



International Journal of Research in Pharmacology & Pharmacotherapeutics



ISSN Print: 2278-2648 IJRPP |Vol.5 | Issue 2 | April - June - 2016
ISSN Online: 2278-2656 Journal Home page: www.ijrpp.com

Research article

Open Access

Changes in morphological, biochemical and yield Parameters of Macrotyloma uniflorum (L.) due to Panchagavya spray

Dr. Jayachithra J^{1*} and Abirami N²

¹Post Graduate Department of Biochemistry, D.G.G.Arts College (w), Mayiladuthurai, 609 009, Tamilnadu, India.

²P.G Student, Department of Biochemistry, D.G.G Arts college (w), Mayiladuthurai, 609 001, Tamilnadu, India.

*Corresponding author: Dr. Jayachithra

ABSTRACT

A field experiment was conducted to find the variation in growth, biochemical and yield parameters of Horse gram under different concentrations (control, 1, 3, 5, 7.5 and 10%) of panchagavya, and all the parameters were increased in 3% concentration. Since there was an increase in growth and yield at low concentration of panchagavya, it is recommended that the panchagavya can be used for spray after diluted properly.

Keywords: Horse gram, Panchagavya, Biochemical Parameter, Morphology Studies.

INTRODUCTION

Agriculture is considered to be one of the oldest occupations, perhaps as human civilization. About half of the world's population is engaged in agriculture, of which the developing countries of Asia contribute more than 75%. Indian agriculture contributes about 40% of the nation's income, though about 72% of the population engaged in it and it is approaching the "take off" to scientific farming. Portending a continuing demand for scientific information to improve the basis for agriculture in the future. In fact, sixty percent of our agricultural land, which is currently under cultivation suffer from serious problems of soil health, mainly due to indiscriminate use of chemical fertilizers. Building of soil fertility is indispensable for higher productivity

of the cultivated lands. Thus, organics play a vital role in soil fertility and crop productivity. In the Vidarbha region of Maharashtra, a number of growers are still using only organic manures in the mandarin orange orchards and have not resorted to using chemical fertilizers where the fruit quality was found to be superior^[1].

The panchagavya solution containing cow dung, urine, curd and ghee. The cow has been a cornerstone of Indian agriculture for centuries and has soared as a source of nutrition for farmer's families through milk products as well as providing draught animal power for both agricultural operations such as ploughing and tilling the land. Nearly all basic necessities of life were woven around the with contributions in all aspects of life including family and manure.

Panchagavya is also mentioned in vvkshayurevada texts and it has been experimented by farmers. It has a significant role in providing resistance to pests' disease and increasing the overall yield.

Heavy use of chemicals in agriculture has weakened the ecological base in addition to degradation of soil, water resources and quality of the food. 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. It is very much essential to develop a strong working and a compatible package of nutrient management through organic resources for various crops based on scientific facts, local conditions and economic viability. Panchagavya is a foliar nutrition prepared by organic growers of Tamil Nadu and used widely for various agricultural and horticultural crops. In Sanskrit, Panchagavya means a combination of five products obtained from the cow. When suitably mixed and used, these have miraculous effects. Panchagavya is used in different means such as foliar spray, soil application along with irrigation water, seed or seedling treatment, etc. For foliar spray 3% concentration is being adopted by organic farmers using hand-operated sprayers with high pore sized nozzle [2].

Panchagavya is an organic formulation, which in Sanskrit means the 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 (divine scripts of Indian wisdom) and Vrikshayurveda [3]. In India, the use of panchagavya of organic farming is gaining popularity in recent years, especially in states like Tamil Nadu and Kerala.

Plant-based drugs have been used globally for healing different illnesses in conventional systems of medicines. Around 80% of the world's population still depends on medicinal plants for their primary health care needs, especially where modern medicines are not accessible.

In Veda, cow's urine was compared to the nectar. In substrata several medicinal properties of cow's urine have been mentioned and are known to cause weight loss, reversal of certain cardiac and kidney problems, indigestion, stomach ache, edema, etc. Cow urine has a unique place in Ayurveda and has been described in Sushrita Sumhita and Ashtanga Sangraha to be most effective substances secretion of

animal origin with innumerable therapeutic values. It has been recognized as water of life or Amrita (beverages of immortality) the nectar of the God. In India drinking of cow urine has been practiced for thousands of years. Panchagavya is a term used in Ayurveda to describe five important substances obtained from cow, namely urine, dung, milk, ghee and curd. A number of formulations mentioned in Ayurveda described the use of panchagavya components either alone *or* in combination with drugs of herbal, animal or mineral origin. [4].

