



# International Journal of Research in Agronomy

E-ISSN: 2618-0618

P-ISSN: 2618-060X

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2024; 7(2): 501-503

Received: 18-12-2023

Accepted: 22-01-2024

**Sandip D Kanzariya**

M.Sc (Agri) Organic Farming,  
Gujarat Natural Farming and  
Organic Agricultural University,  
Borsad Chokdi, Camp - Anand,  
Gujarat, India

**J S Patel**

Associate Professor, Department of  
Horticulture, B.A. College of  
Agriculture, A.A.U., Anand,  
Gujarat, India

**Corresponding Author:**

**Sandip D Kanzariya**

M.Sc (Agri) Organic Farming,  
Gujarat Natural Farming and  
Organic Agricultural University,  
Borsad Chokdi, Camp - Anand,  
Gujarat, India

## Impact of organic nutrients on yield and quality of cluster bean [*Cyamopsis tetragonoloba* (L.) Taub.]

**Sandip D Kanzariya and J S Patel**

DOI: <https://doi.org/10.33545/2618060X.2024.v7.i2g.347>

### Abstract

The present experiment was carried out at Horticultural Research Farm, Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, Anand during the year *kharif*-2021. The experiment was laid out in Randomized Complete Block Design having ten treatments *viz.*, T<sub>1</sub>: Vermiwash 5%, T<sub>2</sub>: Vermiwash 7.5%, T<sub>3</sub>: Vermiwash 10%, T<sub>4</sub>: Novel Plus 1.0%, T<sub>5</sub>: Novel Plus 1.5%, T<sub>6</sub>: Novel Plus 2.0%, T<sub>7</sub>: Seaweed extract 0.5%, T<sub>8</sub>: Seaweed extract 1%, T<sub>9</sub>: Seaweed extract 1.5% and T<sub>10</sub>: Control. The treatments were replicated thrice. The findings revealed that application of novel plus 2.0% were recorded significantly higher yield parameters in terms of number of clusters per plant (16.43), pod length (11.48 cm) and green pod yield (8.56 kg/net plot and 15.85 t/ha). Maximum protein content (8.54%) was recorded under novel plus 2.0%. Based on the results of the experiment it can be concluded that the foliar application of novel plus at 2.0% was found beneficial for yield and quality parameters of cluster bean.

**Keywords:** Cluster bean, organic nutrients, vermiwash, novel plus, seaweed extract

### Introduction

Cluster bean [*Cyamopsis tetragonoloba* (L.) Taub.] belongs to *Fabaceae* family and popularly known as *guar* which is an important legume vegetable crop grown during *kharif* as well as *summer* season. Cluster bean is grown for its young tender green immature pods as a vegetable purpose. It can be grown on almost all types of soil. It is a very hardy crop and withstands very high temperatures and severe drought conditions as well as capable of growing under scanty rainfall, poor fertility and semi-arid tracks of India. Rajasthan is the leading state in India in the production followed by Gujarat, Haryana and Punjab. In India, it is cultivated in an area of 103.53 lakh ha with production of 1917.69 lakh MT and productivity of 18.52 MT/ha. While, in Gujarat state, vegetables are cultivated in an area of 6.54 lakh ha with total production of 132.30 lakh MT with productivity of 20.23 t/ha. (Anonymous, 2019-20) <sup>[1]</sup>.

Vermiwash is a liquid extract made from organic waste that is gathered after water has been filtered through the various earthworm culture units' layers. Vermiwash is a key enzymatic and nutritional liquid that is used to stimulate the growth of all green plants (Nath *et al.*, 2009) <sup>[7]</sup>. Earthworm plays a vital role in converting organic wastes to useful vermicompost. Enzymes including phosphatase, amylase, and protease are included in this liquid fertiliser and are beneficial to the plant's growth and development, plant resistance to stresses and increasing yield. It also contains amino acids, phenols and sugars along with plant growth promoting hormones such as humic acid and indole acetic acid.

