

Organic Liquid: A Source of Nutrients for Vegetable Crops Production

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ARTICLE ID: 55

Abstract

Organic liquid fertilizers are formed by easy fermentation processes using organic wastes as carbon substrates. Liquid organic fertilizers consist of essential plant nutrients and beneficial microorganisms, which recycle organic matter. *Panchagavya* contains growth regulatory substances such as IAA, GA₃, Cytokinin, essential plant nutrients, effective microorganisms like lactic acid bacterium, yeast and actinomycetes. *Jivamrith* is an important organic liquid formulation which provides a congenial environment to microorganisms upon its application to soil or spray which helps in making essential nutrients more available for growth and development of vegetable crops. Verminwash contains sugars, amino acids and phenols along with plant growth promoting hormones such as Indole acetic acid and humic acid. Sea weed extract have been reported to stimulate the growth in both prokaryotic organism as well as higher plants and yield of the plants, develop tolerance to environmental stresses, increase nutrient uptake from soil and enhance antioxidant properties

Keywords: Vegetable crops, Organic liquid nutrients, *Panchgavya*, *Jivamrith*, Sea weed extract, Vermiwash.

Introduction

Vegetable is an indispensable part of the nation's agricultural system having both food value and export earnings. Vegetables are lavish source of essential vitamins, minerals, dietary fibers with good amount of carbohydrates and proteins. The composition of vegetables has both the nutritional and therapeutic virtue due to its antioxidant properties (Singh and Kalloo, 2000). As many as 61 annual and 4 perennial vegetable crops belonging to different groups are commercially cultivated in India.

Liquid organic fertilizers produced from agricultural residues and industrial wastes are becoming increasingly popular. These fertilizers are formed by easy fermentation

processes using organic wastes as carbon substrates. Liquid organic fertilizers consist of essential plant nutrients and beneficial microorganisms, which recycle organic matter. Microorganisms have an important role on the degradation of substrates in the fermentation process. At the end of the fermentation process, phytohormones such as auxin and cytokinin, organic acids and plant growth promoters are present in the liquid organic fertilizers.

Types of Organic Liquids

1. Panchgavya

Panchagavya is one of the *vedic* formulations of the five products of cow *viz.*, cow dung, milk, urine, curd and ghee which is used as a foliar application to boost the yield of crop plants and to restrict the incidence of common diseases. This traditional *panchagavya* formulation is now being used by some farmers in organic farming with some modifications. This *panchagavya* found to enhance the biological efficiency of the crop plants and the quality of vegetables. *Panchagavya* contains growth regulatory substances such as IAA, GA3, Cytokinin, essential plant nutrients, effective microorganisms like lactic acid bacterium, yeast and actinomycetes. It also contains biofertilizers like *Acetobacter*, *Azospirillum* and *Phosphobacterium* as well as plant protection substances (Selvaraj *et al.*, 2007).

2. Jivamruth

Jivamruth is produced from available farm wastes like cattle dung and urine along with other ingredients like jaggery, pulse flour and water. It is an important organic liquid formulation which provides a congenial environment to microorganisms upon its application to soil or spray which helps in making essential nutrients more available for growth and development of vegetable crops (Palekar, 2006).

3. Vermiwash (VW)

Vermiwash collected from vermibed after the passage of water through a column of worm activation path. It is a collection of excretory and secretory products of earthworm along with other micronutrients. Vermiwash is a liquid fertilizer used in organic agriculture both as replacement and supplement for solids and for their unique capacity to provide nutrients effectively and quickly. This liquid fertilizer contains enzymes such as protease, amylase and phosphatase, which are useful for the growth and development of the plant, increasing yield and plant resistance to stresses. It also contains sugars, amino acids and phenols along with plant

growth promoting hormones such as Indole acetic acid and humic acid. Vermiwash also possesses an inherent property of acting not only as a fertilizer but also as a mild biocide. Microbial studies in vermiwash showed nitrogen stabilizing bacteria such as *Azotobacter*, *Agrobacterium* and *Rhizobium* as well as phosphate solubilizing bacteria (Karuna, 1999).

4. Novel organic liquid nutrients

Novel organic liquid nutrients are an enriched sap of banana pseudo-stem. It is developed and patented by Navsari Agricultural University under NAIP project in the year of 2012. It is rich source of Nitrogen, Phosphorus, Pottasium, Sulphur, Calcium, Magnesium, Iron, Manganize, Zinc, Copper, soluble sugars, phenols, amino acids and plant growth regulators like cytokinin and gibberellic acid (Desai *et al.*, 2016).

5. Sea weed extract

The marine algae and sea grasses are the two-chief group of plants occurring in the marine environment, grouped under one head namely sea weeds. Sea weed extracts have been marketed for several years as fertilizers additives and beneficial results from their use have been reported. Sea weed have been used as manure, cattle feed, food for human consumption and as a source of phycocolloids such as agar, alginic acid and carrageenan. (Rathore *et al.*, 2009).

