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Dasagavya and Panchagavya: elixirs of organic farming

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ABSTRACT

The practice of organic farming in the Indian subcontinent has ancient roots dating back to Vedic agriculture around 1800 – 1500 BCE, emphasizing the Desi cow's crucial role. *Panchagavya,* an organic formulation, is renowned for its ability to promote plant growth and bolster immunity. Dasagavya, another organic concoction derived from ten components including *panchagavya* and specific plant extracts. By enhancing soil fertility, improving plant health, and boosting immunity against diseases, they reduce the dependency on synthetic chemicals and pesticides. This approach aligns with sustainable agricultural practices by promoting biodiversity, enhancing seed germination and vigour, disease and pest resistance, conserving natural resources, and fostering healthier ecosystems. Moreover, their integration into farming practices supports long-term soil health, crop resilience, and overall sustainable food production. Thus, *Panchagavya* and *Dasagavya* contribute significantly to achieving agricultural sustainability by fostering balanced and eco-friendly farming systems.

Keywords: *Crop resilience, Dasagavya, Panchagavya, Seed germination, Vigour*

INTRODUCTION

Panchagavya, an organic product, has the capacity to stimulate growth and enhance immunity in plants. It is composed of nine ingredients: cow dung, cow urine, milk, curd, jaggery, ghee, banana, tender coconut, and water. When properly combined and applied, these components exhibit remarkable benefits for plants. *Dasagavya* is an organic blend derived from a combination of ten ingredients including *panchagavya* and specific plant extracts. "*Gavya*" refers to substances sourced from cows such as cow dung, urine, milk, curd, and ghee, known for their remarkable impact on plant growth when effectively combined. Both formulations embody principles of sustainable farming, offering farmers viable alternatives to chemical inputs while promoting ecological balance and crop resilience.

1. Preparation and application of *Dasagavya*

The Horticultural Research Station in Ooty has identified specific plant species suitable for temperate regions, including *Artemisia nilagirica*, *Leucas aspera*, *Lantana camera*, *Datura metal*, and *Phytolacca dulcamera*. These plants are commonly found as weeds along roadsides and in wastelands within the district. For tropical areas, recommended plants include neem (*Azadirachta indica*), erukam (*Calotrophis*), Kolingi (*Tephrosia purpurea*), notchi (*Vitex negundo*), umathai (*Datura metel*), Katamanaku (*Jatropha curcas*), adathoda (*Adathoda vasica*), and pungam (*Pongamia pinnata*). These plants offer effective pest and disease management solutions beneficial for agricultural practices. The process involves soaking each plant's foliage separately in cow urine at a ratio of 1 kg of chopped leaves per 1 litre of urine for a period of ten days. After filtering, the extracts from all plants are combined at 1 litre each with a 5-litre solution of *panchagavya*. This mixture is then stirred well and left to settle for 25 days, which encourages the growth and multiplication of certain beneficial bacteria and fungi ensuring thorough integration of the *panchagavya* and plant extracts.

Mode of application

Before spraying, the *Dasagavya* solution should be filtered to prevent sprayer nozzle blockage After filtering, the *Dasagavya* solution is advised for foliar spraying at a concentration of 3%. Soaking seeds or immersing seedling roots in a 3% *Dasagavya* solution for 20 minutes prior to planting improves seed germination and fosters root growth. It enhances crop growth, boosts yield, and improves crop quality. It effectively manages pests such as aphids, thrips, foliar caterpillars, mites, and other sucking insects, as well as controls diseases like leaf spot, leaf blight, and powdery mildew.

Plants treated with *Dasagavya* consistently exhibit larger leaves and denser canopies, along with more extensive rooting systems that enhance nutrient and water absorption. Additionally, *Dasagavya* treatment improves the taste and prolongs the shelf life of treated vegetables and fruits.

A three percent of solution is recommended for foliar spraying on plants. Soaking seeds or dipping seedling roots in this solution for about 30 minutes before planting has been observed to significantly improve seed germination and enhance root development in plants.