Novel Plus is an enriched sap of banana pseudo stem which contains essential macro and micro plant nutrients and naturally occurring plant growth enhancers like NAA, GA<sub>3</sub> and cytokinin. It is a patented product of NAIP project, Navsari Agricultural University, Navsari, Gujarat. The macronutrient composition of the banana pseudo stem samples was found to be between 50-100, 100-200, and 5.0-2.8 ppm of Fe, Mn, and Zn, respectively. The micronutrient content was found to be between 2.25-3.95% K, 0.70-1.5% N, 0.11-0.20% P, and 0.05-0.11% S. (Patil and Kolambe, 2013) <sup>[10]</sup>.

Seaweeds are used as manure, cattle feed, food for consumption and as a source of phycocolloids such as alginic acid, agar and carrageenan.

Liquid extracts from seaweeds, in addition to being applied with farm yard manure (FYM), have recently gained importance for foliar spraying on a number of crops due to their inclusion of trace elements (Fe, Cu, Zn, Co, Mn, and Ni), vitamins, amino acids, and growth-promoting hormones (IAA and IBA) (Sivasankari, 2006) [17].

Since the farmers make these liquid organic manures on their own farm, they are inexpensive and simple to apply. In addition to increasing production, these liquid manures also enhance food quality and post-harvest shelf life while preserving soil health and sustainability over time (Gajjela *et al.*, 2018) [3]. The application of organic manures also beneficial from the aspect of inhibiting physiological disorders during storage (Solaiman, 2015) [18].

## Materials and Methods

A field experiment was conducted during *Kharif* season 2021-22 at Horticulture Research Farm, Department of Horticulture, B. A. College of Agriculture, A.A.U., Anand. The experiment was laid out in a randomized complete block design (RBD) with ten treatments like T<sub>1</sub> - Vermiwash 5% (50 ml/lit), T<sub>2</sub> - Vermiwash 7.5% (75 ml/lit), T<sub>3</sub> - Vermiwash 10% (100 ml/lit), T<sub>4</sub> - Novel Plus 1% (10 ml/lit), T<sub>5</sub> - Novel Plus 1.5% (15 ml/lit), T<sub>6</sub> - Novel Plus 2% (20 ml/lit), T<sub>7</sub> - Seaweed extract 0.5% (5 ml/lit), T<sub>8</sub> - Seaweed extract 1% (10 ml/lit), T<sub>9</sub> - Seaweed extract 1.5% (15 ml/lit) and T<sub>10</sub> - Control. The climate of Anand region is sub-tropical climate. Winter is mild cool and dry, summer is hot and dry and monsoon is warm and moderately humid. The soil of the experimental site was sandy loam, locally known as "Goradu". The soils are alluvial by their nature of origin, very deep, well drained and fairly moisture retentive. Soils respond well to manures and irrigations. Pusa Navbahar, a variety of cluster bean was selected for the experiment which is developed by IARI, New Delhi. The 2-3 seeds of cluster bean cv. Pusa Navbahar were dibbled manually with the help of *khurpi* on 25<sup>th</sup> August, 2021. The seeds were planted at a distance of 45 × 15 cm<sup>2</sup> between the row to row and plant to plant, respectively. Before planting, the seeds were soaked in water for 3 hrs for better germination. Vermicompost @ 2 t/ha with NPK consortia @ 1 l/ha were given as common basal dose for the experiment. They were incorporated in the soil at the time of preparation of plots to all the treatments. Intercultural operations were done as and when necessary. Five randomly selected plants are taken from each plot for observations at the time of different stages. Data were collected on different yield and quality parameters of cluster bean. In case of quality parameters protein content of cluster bean pods were estimated as per the procedure outlined

by Johan Kjeldahl (Piper, 1966) [11]. Total nitrogen in the samples estimated by conventional Micro Kjeldahl's method. The percentage of protein in the immature pod was calculated by multiplying total nitrogen by factor 6.25 (Scheffelen *et al.*, 1961) [13]. The data obtained from experiment was statistically analysed by appropriate procedure to randomized complete block design.

