. College, Jalna (MS) India
E –mail- rekhajain0312@gmail.com

Manuscript details:

Received: 23.06.2017
Accepted: 12.08.2017
Published : 27.09.2017

Editor:
Dr. Arvind Chavhan

Cite this article as:
Parbhankar RL and Mogle UP (2017) Effect of weed green manure, compost manure and vermicompost on Productivity of Spinach; *International J. of Life Sciences*, 5 (3): 447-450.

ABSTRACT

Organic manures were prepared from common weeds like Tephrosia and Achyranthus. Spinach seeds was sown at the seed rate 30 kg/ha, frequent irrigation was given as per requirement. In a course of time 3 regrowth's were studied after 41, 76 and 111 days of sowing. Productivity of spinach shows maximum amount of yield produced by weed vermicompost, weed compost and green manure as compared to chemical fertilizers and control.

Key words: Weed organic manure, Green Manure, Compost, Spinach productivity.

INTRODUCTION

Weed biomass is one of the easily available source of organic matter and plant nutrients. Economic utilization of this weed biomass for the production of various compost is will open a new horizon. Generally weeds like *Cassia, Crotalaria,* and *Achyranthus* are used as green manures (Chamle, 2007). The function of green manure is to add organic matter to the soil (Kipps, 1970). Many weeds can be used for composting and vermicomposting as nutrient source for many crops. (Naikwade *et al.*, 2011a, Naikwade *et al*., 2011b, Ghadge *et al*., 2013).

MATERIAL AND METHODS

The fresh green leafy vegetation of *Tephrosia* and *Achyranthus* collected from nearby wasteland during the early hours of the day at 10-20 %flowering stage, chopped into small bits (2-3 cm) by the traditional iron cutter. The weed plant material was incorporated into the pots at the rate of 13333 kg/ha about 5-10 cm in the soil as green manure (GM). The same amount of weed vegetation was used for the preparation of compost (CM), and vermicomposting (VM).

Chemical analysis

The leaf chlorophyll content (a,b and total) were estimated following Arnon (1961), using 80% acetone as a solvent for extraction of pigments. Nitrogen (N) content of the samples were estimated by Micro Kjeldahl method (AOAC, 1965).

Statistical Analysis

All the results were statistically analyzed using analysis of variance (ANOVA) test and treatments means were compared using the least significant difference (C. D. p = 0.05) which allowed determination of significance applications (Mungikar, 1997).

Spinach is a short duration vegetable crop, it requires proper and sufficient N and K for regular growth (Premshekhar and Rajshree, 2009). Pot experiment was conducted to evaluate the role of weed manures for improving biochemical content in spinach.

RESULTS AND DISCUSSION

The fresh weight and dry weight of leaves was found higher in VMA in all the three harvest, but was followed by different orders of treatments. During first harvest it was followed by VMT, GMT, and GMA. It was found equal in treatment of COT and COA. It was minimum in FER and control. But during second harvest order was again different, it was followed by treatments COA, GMA, VMT, COT and GMT. During third harvest the highest treatment was followed by VMT, GMA, COA, COT, and GMT. It was minimum in FER and control. (Table 1, 2, 3).

Table-1. Effect of weed manures on spinach. (Age of the plant: 41 DAS).

Treatments	FW (gm.)	%			Kg / ha			
		DW	N	CP	FW	DW	N	CP
GMT	71.30	7.10	1.32	8.25	11572	1152	214	1338
GMA	67.00	6.60	1.42	8.87	10874	1071	230	1439
COT	72.60	7.20	2.12	13.25	11783	1169	344	2150
COA	72.60	7.20	2.40	15.00	11783	1169	390	2434
VMT	78.60	7.80	2.56	16.00	12757	1266	415	2596
VMA	82.30	8.00	2.65	16.56	13406	1298	430	2688
FER	56.60	6.40	1.00	6.25	9168	1039	162	1014
CON	55.00	5.50	0.92	5.75	8927	893	133	933
S. E.					**559**	**46**	**42**	**256**
C.D. (0.05)					**1325**	**109**	**100**	**607**

ABBREVIATIONS:
CON = Control; CFU = Chemical fertilizer urea; GMT = Green manure *Tephrosiaperpurea*; GMA = Green manure *Achyranthesaspera*; COT = Compost *Tephrosiaperpurea;* COA = Compost *Achyranthesaspera; VMT* = Vermicompoost *Tephrosiaperpurea*; VMA = Vermicompost *Achyranthesaspera.* S. E. = Standard error. C. D. = Critical difference

Table-2. Effect of weed manures on spinach. (Age of the plant: 76 DAS).

