



## Panchagavya – An Organic Weapon against Plant Pathogens

(\*Patel Jaina V., Parmar Darshan M. and Chavda Nikunj S.)

Department of Plant Pathology, B. A. College of Agriculture, Anand Agricultural University, Anand, Gujarat-388110

\*[jainapatel31095@gmail.com](mailto:jainapatel31095@gmail.com)

Indiscriminate use of chemical fertilizers and pesticides has adversely affected the soil quality and the beneficial microbial load leading to decreased productivity in intensive agriculture. The adverse effects of chemicals used in agriculture over decades has changed the mindset of farmers and consumers who are now producing and buying organic foods for their health (Vyas *et al.*, 2019). Government intervene to promote organic farming by policy making. Gujarat has become the ninth state to implement the Organic Farming Policy on March, 2015 after Kerala, Karnataka, Andhra Pradesh, Sikkim, Mizoram, Madhya Pradesh, Himachal Pradesh and Nagaland. Moreover, the Gujarat becomes the first state to set up Gujarat Organic Agricultural University at Halol, Dist. Panchmahal under 'The Organic Agricultural University Act, 2017' (Anon., 2015).

### Panchagavya

Historically, Maharshi Vasishtha served the divine “Kamdhenu” cow and Maharshi Dhanvantari offered to mankind a wonder medicine “Panchagavya” (a combination of cow urine, milk, dung, ghee and curd). In Sanskrit, all these five products are individually called “Gavya” and collectively termed as “Panchagavya”. Panchagavya had reverence in the scripts of Vedas and Vrikshyurveda. Indian cow breeds are unique and distinct species, both in their appearance and characteristics. As growth promoting hormones results into impressive yield and as immunity booster results into free of diseases which arise as high profit in agriculture (Natarajan, 2002).

### Ingredients for Preparation of Panchagavya (Anon., 2017)

- |                   |         |
|-------------------|---------|
| ✓ Fresh cow dung  | : 5 kg  |
| ✓ Fresh cow urine | : 5 L   |
| ✓ Cow milk        | : 1 L   |
| ✓ Cow curd        | : 1 L   |
| ✓ Cow ghee        | : 500 g |
| ✓ Coconut water   | : 1.5 L |
| ✓ Sugarcane juice | : 1.5 L |
| ✓ Ripened banana  | : 6 No. |

### Mode of Action

Cow urine rich in urea and other minerals like NaCl, sulphates of calcium and magnesium, potassium, act both as a rich nutrients source as well as a hormone. Cow milk contains *Lactobacillus* bacterium and is reported as an excellent sticker and spreader (casein), for

trapping insects and viral vectors, thus reducing viral diseases (Rebeiro *et al.*, 2001). Cow ghee contains Vit-A, Vit-B, calcium, fats and rich in glycosides which protect the cut wounds from infection. The milk and milk products of a cow also have proline amino acid that induces systemic resistance in plants (Niranjan and Shetty, 2002).

Uses and Functional Activities of <i>Panchagavya</i>		
Uses	Functional Activities	
✓ Spray system	➤ Growth promoter	➤ Antimicrobial activity
✓ Flow system	➤ Hepatoprotective	➤ Probiotic
✓ Seed-seedling treatment	➤ Immunostimulant	➤ Human and animal health
	➤ Antioxidant	

### ***Panchagavya* as Bio - Pesticide and Bio - Enhancer**

Physio-chemical properties of *panchagavya* revealed that they possess almost all the major nutrients, micro-nutrients and growth hormones (IAA & GA) required for crop growth. Predominance of fermentative microorganisms like yeast and *Lactobacillus* might be due to the combined effect of low pH, milk products and addition of jaggery as substrate for their growth. *Lactobacillus* produces various beneficial metabolites such as organic acids, hydrogen peroxide and antibiotics, which are effective against other pathogenic microorganisms besides its growth (Dutta, 2017).

