The Pharma Innovation Journal 2022; 11(9): 2749-2751

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(9): 2749-2751

www.thepharmajournal.com
Received: 07-06-2022
Accepted: 13-07-2022

Pankaj Kumar Bagri
Department of Agronomy, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Gwalior, Madhya Pradesh, India

SS Bhadauria
Department of Agronomy, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Gwalior, Madhya Pradesh, India

Vikash Singh
Department of Agronomy, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Gwalior, Madhya Pradesh, India

Rajenrda Patel
Department of Agronomy, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Gwalior, Madhya Pradesh, India

Uma Shankar Bagri
Department of Agronomy, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Gwalior, Madhya Pradesh, India

Corresponding Author:
SS Bhadauria
Department of Agronomy, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Gwalior, Madhya Pradesh, India

Effect of organic sources of nutrients on productivity, nutrient contents and uptake of wheat (*Triticum aestivum* L.)

Pankaj Kumar Bagri, SS Bhadauria, Vikash Singh, Rajenrda Patel and Uma Shankar Bagri

Abstract
A field experiment was conducted during winter seasons of 2020-21 and 2021-22 at the Research Farm, RVSKVV College of Agriculture, Gwalior (M.P.) to study the effect of organic sources of nutrients on productivity, nutrient contents and uptake of wheat. Amongst the organic sources of nutrients, F_{12} (VC 5 t/ha + Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10t/ha) resulted in maximum grain yield (41.82 q/ha) and straw yield (61.70 q/ha). The N, P and K contents in grain and straw were also found in the maximum range. Consequently the total uptake of N, P and K nutrients in grain + straw was 148.78, 24.23 and 125.21 kg/ha, respectively. The second best treatment was Panchagavya 15 lit./ha + VC 5 t/ha + FYM 10 t/ha which recorded total N, P and K uptake 139.77, 21.72 and 120.23 kg/ha, respectively. The third position was attained by Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10 t/ha. The dual and single applied organic treatments recorded lower yield NPK contents, and their uptake per hectare. In control treatment the total NPK uptake was only 88.22, 11.72 and 68.39 kg/ha, respectively.

Keywords: Utilization, nutrients, productivity, wheat organic nutrients

Introduction
The long-term use of chemical fertilizers is known to degrade physico-chemical and biological properties of soil i.e. soil environment and soil health. Therefore organic manures are the only option for improving the quality and sustain the yield of wheat as well as soil health. There exists wide differences between addition and uptake of such fertilizers by the crops. The general tendency is that the total crop removal of nutrients is never replenished. Wheat is a heavy nutrient feeder and leads to large withdrawal of plant nutrients from soil. Consequently, the danger signals have started coming sooner than expected. Many of our highly productive soils have started showing signs of declining productivity. That is why soil health and sustainable productivity of crops are becoming great threat. Therefore serious attention is being paid to add sufficient amount of different organic sources of nutrients. Among these, FYM, vermicompost are the store-house of plant nutrients which are already in use in different crops. Now-a-days, the cheapest organic growth promoters like Jeewamrit and Panchagavya are also being applied in different crops. However due to lack of relevant information for the gird region, the present research was taken up.

Materials and Methods
The field experiment was conducted during *rabi* seasons of 2020-21 and 2021-22 at the Research Farm, RVSKVV College of Agriculture, Gwalior (M.P.). The soil of the experimental field was clay loam having pH 7.3 to 7.4, electrical conductivity 0.32 to 0.37 dS m^{-1}, organic carbon 4.8 to 5.4 g kg^{-1}, available-N 196 to 219 kg ha^{-1}, available-P_2O_5, 16.0 to 18.5 kg ha^{-1} and available-K_2O 254 to 274 kg ha^{-1}. The rainfall received during the winter months was 161.2 and 98.6 mm in both the years. The 12 treatments comprised of F_1= control, F_2= FYM 10 t/ha, F_3 = Jeewamrit 500 lit./ha, F_4= Vermicompost 5 t/ha, F_5= Panchagavya 15 lit./ha, F_6 = Jeewamrit 500 lit./ha + FYM 10 t/ha, F_7= VC 5 t/ha + FYM 10 t/ha, F_8 = Panchagavya 15 lit./ha + FYM 10 t/ha, F_9 = Jeewamrit 500 lit./ha + VC 5 t/ha + FYM 10 t/ha, F_{10} = VC 5 t/ha + Panchagavya 15 lit./ha + FYM 10 t/ha, F_{11}= Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10 t/ha, and F_{12} = VC 5 t/ha + Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10 t/ha.