Effect of *Dasagavya* on hill crop pests and diseases

1. For roses, applying a 3% *dasagavya* spray helps manage thrips and powdery mildew.
2. For gerberas, using *dasagavya* as a foliar spray effectively combats powdery mildew.
3. In tea plants, spraying a 3% *dasagavya* solution every 15 days effectively controls blister blight disease.

2. Preparation and application of *Panchagavya*

To prepare *Panchagavya*, begin by thoroughly mixing 7 kg of cow dung with 1 kg of cow ghee twice daily for 3 days. After this initial fermentation period, combine 10 litres of cow urine with 10 litres of water and stir twice daily for 15 days. Following the 15-day period, add 3 litres of cow milk, 2 Liters of cow curd, 3 litres of tender coconut water, 3 kg of jaggery, and 12 well-ripened poovan bananas to a wide-mouthed container, stirring the mixture twice daily for 30 days. Ensure the container remains open in a shaded area and cover it with a wire mesh or plastic net to prevent

insects. Use only products from local cow breeds for potency. After 30 days, the *Panchagavya* stock solution will be ready for application as an organic growth stimulant and immune enhancer for plants.

The physico-chemical characteristics of *Panchagavya* indicate its richness in essential nutrients, micronutrients, and plant growth hormones like IAA and GA, vital for crop development. The presence of fermentative microorganisms such as yeast and *lactobacillus* are likely influenced by factors such as the acidic pH environment, milk components, and the addition of jaggery or sugarcane juice as growth substrates. These microorganisms contribute to the production of organic acids, as confirmed by population dynamics and GC analysis, which enhance the medium's acidity. *Lactobacillus* further produces beneficial metabolites including organic acids, hydrogen peroxide, and antibiotics, which not only support its own growth but also combat pathogenic microorganisms effectively. The biofertilizer efficacy of *Panchagavya* prepared traditionally and with a modified formulation enriched with kelp extract was evaluated for their fertilizing potential using various crops including *Vigna radiata*, *Vigna mungo*, *Arachis hypogaea*, *Cyamopsis tetragonoloba*, *Lablab purpureus*, *Cicer arietinum*, and the rice variety *Oryza sativa* var. ponni as experimental plants (Thevanathan *et al*., 2005).

Mode of application

- A 3% solution of *Panchagavya* has been found to be the most effective concentration for all crops, whether sprayed using power sprayers or hand-operated sprayers. For power sprayers with a capacity of 10 litres per tank, 300 ml of *Panchagavya* solution should be used, ensuring any sediment is filtered out. Hand-operated sprayers should use nozzles with larger pore sizes.
- *Panchagavya* solution can be mixed with irrigation water at a rate of 50 litres per hectare for either drip irrigation or flow irrigation systems.
- For seed and seedling treatment, soaking in a 3% *Panchagavya* solution for 20 minutes before planting enhances germination and root development. Rhizomes of Turmeric, Ginger, and sets of Sugarcane can benefit from soaking in the solution for 30 minutes before planting.
- To preserve seeds, a 3% *Panchagavya* solution can be used to dip seeds before drying and storing them, helping maintain their viability and resistance to pests and diseases.

Table. 1: Physico chemical properties of *Panchagavya*

Chemical composition		
pH	:	5.45
EC dSm2	:	10.22
Total N (ppm)	:	229
Total P (ppm)	:	209
Total K (ppm)	:	232
Sodium	:	90
Calcium	:	25
IAA (ppm)	:	8.5
GA (ppm)	:	3.5

(*Source: TNAU Agritech portal*)

Table. 2: Microbial Load of *Panchagavya*

Microbial Load		
Fungi	**:**	38800/ml
Bacteria	**:**	1880000/ml
Lactobacillus	**:**	2260000/ml
Total anaerobes	**:**	10000/ml
Acid formers	**:**	360/ml
Methanogen	**:**	250/ml

(*Source: TNAU Agritech portal*)