Heavy use of chemicals in agriculture has weakened the ecological base addition to degradation of soil, water resources and quality of food. At this juncture a keen awareness has sprung of the adoption of "organic farming" as a remedy to cure. Organic agriculture is low cost and chemical free fertilizers. It is very essential to develop a strong, workable and a compatible package of nutrient management through organic resources for various crops based on scientific facts, local conditions and economic viability [5].

The current global scenario firmly emphasizes the need to adult eco-friendly agricultural practices of sustainable agriculture. Chemical agriculture has made an adverse impact on the healthcare of not only the soil but also the beneficial soil microbial communities and the plants cultivated in these soil. This eventually has led to a high demand organic produce by the present day health conscious society and sporadic attempts are being made by farmers all over the world to detoxify. The land by switching over to organic farming dispenses with chemical fertilizers, pesticides, fungicides and herbicides. In India, organic farming was a well-developed and systematized agricultural practice during the past and this "ancient wisdom" obtained through Indian knowledge systems such as Vedas, specify the use of panchagavya in agriculture.

The medical importance of panchagavya obtained from the cow knows no bounds. Panchagavya a mixture of five products is a formulation of Ayurveda, which possesses healing properties against many disorders. In recent years, results of scientific investigation in India and abroad, the medical and curative properties of these products have created a lot of enthusiasms and hope, as they could be potent anti-cancer and anti-HIV agents [6].

In the present study a preliminary attempt has been made to find out the effect of panchagavya

spray on the growth, biochemical and yield parameters of Horse gram (L.).

MATERIALS AND METHODS

Seed Collection

The seeds of *Macrotyloma uniflorum* (L.) Were collected from the market at Mayiladuthurai, Tamil Nadu.

Plant Materials

M. uniflorum seeds were washed, shadow dried and subjected to pulverization to get a coarse powder.

Preparation of Alcoholic Extract

The powdered seeds of about 20g were extracted with alcoholic in a soxhlet apparatus. Then, the extract was evaporated in a rotatory vacuum evaporator at 40°C under reduced pressure. The crude extract of about 13g was obtained which is equivalent to about 20% of total extraction.

Preparation of panchagavya

Cow dung	- 1kg
Cow urine	- 750 ml
Cow milk	- 400 ml
Curd milk	- 400 ml
Ghee	- 200 ml
Distilled water	- 10ml

The above mentioned components were mixed thoroughly with ten liters of water, and daily thoroughly mixed with a stump on the solution morning and evening, after ten days to make different concentrations (control, 1, 3, 5, 7.5 and 10%) and spray on crops separately.

A field experiment was carried out to assess panchagavya foliar spray and also to arrive at the suitable dilution factor to change the growth and yield of *Macrotyloma uniflorum* (L.) The field experiment was conducted during at Mayiladuthurai to Tamilnadu.

Design of the Experiment

Experiment Period:	June to July;
Experiment Design:	Randomized Block Design;
Plot Size:	2 × 2 m;
Crop Studied:	<i>Macrotyloma uniflorum</i> (L.)

Treatment: Control × Different Concentration of Panchagavya;

Panchagavya Concentration: 1%, 3%, 5%, 7.5% & 10%.

Morphological Studies

The morphological studies were observed in *Macrotyloma uniflorum* (L.), and plant height (centimeter scale), fresh weight and dry weight (electrical single pan balance) were measured in various concentrations with various intervals (seedling, and yielding).

Biochemical Analysis

The biochemical contents (starch, protein, amino acid and sugars) were analyzed at various stages (seedling, and yielding) of *Macrotyloma uniflorum* (L.)

Estimation of protein

Protein was estimated by the Lowry's method (Lowry's et al., 1951).

Estimation of amino acids

Amino acids were estimated by the Moore and Stein, 1948

Estimation of sugars

A sugar was estimated by the Nelson methods (Nelson, 1944).

Estimation of starch

Starch was estimated by the Mccready methods (McCready et al., 1950).