The experiment was laid out in randomized block design with three replications. Wheat var.HI-1544 was sown between 5th to 12th November in both the years @100 kg seed ha^{-1} in rows 22.5 cm apart. An uniform dose of N_{120} P_{60} K_{40} was applied through urea, single superphosphate and muriate of potash, respectively in all the treatments. Before sowing, the seeds were first treated with thirum fungicide @3 g kg^{-1} seed. Wheat was grown as per recommended package of practices. The crop was harvested on 14th March, 2021 and 24th March, 2022.

Results and Discussion

Productivity

The perusal of data in Table 1 reveal that the treatment T_{12} receiving four types of organics (VC 5 t/ha + Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10t/ha) recorded highest grain yield upto 41.82 q/ha and straw yield 61.70 q/ha. This was followed by the treatments receiving three types of organics (F_{10}, F_9 and F_{11}). The response from combined functions of multi-organics in improving starch and protein contents in grain may be attributed to their significant role in regulating the photosynthesis, root enlargement and better microbial activities and more synthesis of starch and protein as a result of associated metabolism (Singh *et al.*, 2019) [5]. These results are in close conformity with observations made by Yogananda *et al.* (2019) [8], Sutar *et al.* (2018) [6], and Onte *et al.* (2019) [1].

Table 1: Productivity and NPK contents of wheat as influenced by organic sources of nutrients

	Treatments	Seed yield (q/ha)	Straw yield (q/ha)	N-Content (%)		P-Content (%)		K-Content (%)	
				Grain	Straw	Grain	Straw	Grain	Straw
F_1	Control	31.64	50.21	1.86	0.585	0.207	0.103	0.492	1.052
F_2	FYM 10 t/ha	36.72	53.73	2.06	0.654	0.244	0.110	0.519	1.326
F_3	Jeewamrit 500 lit/ha	33.61	52.78	2.10	0.600	0.225	0.105	0.511	1.141
F_4	Vermicompost (VC) 5t/ha	38.06	56.72	2.12	0.674	0.267	0.111	0.535	1.347
F_5	Panchagavya 15 lit./ha	34.83	53.30	2.11	0.646	0.247	0.108	0.529	1.346
F_6	Jeewamrit 500 lit./ha + FYM 10 t/ha	36.69	58.97	2.13	0.670	0.300	0.113	0.547	1.355
F_7	VC 5 t/ha + FYM 10 t/ha	38.86	58.18	2.17	0.755	0.334	0.119	0.559	1.396
F_8	Panchagavya 15 lit./ha + FYM 10 t/ha	37.65	59.43	2.15	0.692	0.274	0.120	0.555	1.387
F_9	Jeewamrit 500 lit./ha + VC 5 t/ha + FYM 10 t/ha	39.04	61.08	2.20	0.791	0.294	0.128	0.566	1.436
F_{10}	VC 5 t/ha + Panchagavya 15 lit./ha + FYM 10 t/ha	39.75	60.13	2.25	0.837	0.336	0.139	0.677	1.552
F_{11}	Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10 t/ha	38.74	61.89	2.23	0.817	0.303	0.131	0.569	1.439
F_{12}	VC 5 t/ha + Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10t/ha	41.82	61.70	2.28	0.866	0.358	0.150	0.685	1.565
S.EM±		0.12	0.14	0.06	0.090	0.005	0.007	0.012	0.050
CD (P=0.05)		0.35	0.40	0.18	NS	0.014	0.019	0.036	0.140

Nutrient contents in grain and straw

The percentage of N, P and K contents were found higher in wheat grain than in straw, whereas K content was found higher in straw than in grain. This may be due to the fact that seeds acted as a sink for photosynthesis, nitrogen and other nutrients. Amongst the applied organic sources of nutrients, F_{12} and then F_{10}, F_9 and F_{11} resulted in significantly higher N, P and K contents over other treatments. This might be due to stimulation of root growth, increased microbial activities and chlorophyll content of leaves. Consequently plants absorbed multi-nutrients proportionately in higher amounts because the pool of available nutrients was already increased in the soil by supplementing three to four types of organic sources of nutrients.

With the increment in the physico-chemical properties of soil and supply of all the essential nutrients to wheat through all the three or four organics, the availability, acquisition, mobilization of influx into the plant tissues of nutrients increased and thus improved growth and yield components could be achieved. The present results agree with those of Singh and Bahir (2010) [4], Pradeep Kumar *et al.* (2010) [2], Singh and Anil Kumar (2015) [3], Tyagi and Singh (2019) [7].