Effect of *Panchagavya* on plants

1. **Leaf:** Plants treated with *Panchagavya* consistently exhibit larger leaves and develop a denser canopy. This promotes heightened activity within the photosynthetic system, boosting biological efficiency and facilitating the synthesis of a maximum amount of metabolites and photosynthates.
2. **Stem:** The main trunk of the plants produces robust side shoots capable of supporting a substantial yield of mature fruits. The plants demonstrate extensive branching, enhancing overall productivity**.**
3. **Roots:** *Panchagavya*-treated plants display profuse and dense rooting systems that remain vigorous for extended periods. These roots spread extensively into deeper soil layers, optimizing nutrient and water uptake efficiency**.**
4. **Yield:** Transitioning from conventional inorganic farming to organic methods typically leads to initial yield reductions. *Panchagavya,* however, swiftly restores and maintains yield levels across all crops from the first year of cultivation. Harvests are advanced by up to 15 days, improving the shelf life and flavour of vegetables, fruits, and grains. By reducing dependence on costly chemical inputs, *Panchagavya* ensures higher profitability for organic farmers, freeing them from financial burdens.
5. **Drought Hardiness***: Panchagavya* application results in a protective oily film on leaves and stems, which minimizes water evaporation. Additionally, the plants develop deep and extensive root systems capable of withstanding prolonged dry periods. These factors collectively reduce irrigation water requirements by up to 30% and enhance drought resistance capabilities.

Beneficial effects of *Panchagavya* on crops

1. **Mango:** It has beneficial effects on mango crops, promoting dense flowering with an increased occurrence of female flowers. It prevents irregular or alternate bearing patterns, ensuring consistent fruiting. Additionally, it extends the shelf life of mangoes by 12 days at room temperature, while also enhancing their exceptional flavour and aroma.
2. **Turmeric:** Turmeric benefits significantly from *Panchagavya* application, increasing yield by 22%. It promotes the growth of extra-long fingers and reduces drainage loss. The ratio

between mother and finger rhizomes becomes narrower, contributing to better overall yield quality. *Panchagavy*a also supports beneficial insects like dragonflies and spiders, which help in natural pest and disease control. Turmeric treated with it commands a premium price, particularly for its superior mother and seed rhizomes. Furthermore, it enhances the curcumin content, adding to its value in both medicinal and culinary applications.

3. **Jasmine:** Jasmine benefits from *Panchagavya* treatment with its outstanding aroma and fragrance preserved. It experiences no occurrences of bud worm and maintains continuous flowering year-round.
4. **Vegetables:** *Panchagavya* contributes significantly to vegetable cultivation, increasing yield by 18%, and in certain cases such as cucumber, doubling the yield. The vegetables exhibit wholesome qualities with glossy, attractive skin and enjoy an extended shelf life. They are noted for their delicious taste and robust flavour profile.
5. **Banana**: Banana plants benefit from the application of *Panchagavya*, which involves adding a 3% solution (100 ml) to irrigation water and spraying it. Additionally, the solution is applied by tying it at the naval end of the bunch after removing the male bud. This practice results in uniform bunch sizes and promotes earlier harvests by about a month. Moreover, it ensures that both the top and bottom hands of the banana bunch are uniformly large in size.
6. **Acid lime:** *Panchagavya* application guarantees year-round continuous flowering for acid lime plants. The fruits develop into plump ones with a robust aroma, and their shelf life is extended by an additional 10 days.

CONCLUSION

In conclusion, both *Dasagavya* and *Panchagavya* exemplify the potential of organic agricultural solutions in modern farming. *Dasagavya* proves effective in not only controlling pests and diseases comprehensively but also in enhancing plant vigor, root development, and overall crop quality. Its ability to improve leaf size, canopy density, and the longevity of harvested produce underscores its value in sustainable agriculture. Similarly, *Panchagavya* offers a balanced blend of nutrients, growth hormones, and microbial benefits that stimulate robust plant growth and bolster crop resilience. By supporting healthier soils and reducing dependence on synthetic inputs, both *Dasagavya* and *Panchagavya* contribute to sustainable farming practices that promote environmental stewardship and economic viability for farmers.

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