RESULTS AND DISCUSSION

Phytochemical Analysis

Alcoholic extract of seeds of *M. uniflorum* were taken and analysed to find the presence of various phytoconstituent (Table 1). The result showed positive response to the phytoconstituents like carbohydrate, steroid, tannins, phenol, protein and amino acid. Both extracts of seeds of *M. uniflorum* exhibited negative result for alkaloids, glycosides, flavonoids and saponins.

Table: 1 Phytochemical screening of *Macrotyloma uniflorum*

Phytochemical analysis of alcoholic extract of *Macrotyloma uniflorum*

S. No	Name of phytoconstituents	Alcoholic extract	
		Observation	Inference
1	Carbohydrate	Reddish yellow or green colour	+
2	Steroids	Green colour	+
3	Tannins	White precipitate	+
4	Protein	Pink colour	+
5	Phenol	White precipitate	+
6	Amino acids	Purple colour	+
7	Alkaloids	White or pale precipitate	-
8	Glycosides	Yellow colour	-
9	Flavonoids	Reddish pink or dirty brown colour	-
10	saponins	Foam	-

Field experiment was conducted to know the changes in morphological, biochemical and yield parameters of *Macrotyloma uniflorum* due to panchagavya spray. The morphological parameters of

Macrotyloma uniflorum at various stages (seedlings, flowering and yielding) are shown in Plate 1 and Table 2.

Table 2. The morphological parameters of *Macrotyloma uniflorum* (L.) grown under different concentration of panchagavya spray.

Concentration of panchgavya	Seedling stage			Yielding stage		
	Plant Height	Fresh Weight	Dry Weight	Plant Height	Fresh Weight	Dry Weight
	(Mg/plant)	(Mg/plant)	(Mg/plant)	(Mg/plant)	(Mg/plant)	(Mg/plant)
Control	16.4	21.4	9.4	56.6	91.4	22.4
1%	17.8	23.6	10.2	69.2	93.2	23.6
3%	20.6	29.6	11.6	79.6	97.4	26.3
5%	15.8	23.1	8.3	77.2	92.3	24.6
7.5%	15.2	21.5	8.2	71.3	91.1	23.2
10%	11.6	20.6	7.6	71.1	90.4	21.4

Note: (±) percentage over control is expressed in parenthesis.

The morphological parameters such as plant height, fresh weight, and dry weight of *Macrotyloma uniflorum* were increased with the age of the plant. The highest morphological parameters (plant height 20.6, and 79.6 cm/plant; the fresh weight 27.6, and 97.4 mg/plant; and dry weight 11.6, and 26.3 mg/plant on seedling, and yielding stages respectively) of *Macrotyloma uniflorum* (L.) were

recorded in the plants sprayed with 3% concentration of panchagavya when compared with control as well as other concentrations.

The biochemical contents such as protein, starch, amino acid and sugars at various stages of plants sprayed with different concentrations of panchagavya spray is presented in Table 3.

Table 3. Biochemical contents of *Macrotyloma uniflorum* (L.) grown under different concentration of panchagavya spray.

Concentration Of Panchagavya	Seedling stage				Yielding stage			
	Protein mg/plant	Starch mg/plant	Amino Acid mg/plant	Sugars mg/plant	Protein mg/plant	Starch mg/plant	Amino Acid mg/plant	Sugars mg/plant
Control	0.363	0.428	0.318	0.387	0.315	0.368	0.315	0.295
1%	0.375	0.435	0.327	0.345	0.367	0.389	0.326	0.314
3%	0.415	0.514	0.387	0.415	0.415	0.419	0.393	0.327
5%	0.365	0.496	0.319	0.367	0.529	0.398	0.318	0.275
7.5%	0.356	0.419	0.287	0.315	0.312	0.15	0.316	0.218
10%	0.344	0.415	0.268	0.35	0.289	0.295	0.285	0.215

Note: (+) percentage over control is expressed in parenthesis.

The plants showed increasing trend in biochemical contents up to seedling stage decreased in yielding stage. The highest biochemical contents (protein 0.415, and 0.415 mg/plant; starch 0.514, and 0.419 mg/plant; and amino acid 0.387, and 0.393 mg/plant; sugars 0.415, and 0.327 mg/plant) on seedling, flowering and yielding stages of *Macrotyloma uniflorum* (L.) were recorded in the plants sprayed with 3% concentration of panchagavya when compared with control and other concentrations.