Uptake of nutrients

Application of three to four types of organic sources of nutrients in treatments like F_{12}, F_{10}, F_9 and then F_{11} enhanced the N, P and K uptake by grain and straw significantly. This might be attributed to in accordance with the increased grain and straw yields as well as nutrients contents in grain and straw under these treatments (Table 2). The uptake of N and P was higher in grain than in straw, whereas the K-uptake was higher in straw than in grain. This was due to similar differences in the N, P and K contents in grain and straw. The highly beneficial influence of F_{12}, F_{10}, F_9 and then F_{11} treatments on the plant growth, grain yield and nutrient uptake might be due to its impact on the carbon cycle in plant i.e. higher CO_2 fixation and their efficient translocation towards developing grains The present results corroborate with those of Singh and Bahir (2010) [4], Singh and Anil Kumar (2015) [3] Tyagi and Singh (2019) [7].

Table 2: Nutrients uptake kg/ha of wheat as influenced by organic sources of nutrients

	Treatments	N- Uptake (Kg/ha)			P-Uptake (Kg/ha)			K-Uptake (kg/ha)		
		Grain	Straw	Total	Grain	Straw	Total	Grain	Straw	Total
F_1	Control	58.85	29.37	88.22	6.55	5.17	11.72	15.57	52.82	68.39
F_2	FYM 10 t/ha	75.64	35.14	110.78	8.96	5.90	14.86	19.06	71.25	90.31
F_3	Jeewamrit 500 lit/ha	70.58	31.67	102.25	7.56	5.54	13.10	17.17	60.22	77.39
F_4	Vermicompost (VC) 5t/ha	80.69	38.23	118.92	10.16	6.30	16.46	20.36	76.40	96.76
F_5	Panchagavya 15 lit./ha	73.49	34.43	107.92	8.60	5.76	14.36	18.43	71.74	90.17
F_6	Jeewamrit 500 lit./ha + FYM 10 t/ha	78.15	39.51	117.66	11.01	6.66	17.67	20.07	79.90	99.97
F_7	VC 5 t/ha + FYM 10 t/ha	84.33	43.93	128.26	12.98	6.92	19.9	21.72	81.22	102.94
F_8	Panchagavya 15 lit./ha + FYM 10 t/ha	80.95	41.13	122.08	10.32	7.13	17.45	20.90	82.43	103.33
F_9	Jeewamrit 500 lit./ha + VC 5 t/ha + FYM 10 t/ha	85.89	48.31	134.20	11.48	7.82	19.30	22.10	87.71	109.81
F_{10}	VC 5 t/ha + Panchagavya 15 lit./ha + FYM 10 t/ha	89.44	50.33	139.77	13.36	8.36	21.72	26.91	93.32	120.23
F_{11}	Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10 t/ha	86.39	50.56	136.95	11.74	8.11	19.85	22.04	89.06	111.10
F_{12}	VC 5 t/ha + Jeewamrit 500 lit./ha + Panchagavya 15 lit./ha + FYM 10t/ha	95.35	53.43	148.78	14.97	9.26	24.23	28.65	96.56	125.21
S.EM±		1.32	0.69	2.01	0.09	0.10	0.19	0.11	1.38	1.49
CD (P=0.05)		3.82	2.00	5.82	0.25	0.29	0.54	0.31	3.98	4.29

References

1. Onte S, Singh M, Kumar S, Pyati PS. Impact of organic nutrient management on crop quality, yield and soil health. International Journal of Current Microbiology and Applied Sciences. 2019;8(5):394-402.
2. Pradeep Kumar, Singh Archana, Singh AK. Effect of bio fertilizers, farmyard manure and nitrogen levels on growth, yield and uptake of nutrients in wheat. Annals of Plant and Soil Research. 2010;12(2):92-94.
3. Singh D, Anil Kumar. Effect of inorganic and organic sources of nutrients on yield and nutrient uptake by wheat and soil fertility. Annals of Plant and Soil Research. 2015;17(2):146-149.
4. Singh, Harendra, Ahmad, Bahir. Effect of integrated use of vermicompost, *Azotobacter* and inorganic fertilizers on yield and nutrients uptake by wheat. Annals of Plant and Soil Research. 2010;12(2):89-91.
5. Singh M, Kumar S, Prasanna SP. Impact of Organic Nutrient Management on Crop Quality, Yield and Soil Health: a Review Santosh Onte. International Journal of Current Microbiology and Applied Sciences. 2019;8(5):394-402.
6. Sutar R, Sujith GM, Devakumar N. Growth and yield of Cowpea (*Vigna unguiculata* L.) as influenced by jeevamrutha and panchagavya application. Legume Research. 2018, 3932.
7. Tyagi PK, Singh VK. Effect of integrated nutrient management of growth, yield and nutrients uptake of summer blackgram (*Vigna mungo*) Annals of Plant and Soil Research. 2019;21(1):30-35
8. Yogananda SB, Thimmegowda P, Shruthi GK. Performance of cowpea (*Vigna unguiculata* L.) under organic production system in southern dry zone of Karnataka. Legume Research, 2019, 4175.