Folk Liquid Manures for Sustainable Horticulture

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Abstract

Folk liquid mannures are potent source for macro and micro nutrients, plant growth promoting factors and immunity enhancer. These possess pesticide and fungicidal properties. However, efficacy of these manures is influenced by inputs used and method of preparation. These can be used for seed or seedling treatment, enhancing decomposition, improving soil fertility and productivity. These are fertigation compatible through drip irrigation systems. In Sanskrit, Panchagavya means a combination of five products obtained from cow. When suitably mixed and used, these have miraculous effects. Panchagavya is used in different forms such as foliar spray, soil application along with irrigation water, seed or seedling treatment etc. For foliar spray 3% concentration is being used by organic farmers. Panchagavya was an important one that enhanced the biological efficiency of crop and the quality of fruits and vegetables production. It also increases the soil fertility. Sanjibani is a preparation having cow dung and cow urine. It helps to improve soil fertility and enhance crop productivity and quality of product and also working as a pest-repellent. This paper reviews the preparation, uses and benefits of such formulation in detail.

Keywords: Micro nutrients, plants growth,

1. Introduction

The greatest challenge facing by the nation in the coming years is to provide safe food for the growing population in the country. In this regard, organic farming which is a holistic production management system for promoting and enhancing health of agro-ecosystem, has gained wide recognition as a valid alternative to conventional food products and ensures safe food for human consumption . This farming system avoids largely use of synthetic fertilizers, pesticides, growth regulators and livestock feed additives and relies on green manures, crop rotations, crop residues, animals manures, biofertilizers, bio or botanical pesticides, different kinds of cow based liquid organic manure such as *Panchagavya*, *Sanjibani*, *Jeevamrut*, *amritpani* etc. (Devakumar et al., 2008). In Sanskrit, *Panchagavya* means a combination of five products obtained from cow. When suitably mixed and used, these have miraculous effects. *Panchagavya* is used in different forms such as foliar spray, soil application along with irrigation water, seed or seedling treatment etc. For foliar spray 3% concentration is being used by organic farmers. *Panchagavya* was an important one that enhanced the biological efficiency of crop and the quality of fruits and vegetables production. It also increases the soil fertility. *Sanjibani* is a preparation having cow dung and cow urine. It helps to improve soil fertility and enhance crop productivity and quality of product and also working as a pest-repellent. It is very much essential to develop a strong workable and compatible package of nutrient management through organic resources for various crops based on scientific facts, local conditions and economic viability. Liquid manures are rich source of microbial consortia, macro, micronutrients and plant growth promoting substances including immunity enhancers. In general these are utilized to treat seeds or seedlings, enhance decomposition of organic materials thereby enrich soil and induce better plant vigour (Palekar, 2008).

2. Why Use Liquid Manure?

- To protect crops
- To prevent pests and diseases
- To avoid using harmful, manufactured chemicals
- To provide nutrients
- To provide irrigation

3. Characteristics of Liquid Manures

- Potent source for macro and micro nutrients
- Presence of Plant Growth Promoting factors

• Immunity enhancer

• Pesticide & fungicidal property

• Efficacy is influenced by inputs used and method of preparation

• Used for seed or seedling treatment, enhancing decomposition, improving soil fertility and productivity

• An effective and potent tool for fertigation

4. Methodology to Prepare Different Type of Liquid Manures and Its Application to Horticultural Crops

4.1. Jeevamrut

Jeevamrut is another local preparation which has been found very effective as it is rich in microorganisms. It is prepared with the following ingredients:

Cow dung -10 kg ,

Cow urine -10 litres,

Jaggery (old) -2 kg

Flour of gram, pigeon pea moong, cowpea or urad - 2 kg,

Live soil - 1 kg ,

Water - 200 litres.

In an earthen pot or plastic drum, mix 10 kg cow dung and 10 litres of cow urine well with the help of a wooden stick. Add 2 kg jaggery and 2 kg flour. Again, mix well. Keep this solution to ferment for 2 to 7 days. Shake the solution regularly three times a day. This stock solution can be diluted 5–7 times with water and used for seed or seedling treatment or incorporated in the field with irrigation water.

4.2. Beejamrut

Beejamrut is a local preparation to treat seeds for better germination, enhance growth and give higher yields. It is prepared with the following ingredients:

Cow dung -5 kg ,

Cow urine - 5 litres,

Cow milk - 1 litre,

Lime -250 gm,

Water -100 litres.

Mix all the ingredients and keep overnight. Sprinkle this solution on seeds to be sown. Dry in the shade before sowing.