Panchagavya is a combination of 5 products obtained from the cow which is used in traditional medicine extensively. These are cow dung, cow's urine, cow's milk, curd and ghee. This is also mentioned in Vrکشayurveda texts and it has been experimented by various organic farmers. It has a significant role in providing resistance to pests and disease and increasing the overall yield.

Field experiment was conducted to know the changes in morphological, biochemical and yield parameters of Horse gram (L.) Moench due to panchagavya spray. The morphological parameters of Horse gram at various stages (seedlings, and yielding) are shown in Plate 1 and Table 1. The morphological parameters of *Horse gram* (L.) grown under different concentrations of panchagavya spray.

Many advanced countries mainly depend upon the dairy by products because of their commercial,

agricultural and medicinal activities play a vital role in the development of the countries. When a new house or building or even a temple constructed in India, the first to enter premises would be the cow because this is considered to be auspicious. In recent years the people have recognized a number of commercial, medicinal and agricultural values from the various products of dairy forms.

^[9] Have carried out extensive works in this aspects and the environmental management in developing countries. The number of new methods of recycling and controlling measures of organic waste in urban and rural habits was proposed by ^[10] and ^[11]

The morphological parameters such as plant height, number of leaves, fresh weight and dry weight of *Macrotyloma uniflorum* (L.) were increased in 3% panchagavya spray when compared with control and other concentrations. Similar finding were observed in black gram ^[12] and *Coleus forskohili* ^[13].

Xu (2001) ^[14] reported that effective micro-organism (EMO) cultures in panchagavya could synthesize phytohormones i.e., auxins and other growth regulators that stimulated plant growth. Chemotrophs and autotrophic (ammonifiers and nitrifiers) present in panchagavya which colonize in the leaves increase the ammonia uptake and enhance total nitrogen supply ^[15].

Similar findings were observed in grains of *Oryza sativa*^[16] ^[17].

The plant growth substances in panchagavya help to bring rapid changes in phenotypes of plants and also improve the growth and productivity^[18].

In panchagavya spray, the nutrients easy transfer to plant through foliar spray and the quantities of IAA and GA present in panchagavya^[19], ^[20].

In this context^[21] have reported that the influence of soilless culture system on growth and biochemistry of horse gram- *Macrotyloma uniflorum* (Lam.) Verdc.

In this context Sharmila and saravanan (2012)^[22] have reported that the Efficacy of lead on germination growth & morphological studies of Horse Gram (*Dolichos biflorus* Linn).

Moreover^[23] have reported that the Antioxidant and hepatoprotective effect of *Macrotyloma uniflorum* seed in antitubercular drug induced liver injury in rats.

In this context Sangeetha and Thevanthiran Biofertilizer Potential of Traditional and Panchagavya Amended with Seaweed Extract.

^[24] Reported Bowman-Birk type proteinase inhibitor profiles of horse gram during germination and seed development.

Moreover^[25] have reported that the plant in productivity.

SUMMARY AND CONCLUSION

Herbs are widely exploited in the traditional medicine and their curative potentials are well documented. Large scale evaluation of the local flora exploited in traditional medicine for various

biological activities is a necessary first step in the isolation and characterization of the active principle and further leading to drug development.

The present research work was carried out to study the effect of panchagavya spray on growth, yield and biochemical changes of *Horse gram* (L.).

All parameters were increased in 3% concentration. Since there was increase in growth and yield at low concentration of panchagavya, it is recommended that the panchagavya can be used for spray after diluted properly.

Ghee provides vitamins A and B, calcium and fat. These contents stimulate the growth and yield of all vegetable crops.

The present study was constructed to assess the biochemical changes in panchagavya with Neem to *Macrotyloma*. The consequence of the reflects are bridged as follows,

The screening of alcoholic extract in presence of carbohydrate, steroids, Tannins, protein, phenol, Amino acids and the absence of Alkaloids, Glycosides, Flavonoids and saponins.

Cow's urine provides nitrogen which is essential for crop growth. Milk provides protein, fat, carbohydrates, amino acid and calcium. Curd provides lactobacillus which act as a catalyst in the digestion of organic waste.

On the basis of our study, it may be concluded that *macrotyloma uniflorum* is good for health.

ACKNOWLEDGEMENT

Authors are thankful to the managing trustee of D.G.G. Arts College, women's college, Mayiladuthurai for the facilities provided to complete the project work in a successful way.