Treatments	FW (gm.)	%			Kg / ha			
		DW	N	CP	FW	DW	N	CP
GMT	58.30	5.90	2.18	13.62	9462	958	354	2210
GMA	76.60	6.60	2.65	16.56	12432	1071	430	2687
COT	66.60	6.30	3.15	19.68	10809	1022	511	3194
COA	95.00	9.00	3.80	23.75	15419	1461	617	3855
VMT	73.30	7.70	3.90	24.37	11897	1250	633	3955
VMA	110.00	11.00	2.68	16.75	17853	1785	435	2718
FER	42.30	4.40	1.10	6.88	6865	714	179	1117
CON	39.00	4.10	0.84	5.50	6330	666	136	893
S. E.					**1399**	**133**	**67**	**402**
C.D. (0.05)					**3316**	**315**	**159**	**953**

Table-3. Effect of weed manures on spinach. (Age of the plant: 111 DAS).

Treatments	FW (gm.)	%			Kg / ha			
		DW	N	CP	FW	DW	N	CP
GMT	68.00	6.80	3.10	19.31	11036	1103	503	3134
GMA	79.00	8.00	2.66	16.62	12822	1298	432	2697
COT	68.30	7.00	3.16	19.75	11074	1136	512	3205
COA	76.00	7.60	4.66	29.12	12355	1233	756	4726
VMT	90.00	8.70	4.20	26.25	14607	1412	682	4260
VMA	98.30	9.80	3.28	20.50	15954	1591	532	3327
FER	60.00	4.80	1.20	7.50	9738	779	195	1217
CON	47.30	4.70	0.88	5.80	7677	762	143	941
S. E.					**940**	**102**	**75**	**467**
C.D. (0.05)					**2228**	**242**	**178**	**1107**

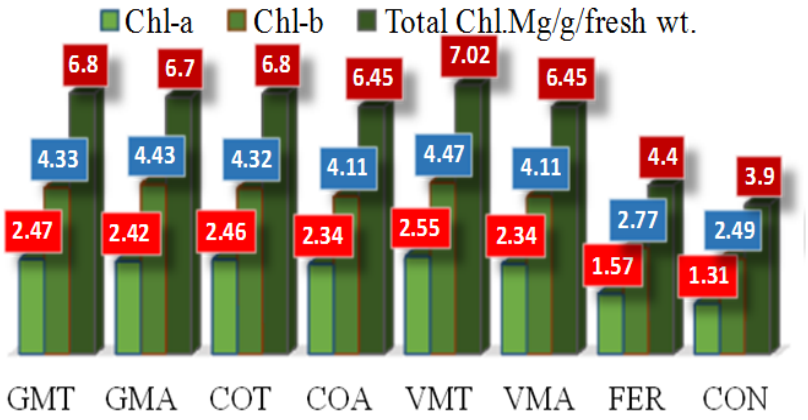

Fig-1.Estimation of chl-a, chl-b and total chl (age of the plant 41 days)

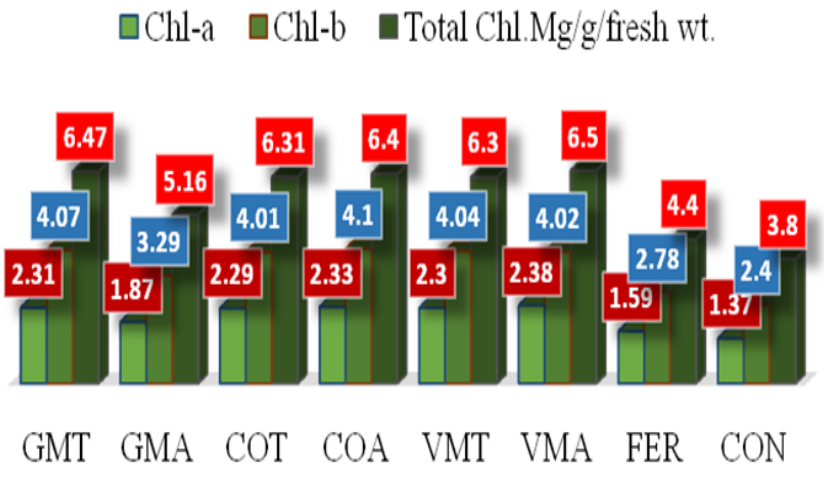

Fig-2. Estimation of chl-a, chl-b and total chl (age of the plant 76 days)

Organic manures are source of macro as well as micronutrient and plant growth promoting molecules, which together lead to good crop yields (Mader *et al*., 2002).

The content of nitrogen and crude protein was found maximum in the treatment of VMA followed in order by VMT, COA, COT, GMA, and GMT. It was minimum in FER and control during period of first harvest. During the period of second harvest nitrogen and crude protein was highest in the treatment of VMT followed in order by COA, GMA, VMT, COT, and GMT. It was found minimum in FER and control. During third harvest it was highest in treatment of COA, followed by VMT, VMA, COT, GMA, and GMT. I t was minimum in FER and control. (Table 1, 2, 3).