4.3. Amrutpani

Amrutpani is a special bio-inoculant prepared from cow dung, cow *ghee* and honey. Mix 10 kg cow dung with 250 gm cow *ghee* and stir thoroughly to form a creamy paste. Add 500 gm of jaggery and stir at high speed. Dilute with 200 litres of water. Sprinkle this solution over one acre of soil either directly or with irrigation water. After 30 days, apply a second dose in between the rows of plants either directly or through irrigation water. *Amrutpani* revitalizes the soil and enriches it. A peculiar practice in some places is for the farmers to dig up the rhizosphere soil from beneath a banyan tree (*Ficus bengalensis*) as it is considered rich in microbial population. This soil is sprinkled on the soil surface before the application of *amrutpani*.

4.4. Panchagavya

Panchagavya is a special preparation made from five by-products obtained from the cow, namely, milk, curd, ghee, dung and urine. These ingredients are mixed in a certain order. The process is described below: Mix 7 kg of cow dung with 1 kg of cow ghee and keep in a pot with a wide mouth. Stir this mixture for three days once every day in the morning and in the evening. After three days, add the cow urine and water and keep for 15 days, stirring the mixture once every morning and evening. After that, add three litres of cow milk, two litres of cow curd, three litres of tender coconut water, three kilos of jaggery and twelve well ripened bananas. The above mixture may be poured now into a wide mouth mud pot or concrete tank or plastic container. The container should be kept open, but under shade. The contents should be stirred twice a day, once in the morning and once in the evening. The *panchagavya* stock solution will be ready after 30 days. It should continue to be kept in the shade and covered with wire mesh or plastic mosquito net to prevent houseflies from laying their eggs. This preparation is rich in nutrients, auxins, gibberellins, and microbial fauna and acts as a tonic to enrich the soil and induce plant vigour. For application, 3-4% solution is prepared by diluting the stock solution with water. This can be used for seed or seedling treatment, through irrigation water (flow, drip, and sprinkler) or as foliar spray. Use of *panchagavya* has been found very effective in the growth of vegetables, cereals, pulses, sugarcane, turmeric, ornamental plants and fruit trees.

4.5. Vermiwash

Vermiwash is prepared from populations of earthworms reared in earthen pots or plastic drums. The extract contains important micronutrients, vitamins (such as B12) and hormones (gibberellins) secreted by earthworms. Earth worms produce bacteriostatic substances and so the use of vermiwash can prevent bacterial infection. Vermiwash is sprayed on crops and trees for better growth, yield and quality of produce.

4.6. Sanjivak

Used for enriching the soil with microorganisms and quick residue decomposition. Mix 100-200 kg cow dung, 100 liters cow urine and 500 gm jaggery in 300 liters of water in a 500 liters closed drum. Ferment for 10 days Dilute with 20 times water and sprinkle in one acre either as soil spray or along with irrigation water. Used as soil application either by sprinkling or by applying through irrigation water. Three applications are needed one before sowing, second after twenty days of sowing and third after 45 days of sowing.

5. Effect of Liquid Manures on Soil Fertility

✓ Liquid manures improves fertility status in soils by increasing macronutrients,

✓ Micronutrients and beneficial microorganisms thus increase soil health.

✓ It improves water holding capacity of soils because it acts as a organic manure.

✓ It encourages growth and reproduction of beneficial soil microorganisms

✓ It increases nutrient uptake in plants and enhances plant growth.

✓ Effect of liquid manures on pest and diseases

✓ It increases immunity power in plants thereby confers resistance against pest and diseases various beneficial metabolites produced by microorganisms such as organic acids, hydrogen peroxide and antibiotics, which are effective against various pathogenic microorganisms

6. Effect of Liquid Manures on Plants

✓ Plants sprayed with liquid manures habitually produce bigger leaves and develop denser canopy.

✓ Branching is relatively high.

✓ The rooting is prolific and intense.

✓ The roots spread and grow into deeper layers were also observed.

7. Conclusion

The most of the soil are not responding towards productivity owing to indiscriminate use of synthetic fertilizers and pesticides. Under such circumstances buildup of soil health is urgent need. To minimize the cost of cultivation which is beyond the farmer's reach, low cost organic inputs respondent to soil health and crop productivity. At this juncture, a keen awareness has sprung on the adoption of "organic farming" as a remedy to cure the ills of modern chemical agriculture.

8. References

Devakumar, N., Rao, G.G.E., I., Gowda, S.B., 2008. Activities of organic farming research centre, Navile, Shivamogga, University of Agricultural Sciences, Bangalore, 12.

Palekar, S., 2006. Shoonya bandavalada naisargika krushi. Swamy Anand Agri Prakashana, Bangalore, India.