### ***Panchagavya* Against Phytopathogens**

Kumar *et al.* (2010) tested efficacy of Maha Pancha Gavya (MPG) against *Pythium aphanidermatum* causing damping-off of tomato. They found MPG 10% (3 l/m<sup>2</sup>) in integration with neem cake (250 g/m<sup>2</sup>) and neem leaf extract 10% (3 l/m<sup>2</sup>) gave complete control of disease with maximum increase in height of the tomato seedlings in nursery. Chadha *et al.* (2013) studied the effect of *panchagavya* @ 100% concentration against stalk-rot of cauliflower in sick soil and they recorded that *panchagavya* was best in controlling infection during pre & post-infectious phase with 88.9 per cent disease control. Serfoji *et al.* (2015) showed the effectiveness of *panchagavya* against brown leaf spot (*Alternaria solani*) disease of tomato when applied as foliar spray @ 5% concentration as compared to control in pot experiment. Roopadevi and Patil (2017) assessed different Indigenous Traditional Knowledge (ITK) *in vitro* against *Pyricularia grisea*, incitant of blast of bajra. Among them, *panchagavya* found effective at all tested concentrations (5, 10, 25%) with 82 per cent mean inhibition of spore germination. Das *et al.* (2018) tested commercial and indigenous biopesticide against rust of soybean. Among different treatments combination, derisom 3 ml/l + *panchagavya* 3% + cow urine 3% was found most effective in managing disease intensity while, *panchagavya* alone exhibited moderate efficacy under field condition. Kumar *et al.* (2019) proclaimed the different organic treatments with fungicides against stem gall of coriander under *in vivo* condition. They revealed that maximum reduction was found 49.60 and 49.57 per cent with the spray of *panchagavya* @ 30% concentration during flowering and maturity stage, respectively.

### **Conclusion**

Over the years, agrochemicals have caused extensive damage to the quality of soil, crops, water and to human and animal health. As an alternative to chemicals, the '*Panchagavya*' is widely reported to possess antimicrobial activity and disease controlling potential. The term '*Panchagavya*' is used to describe five major substances obtained from cow, which possess

antimicrobial properties against many phytopathogens (*R. solani*, *S. rolfsii*, *P. aphanidermatum*, *S. sclerotiorum*, *F. oxysporum*, *A. solani*, *P. grisea*, *P. macrosporus*, *C. lunata* and *Colletotrichum* spp.) and are used singly or in combination with cow urine, neem cake or carbendazim. *Panchagavya* contains macro- and micro-nutrients, amino acids and growth promoting substances, like indole acetic acid, gibberellins and beneficial microorganisms. The presence of naturally occurring beneficial microorganisms, predominantly bacteria, yeast and, actinomycetes and certain fungi have been reported in this biodynamic preparation. It is used as a foliar spray, soil application along with irrigation, as well as seed treatment.

### Future Prospects

- Need to characterize and identify the antifungal and antibacterial principles present in the *panchagavya*
- Need to test compatibility of *panchagavya* with botanicals and bioagents against phytopathogens

### References

1. Anonymous (2015). <http://ofai.org/wpcontent/uploads/2012/12/Gujarat>
2. Anonymous(2017). [https://ncof.dacnet.nic.in/Training\\_manuals/Organic Agriculture in India](https://ncof.dacnet.nic.in/Training_manuals/Organic_Agriculture_in_India).
3. Chadha, S., Ashlesha, R., Saini, J. P., & Paul, Y. S. (2013). *The Indian Cow*, 35, 45-50.
4. Das, A., Dey, U., Baiswar, P., Pande, R., Ramkrushna, G. I., Layek, J., Suting, D., Babu, S., Yadav, G., & Prakash, N. (2018). *Inno. Farm.*, 3 (1), 11-18.
5. Dutta, P. (2017). Compendium on "Preparation of bioformulation of fungal and bacterial biocontrol agents for management of biotic stress of agricultural crops" 1-10 September, Assam, India. pp. 91-93.
6. Kumar, R., Hooda, I., & Karwasa, S. S. (2010). *Bangladesh J. Agril. Res.*, 35 (1), 11-16.
7. Kumar, S., Chaudhary, V. P., Pathak, S. P., & Kumar, K. (2019). *Int. J. of Chem. Stud.*, 7 (1), 878-881.
8. Natarajan, K. (2002). *Panchagavya: A manual*, India Press, Mapusa, Goa. pp. 33.
9. Niranjana, R. S., & Shetty, H. S. (2002). *Asian Congress of Mycology and Plant Pathology*, 1-4 October, Mysore, India. pp. 91-93.
10. Rebeiro, B., Silva, U. C., & Galli, M. A. (2001). *Ecosystemas*, 26, 105-106
11. Roopadevi & Patil, P. V. (2017). *Int. J. Pure App. Biosci.*, 5 (4), 1457-1463.
12. Serfoji, P., Devi, R., Siva T., & Parameswari, D. (2015). *Int. J. Spe.*, 14 (42), 11-20.
13. Vyas, V. S., Patel, P., Shelat, H. N., & Rajput, A. (2019). *Strategies for Doubling the Farmers' Income: A Gujarat Perspective*. pp. 55-57 (unpublished).