REFERENCE

- [1]. Aicarp.I. (1986) ANNUAL REPORT FOR 1985- 86 All India Coordinated agronomic Research project. ICAR. ICAR. NEW DELHI.
- [2]. Natarajan, K. (2002) Panchagavya – A manual. Other India Press, Mapusa, Goa, India, pp: 33.
- [3]. Natarajan, K, (2007), 'Panchagavya for plant', *Proc. Nation. Conf. Glory Gomatha*, 72-75.
- [4]. Shah, R. (1997). Herbal compositions. US patent 5963327.
- [5]. Kannaiyan, K. (2000). *Biofertilizers: key Factors in Organic Farming*. The Hind Survey of Indian Agriculture, pp. 165-173.
- [6]. Shakh et al., (2009). Herbal compositions. US patent 5963327.
- [7]. Lowry, O. N., Roserbrough, N. J., Farr, A. L., and Randell, R. J. (1951). Protein measurement with Folin-phenol reagent. *J. Biol. Chem.*, 193: 265-275.

- [8]. Moore, S., and Stein, W. H. (1948). Photometric method for use in the chromatography of amino acids. *J. Biol. Chem.*, 176: 176-388.
- [9]. Tharum, G., Tahn, N. C., and Bidwell, R. (1983). Environmental Managements for Developing Countries, Vol. 1: Waste and Water Pollution Control - Review of Technical Solutions. Asian Institute of Technology, Continuing Education Centre, Bangkok, pp. 48-54.
- [10]. Fureday, C. (1987). Social considerations in the recycling of organic wastes. *Conserv. Resour. B*, 12: 103-106.
- [11]. Bluemental, U. J., Strauss, M., Mara, D. D., and Carnicross, L. (1989). Generalized model for the effect of different control measures in reducing health risks from waste reuse water. *Sci. Tec.*, 21: 567-577.
- [12]. Swaminathan, C., Swaminathan, V., and Vijayalakshmi, V. (2007). *Panchagavya Boon to Organic Farming*. International Book Distributing Co., India.
- [13]. Kanimozhi, B. (2004). Effect of organic manures and biostimulants on productivity and quality of brahmi (*Bacopa monnieri* L.). M.Sc. (Hort) Thesis, Tamilnadu Agricultural University, Coimbatore-3, India.
- [14]. Xu, H. L. (2001). Effects of microbial inoculants and organic fertilizers on the growth, photosynthesis, yield attributes and economics of rice (*Oryza sativa*). *Crop Res.*, 31: 1-5.
- [15]. Papen, H., Gables, A., Zumbusch, E., and Rennenberg, H. (2002). Chemolitho autotrophic nitrifies in the phyllosphere of a spruce ecosystem receiving high nitrogen input. *Curr. Microbiol.*, 44: 56-60.
- [16]. Rajasekaran, M., and Balakrishna, S. (2002). A study on the effect of panchagavya an growth of *Oryza sativa* L., *Zea mays* (L) and *Vigna mungo*. M. Phil. Thesis, Please add name of university.
- [17]. Ravikumar, H. S., Janakiraman, N., Sheshadri, T., Venkate, J., and Vijaymahantesh, G. (2012). Integrated organic nutrient supply systems on growth and yield of groundnut. *Environ. Ecol.*, 30: 118-121.
- [18]. Tharumaraj, K. (2011). A critical review on panchagavya - A boon plant growth. *Int. J. Pharm. Biol. Arch.*, 2: 1611-1614.
- [19]. Gowthami et.al. ,2015. Influence of soilless culture system on growth and biochemistry of horse gram- *Macrotyloma uniflorum* (Lam.) Verdc. *International Journal of Applied Research* 2015; 1(7): 468-471
- [20]. Sharmila and saravanan (2012). *Journal of chemical and pharmaceutical Research*, 2012; 4 (11): 4894-4896.
- [21]. vandana sanjeev panda et al., 2015. Antioxidant and hepatoprotective effect of *Macrotyloma uniflorum* seed in antitubercular drug induced liver injury in rats , *The Journal of Phytopharmacology* 2015; 4(1): 22-29
- [22]. Sreerama et al., Variability in the distribution of phenolic compounds in milled fractions of chickpea and horse gram: evaluation of their antioxidant properties. *J. Agric. Food Chem.* 2010; 58(14): 8322-8330.