Effect of organic liquids on vegetable crops

Parmar *et al.* (2020) reported that foliar application of 3 % *panchagavya* at 25 days after transplanting gave maximum plant height, number of branches and early flowering in tomato. Reshma *et al.* (2019) laid out an experiment on cowpea and they observed that treatment *jivamruth* @ 1000 l ha⁻¹ gave superior results in all growth yield and quality parameters. Maheswari *et al.* (2016) found that 10:3% vermiwash and *panchagavya* showed maximum growth, yield and quality parameters of indian bean. Singhal *et al.* (2016) cited that maximum number of pods plant⁻¹, pods yield and protein content with banana pseudo stem enriched sap @ 1% in vegetable cow pea. Thirumaran *et al.* (2009) found that 20% concentration of seaweed liquid fertilizer (SLF) recorded maximum seed germination, shoot length, root length, number of lateral roots, number of leaves, number of pods, length of pod, weight of pod and total chlorophyll content by conducting an experiment on cluster bean.

Conclusions

Now a day heavy use of chemical fertilizers reduce the productivity of soil, on other organic liquid are organic in nature which improve the soil productivity without any hazardous effect on human health. It helps to full fill the all nutrient requirement of vegetable crops for growth as well as development and improve the growth yield and quality of crops. *Panchgavya*, *jivaamrit*, *bijaamrit* and *amrutpani* like organic liquid are easily prepare at home from the cow by product which are cheap in nature and thus help in reduce cost of cultivation of vegetable crops. It also helps to improve biological, physical and physiological properties of soil.

References

- Desai, C. S.; Patel, J. M.; Pawar, S. L.; Usadadia, V. P.; Naik, V. R. and Savani, N. G. (2016). “*Value Added Products from Banana Pseudostem*”. Research Scientist, Soil and Water Management Research Unit, Navsari Agricultural University, Navsari. pp. 55-56.
- Ghodpage, R. M.; Balpande, S. S.; Herale, M. A. and Modhumita, G. (2009). Effect of *amrutpani* and bio fertilizer with fertilizer Vermicompost in soil micro biotic and yield of rainfed cotton. *J. Soil and Crops*, 19(2): 343-346.
- Karuna, K. (1999). Stimulatory effect of earthworm body fluid vermiwash on crinkle red variety of *Anthurium andreanum* L. *Crop Res.*, 17: 253-257.
- Maheswari, V. N.; Shikumaran, M. P.; Rekha, G. S.; Elumalai, D. and Kaleena, P. K. (2016). Growth promoting effect of vermiwash and *panchagavya* on *Dolichos lablab* under field experiment conditions. *Int. J. Appl. Sci. Biotechnol.*, 4(4): 513-518.
- Palekar, S. (2006). *Panchgavya- a manual*. Moth Ind. Press, Mapusa, Goa, India. pp. 33.
- Parmar, M. N.; Patel, S. Y. and Pandey, A. K. (2020). Effect of organic spray on growth parameters of tomato cv. GT 2 under south Gujarat condition. *Int. J. Creative Res. Thoughts*, 8(5): 2320-2882.
- Rathore, S. S.; Chaudhary, D. R.; Boricha, G. N.; Ghosh, A; Bhatt, B. P.; Zodape, S. T. and Patolia, J. S. (2009). Effect of seaweed extract on the growth, yield and nutrient uptake of soybean under rainfed conditions. *South African J. Botany*, 75(2): 351-355.
- Reshma Sutar; Sujith, G. M. and Devakumar, N. (2019). Growth and yield of cowpea as influenced by *jivamruth* and *panchagavya* application. *Legume Res.*, 42(6): 824-828.



- Selvaraj, J.; Ramaraj, B.; Devarajan, K.; Seenivasan, N.; Senthilkumar, S. and Sakthi, E. (2007). Effect of organic farming on growth and yield of thyme. *In: Articles and Abstracts of Nation. Sem. Prod. Utiliz. Med. Pl.*, Annamalai University, Tamil Nadu, pp. 63.
- Singh, K. P. and Kalloo, G. (2000). Nutrient management in vegetable crops. *Fertil. News*, **45**(4): 77-81.
- Singhal, V.; Patel, G. G.; Bambhaneeya, S.; Patel, D. H. and Saras, P. (2016). Effect of foliar application of water soluble fertilizer in okra. *Res. Env. Life Sci.*, **9**(3): 297-299.
- Thirumaran, G.; Arumugam, M.; Arumugam, R. and Anantharaman, P. (2009). Effect of seaweed liquid fertilizer on growth and pigment concentration of cluster bean. *American-Eurasian J. Agron.*, **2**(2): 50-56.

