AgriCos e-Newsletter
ISSN: 2582-7049
Volume : 01 Issue : 05 September 2020 Article No: 23

Panchagavya an Eco-Friendly Formulation and Organic Growth Promoter of Plants

Kachave T. R.[1], Dhamak A. L.[2] and Gourkhede P. H.[3]
[1]Assistant Professor, Dr. D.Y. Patil College of Agricultural Business Management, Akurdi, Pune, (M.S.)
[2]Associate Professor, Department of SSAC College of Agricultural, VNMKV, Parbhani, (M.S.)
[3]Assistant Professor, College of Agricultural, VNMKV, Parbhani, (M.S.)

SUMMARY

The increasing concern for environmental safety and global demand for pesticide residue free food has evoked keen interest in crop production using eco-friendly products which are easily biodegradable and do not leave any harmful toxic residues besides conserving nature. So it is necessary to use natural products like Panchagavya to produce chemical residue free food crops and hence Panchagavya can play a major role in organic farming. The components like cow dung and cow urine enhances the insecticidal activity of Pachagavya which can reduce the number of application hazardous chemicals on crops.

INTRODUCTION

Panchagavya is an organic formulation, which in Sanskrit means the Pancha means blend of five products obtained from cow i.e. milk, ghee, curd, dung and urine (all these products are individually called as "Gavya" and collectively named as Panchagavya). Panchagavya has got reference in the scripts of Vedas (devine scripts of Indian wisdom) and Vrikshayurveda. In India, use of Panchagavya in organic farming is gaining popularity in recent years especially in states like Tamil Nadu and Kerala. It is a mixed culture of naturally occurring, beneficial microbes' mostly lactic acid bacteria (Lactobacillus), yeast (*Saccharomyces*), actinomyces (*Streptomyces*), photosynthetic bacteria (*Rhodopsuedomonas*) and certain fungi (*Aspergillus*) which promotes the growth and yield in different crops and provides high B:C ratio. So, Panchagavya can be an effective organic growth-promoter for small and marginal farmers. Panchagavya requires mainly five products of cow along with certain other ingredients as listed as; (1) Fresh cow dung - 7 kg; (2) Cow urine - 10 lit; (3) Cow milk - 2 l; (4) Cow curd - 1 kg(5) Cow ghee - 1 kg; (6) Sugarcane juice - 3 l or 500 g jaggary; (7) Tender coconut water – 3 l; (8) Riped banana – 12 Nos. (Natarajan, 2002)

Dosage of Panchagavya Recommended for Field Application

Spray system:

3% solution is effective. 3 litres of Panchagavya mixed with every 100 litres of water is suitable for all crops.

Flow system:

The solution of Panchagavya can be mixed with irrigation water at 48-52 litres per hectare either through drip irrigation or flow irrigation.

Seed/Seedling Treatment:

3% solution of Panchagavya can be used to soak the seeds or dip the seedlings before planting. Soaking the seeds or dipping the seedlings for 30 minutes is feasible.

General Advantages of Panchagavya

- It improves soil health and fertility
- It is used against pest and diseases
- It increases yield and quality of produce
- No chemicals are used
- Eco-friendly approach
- Cost required for preparation is less
- No special techniques is required
- It gives multiple uses
- Reduces cost of cultivation by reducing chemicals like fertilizers, pesticides,fungicides, growth regulators etc
- Farmer friendly method

Flow Chart for Preparation of Panchagavya
Preparation Steps

Cow dung 7 kg and Cow ghee 1 kg thoroughly mixed
↓
Kept it for 3 days
↓
After 3 days added 10 lit urine and 10 lit water
↓
Mixture kept for 15 days
↓
Mixed regularly
↓
After 15 days cow milk, cow curd, jaggery/ sugarcane juice was mixed
↓
Added tender coconut water and ripened bananas
↓
After 30 days Panchagavya was ready for use

All the above items can be added to a wide mouthed mud pot or concrete tank or plastic bucket as per the above order. The container should be kept open under shade. The content is to be stirred twice a day both in morning and evening. Sugarcane juice and coconut water are reported to accelerate fermentation.

Chemical and Biological Properties of Panchagavya

Effective Micro Organisms (EMO) in Panchagavya were the mixed culture of naturally occurring, beneficial microbes' mostly lactic acid bacteria (Lactobacillus), yeast (*Saccharomyces*), actinomyces (*Streptomyces*), photosynthetic bacteria (*Rhodopsuedomonas*) and certain fungi (*Aspergillus*). Presence of macro (N, P and K) and micro (Zn, Fe, Cu and Mn) nutrients besides total reducing sugars (glucose) in panchagavya. Chemolithotrops and autotropic nitrifiers (ammonifers and nitrifers) present in panchagavya which colonize in the leaves increased the ammonia uptake and enhance the total N supply. The pH of Panchagavya was lowered to 5.46 at 30 days of fermentation and this might be due to *Lactobacillus* bacteria in Panchagavya, which produced more organic acids during fermentation. Further, the EC of Panchagavya is 1.88 dSm^{-1}, Organic carbon 4.91 %, Total N 0.14 %, Total P 0.08%, Total K 0.58 %, Total Fe 244.00 mg kg^{-1}, Total Mn 13.10 mg kg^{-1}, Total Zn 77.00 mg kg^{-1}, Total Cu 52.00 mg kg^{-1}. The total volatile fatty acids (TVFA) were higher at 30 days of fermentation. The Coliforms, *Streptococci* and *Staphylococci* counts were not in detectable range. According to Panchagavya also known to contain biofertilizers such as Azospirillum, Azotobactor, Phosphobacteria and Pseudomonas were found besides *Lactobacillus* in Panchagavya (Yadav and Lourduraj, 2005). Besides these, growth regulatory substances such as Indole Acetic Acid (IAA), Gibberlic Acid (GA3), Cytokinin and essential plant nutrients from Panchagavya which caused a tremendous influence on the growth rate in *Alium cepa* and Panchagavya at 30 days of age recorded better proposition of chemical and microbial composition favourable for utilization as a growth promoter and Panchagavya did not have direct antibacterial activity Mathivanan *et al*. (2006).

Effect of Panchagavya on Soil Fertility

- Panchagavya 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 Panchagavya 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. Sivakumar, T. (2014)

Effect of Panchagavya on Plants

- Plants sprayed with Panchagavya 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.

Effect of Panchagavya 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

CONCLUSION

It can be concluded that plant growth substances present in Panchagavya help to bring rapid changes in phenotypes of plants and also improves the growth and ultimately improve the productivity of the crops as well as it improves soil fertility and productivity due to presence of nutrients in Panchagavya.

REFERENCES

Mathivanan,R, Edwin, S. C.,Viswanathan, K.,Chandrasekaran, D. 2006. Chemical, Microbial composition and antibacterial activity of modified panchagavya. *International Journal of Cow Science*, 2(2): (retrieved 12.02.10 from Indian Journals.com).

Natarajan, K. (2002) Panchagavya - A Manual. In: Panchagavya – Boon to organic farming. Eds. Swaminathan, C., Swaminathan, V. and Vijayalakshmi, K., 2007, International Book Distributing Co., Lucknow (India), pp. 39-40.

Sivakumar, T. (2014) Review on Panchgavya. *International Journal of Advanced Research in Biological Sciences*. **1** (8):130-154.

Yadav, B.K. and C.A. Lourdraj (2005).Effect of organic manures and Panchagavya spray on yield attributes and economics of rice (Oryza sativa). *Crop Res*., **31**: 1-5.