## Results and Discussion

### Yield Parameters

The data given in Table 1 revealed that significantly higher number of clusters per plant (16.43), maximum length of green pod (11.48 cm) and green pod yield (8.56 kg per net plot and 15.85 t/ha) was obtained with treatment T<sub>6</sub> (Novel Plus 2%). The higher number of clusters per plant can be due to novel plus organic nutrient that are rich in macro and micro nutrients that improve photosynthetic activities resulting in an increase in the generation and distribution of carbohydrates and photosynthates (Kalariya *et al.*, 2018) [4]. More photosynthates were naturally created by the larger leaf area and the transit of these photosynthates from source to sink may have contributed to the rise in the number of clusters per plant. These results are in close conformity with the findings Champaneri (2021) [2] in Indian bean and Manani (2019) [5] in cluster bean, respectively. The increase in length of green pod may be due to presence of gibberellic acid in novel plus, which may speed up the cell elongation process that is responsible for the reported results (Naik, 2006) [6]. The higher concentration of macro and micro nutrients as well as growth promoting agents contained in novel plus may cause the storage of more carbohydrates, which is another possible explanation for the improved pod characteristics (Kalariya *et al.*, 2018) [4]. Similar type of results reported by Champaneri (2021) [2] in Indian bean and Patel *et al.* (2017) [8] in green gram. The components that recorded the greatest values in this treatment like clusters per plant and pod length are strongly related to the increase in production. This impact may also be attributed to the nutrients' simple digestion and the balance of NPK ratio, which boost crop yield. Water soluble nutrients are used to speed up nutrient intake, resulting in increased photosynthesis and food build up in edible sections (Singhal *et al.*, 2015) [15]. This accumulation of food in edible part *i.e.*, pods lead to increase number of clusters per plant, ultimately leads to increase pod yield. These results are in close conformity with the findings of Champaneri (2021) [2] in Indian bean, Shah (2019) in sweet potato, Patel *et al.* (2018) [9] in cabbage, Patil and Kolambe (2013) [10] in garlic and Salunkhe *et al.* (2013) [12] in onion.

**Table 1:** Impact of organic nutrients on yield and quality of cluster bean

Tr. No.	Treatments	No. of clusters/plant	Length of green pod (cm)	Green pod yield		Protein content (%)
				kg/net plot	t/ha	
T <sub>1</sub>	Vermiwash 5% (50 ml/lit)	15.40	10.99	7.63	14.13	6.24
T <sub>2</sub>	Vermiwash 7.5% (75 ml/lit)	15.53	11.13	7.83	14.51	8.10
T <sub>3</sub>	Vermiwash 10% (100 ml/lit)	16.03	11.10	7.96	14.74	7.33
T <sub>4</sub>	Novel Plus 1% (10 ml/lit)	15.90	11.11	7.84	14.53	7.55
T <sub>5</sub>	Novel Plus 1.5% (15 ml/lit)	16.13	11.17	8.21	15.21	6.46
T <sub>6</sub>	Novel Plus 2% (20 ml/lit)	16.43	11.48	8.56	15.85	8.54
T <sub>7</sub>	Seaweed extract 0.5% (5 ml/lit)	15.10	10.51	7.14	13.22	6.89
T <sub>8</sub>	Seaweed extract 1% (10 ml/lit)	14.83	10.19	7.11	13.16	6.46
T <sub>9</sub>	Seaweed extract 1.5% (15 ml/lit)	14.47	10.47	6.72	12.44	7.44
T <sub>10</sub>	No spray (Control)	13.10	10.15	6.02	11.15	6.02
	S.E.M. ±	0.42	0.29	0.46	0.85	0.19
	CD (e=0.05)	1.24	0.86	1.37	2.53	0.57
	C.V.%	4.73	4.61	10.63	10.63	4.67

### Quality Parameters

Among the different treatments T<sub>6</sub> (Novel Plus 2%) recorded significantly highest protein content (8.54%). According to Singhal *et al.* (2016) [16], the application of novel plus organic liquid nutrients significantly increased protein content due to higher nitrogen uptake during the growth phase as well as the availability of macro elements and hormones in novel plus which improved photosynthetic activity, carbohydrate transformation of enzymes and protoplasm synthesis.

### Conclusion

Based on the findings of the investigation, it can be concluded that the spraying of Novel Plus 2% (T<sub>6</sub>) in 3 frequencies at 15, 30 and 45 DAS influenced yield parameters such as number of clusters per plant, average length of green pod and yield of green pod (kg/net plot and t/ha) as well as quality parameter like protein content of green pod.