On the basis of statistical analysis it has been observed that all the values of fresh weight, dry weight, nitrogen and crude protein was statistically significant in all the treatments. The values of GMT, GMA, COT, COA, VMT, and VMA were statistically significant over the CON, while the values of FER was non-significant over the CON.

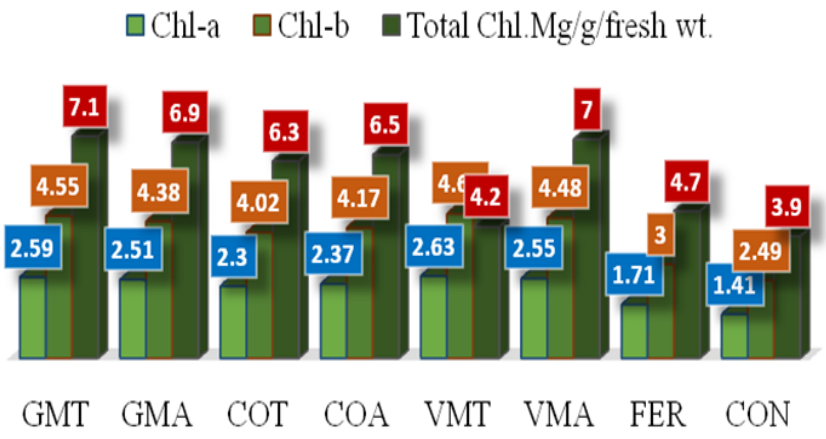

Fig-3. Estimation of chl-a, chl-b and total chl (age of the plant 111 days)

Chlorophyll content

Chlorophyll a, chlorophyll b and total chlorophyll content was ranged from 1.87-2.38, 3.29-4.04, and 5.16-6.5 mg/g. the chlorophyll content was more in VMA and minimum in FER and control during first harvest. It was ranged from 1.57-2.55, 2.77-4.45 and 4.4-7.02 it was maximum in VMT and minimum in control during second harvest. It was ranged from 1.71-2.63, 3-4.62, and 4.7-7.25. It was also maximum in VMT like second harvest and minimum in control during third harvest. (Fig 1, 2, 3).

Use of organic weed manure amplify fresh wt., dry wt., nitrogen, Crude protein and chlorophyll content of vegetables which will be helpful to solve the problem caused by vitamin deficiencies (Mogle, 2013).

CONCLUSION

Green manure, compost manure and vermicompost of *Tephrosia* and *Achyranthus* served as very good manures for the crop but the vermicompost of Achyranthus was best as compared to compost and green manure.

Conflicts of interest: The authors stated that no conflicts of interest.

REFERENCES

Chamle DR (2007) Effect of weed manures and inorganic fertilizers on yield quality of crops. A thesis submitted to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M. S.).

Ghadge SA, Naikwade PV, and Jadhav BB, (2013) Utilization of problematic weeds for improved yield of fenugreek, *Indian Stream research journal*3(4**):** 1-8.

Mungikar AM (1997) *"An Introduction to Biometry"*, Saraswati Printing Press, Auragabad.

Naikwade PV, Mogle UP and Jadhav BB (2011a) Improving total chlorophyll, ascorbic acid and Beta-Carotene in spinach by applying weed manures, *Bioscience discovery***,** 2 (2): 251-255.

Naikwade PV, Mogle UP and Jadhav BB (2011b) Effect of Ipomoea weed manures on quality of fodder crop maize, *Research Journal of agricultural science*, 2(4): 927-930.

Premsekhar M and Rajashree V (2009) Influence of organic manures on growth, yield and quality of Okra. *American-Eurasian Journal of Sustainable Agriculture*, 3(1):6-8.

Arnon (1961) Quoted Frim Yoshida, S., Forno D.A., Forno D.A., Cock J.L and Gomez K.A. 1976. Laboratory Manual for Physiological Studies of Rice. The International Rice Research Institute. Phillippines, 43.

Bailey RL (1967) Techniques in Protein Chemistry. II Edn. Elsevier Publishing Co., Amsterdam.

Kipps, MS (1970) Production of Field Crops. A Text Book of Agronomy, Tata M.C. Graw Hill, and Publishing Company Ltd., Bombay

Masder P, Filebach A, Dubois D, Gunst L, Fried P and Niggli U (2002) Soil Fertility and Biodiversity in Orgnic Farming *Science*, 296:1694-1697.

Mogle UP (2013) Efficacy of weed vermicompost and chemical fertilizer on yield, morpho-physiological and biochemical investigations of Maize, *Int. Res. J. of Sci. and Eng.,* 2(1) I: 19-22