### References

1. Anonymous. NHB Horticulture data base [Internet]. 2019-20 [Cited 2024 Feb 23]. Available from: [www.nhb.org.in](http://www.nhb.org.in). p. 1-2.
2. Champaneri DD, Patel NK, Desai CS, Desai DH. Efficacy of Novel organic liquid nutrient and Novel Plus organic liquid nutrient on quantitative traits of Indian bean [*Lablab purpureus* (L.) Sweet]. *Int J Plant Soil Sci.* 2021;33(17):105-115.
3. Gajjela S, Chatterjee R, Subba S, Sen A. Prospect of liquid organic manure on organic bitter gourd cultivation. *J Pharmacogn Phytochem.* 2018;7(6):189-193.
4. Kalariya VD, Bhandari DR, Patel NK, Vaghasiya JM. Effect of foliar application of micronutrients, novel organic liquid fertilizer and sea weed extract on yield of okra [*Abelmoschus esculentus* L. (Moench)]. *Int J Chem Stud.* 2018;6(3):1834-1836.
5. Manani NP. Integrated nutrient management in cluster bean [*Cyamopsis tetragonoloba* (L.) Taub.]. M. Sc. (Horti.) Thesis, Navsari Agricultural University, Navsari, India. 2019.
6. Naik VM. Effect of triacontanol, NAA and GA<sub>3</sub> on growth and yield of Indian bean (*Lablab purpureus* L.) cv. Navsari Papadi Selection 1. M. Sc. (Agri.) Thesis, Navsari Agricultural University, Navsari, Gujarat, India; c2006.
7. Nath G, Singh K, Singh DK. Chemical analysis of vermicomposts/vermiwash of different combinations of animal, agro and kitchen wastes. *Aust J Basic Appl Sci.* 2009;3(4):3672-3676.
8. Patel HB, Shah KA, Barvalya MM, Patel SA. Response of green gram (*Vigna radiata* L.) to different level of phosphorus & organic liquid fertilizer. *Int J Curr Microbiol Appl Sci.* 2017;6(10):3443-3451.
9. Patel SJ, Desai LJ, Keraliya SJ, Patel CK. Cabbage (*Brassica oleracea* var. *capitata* L.) Yield, nutrients uptake and soil available nutrients as influenced by nitrogen and foliar nutrients application under South Gujarat condition. *Int J Pure Appl Biosci.* 2018;6:1222-1225.
10. Patil TD, Kolambe BN. Effect of rates of castor cake and banana pseudostem sap on the nutrient concentration, uptake and yield of organic garlic (*Allium sativum* L.) (cv. GG-2). *Asian J Soil Sci.* 2013;8(2):264-269.
11. Piper CS. Soil and Plant Analysis. Hans Publisher, Bombay; c1996. p. 133-136.
12. Salunkhe JR, Patel AM, Patil RG, Pisal RR. Effect of banana pseudostem sap as liquid fertilizer in onion. *Indian J Agric Res.* 2013;47(3):258-262.
13. Scheffelen AC, Muller A, Vanschouenburg. Quick test for soil and plant analysis used by small laboratories. *Neth J Agric Sci.* 1961;9:2-16.
14. Shah SB. Response of sweet potato (*Ipomoea batatas* L. Lam) to fertilizer levels and novel organic liquid nutrient. Horticulture, submitted to Navsari Agricultural University, Navsari; c2019. p. 87-92.
15. Singhal VK, Patel GG, Patel DH, Kumar U, Saini LK. Experiment on effect of foliar application of water soluble fertilizers on growth, yield and economics of vegetable cowpea production. *The Ecoscan.* 2015;7:79-83.
16. Singhal V, Patel GG, Patel DH, Saras P, Singh G. Evaluation of the efficacy of foliar application of water-soluble fertilizers in okra. *Int J Environ Sci Technol.* 2016;7:59-64.
17. Sivasankari S, Venkatesalu V, Anantharaj M, Chandrasekaran M. Effect of seaweed extracts on the growth and biochemical constituents of *Vigna sinensis*. *Bioresour Technol.* 2006;97(14):1745-1751.
18. Solaiman AHM, Nishizawa T, Roy TS. Efficacy of organic manures on the productivity, shelf-life and economic efficiency of tomato varieties in a long-term fertilized field by chemical fertilizers. *J Exp Agric Int.* 2015;181-188.