

Review Article

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Effect of Panchagavya on Growth and Yield: A Review

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ABSTRACT

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Panchagavya, an ancient Vedic formulation is a blend of five products namely the dung, urine, milk, curd and ghee obtained from an indigenous cow. All the five components are easily available to the farmer and can be made easily by the farmer himself thereby reducing the initial investment. It is rich in growth enhancing substances like organic compounds, hormones, micro and macro nutrients and minerals besides having anti-bacterial and insecticidal properties. Panchagavya enhances the productivity by increasing the growth of roots, stems, branches and leaves and related parameters like root length, stem length, number of branches, number of leaves, leaf area index, chlorophyll content, oil content, protein content and other quality parameters finally contributing to the overall high yield and yield attributes. Thus, it plays an important role in the overall growth and development of crop plants and increase of yield and profits. It is also eco- friendly.

Introduction

Panchagavya is a Sanskrit word that means a blend of five products obtained from cow. The five products include Cow dung + Cow urine + Cow milk + Cow curd and Cow ghee. All these are individually called “Gavya” and altogether called a “Panchagavya”.

All these five products are the main components for the preparation of Panchagavya. Along with these, other components like jaggery, sugarcane juice, ripen bananas, yeast and tender coconut water also used to boost the fermentation and support the beneficial micro-organisms growth.

Preparation of Panchagavya is as follows

Natarajan (2002) procedure is as follows: Take fresh cow dung (7kg) and cow ghee (1kg) and mix them thoroughly and incubate them for two days. Next, add cow urine (3litre) along with 10 litre of water and stir them properly for one week daily at mornings and evenings. Then add sugarcane juice (3 litre) or jaggery mixed in water at the rate of 1:6 ratio. Add cow milk (2 litre), cow curd (2 litre), tender coconut water (3 litre), yeast (100 g) and ripened banana (12). Stir the solution thoroughly and properly for three weeks daily at mornings and evenings. Finally, Panchagavya is ready and can be used thereafter.

All the above-mentioned items are to be mixed either in an earthen pot or a concrete tank or a plastic bucket that has a larger mouth and must be kept open in shade.

The ingredients must be added only in the above-mentioned order. Stirring the mixture must be done twice daily and only in the mornings and evenings and should be done only in uni - directional method.

Effect of Panchagavya on growth and development

Balasubramanian *et al.*, (2001) reported that the enhanced growth and yield were observed in seedlings dipped in panchagavya before transplanting in rice.

Vasumathi (2001) and Sanjutha *et al.*, (2008) concluded that the growth enzymes present in panchagavya might have favoured rapid cell division and multiplication for higher growth characters and increased height in *Phyllanthus amarus* and *Andrographis paniculata* respectively.

Beulah *et al.*, (2002) concluded that the beneficial microorganisms from panchagavya and their presence in the rhizospheres environment of the root zone influence the plant growth and crop yield.

Natarajan (2002) concluded that panchagavya enhanced the growth, vigour and resistance to pests and diseases and further in the enhancement of keeping quality of vegetables and fruits in various crops like turmeric, paddy, onion, gingelly, sugarcane, banana, vegetables and curry leaf.

Subramanian (2005) concluded that the use of traditional panchagavya as manure resulted in the increase of nodule formation by almost 18% to 62%.

Velmurugan (2005) observed that seed treatment + foliar application of panchagavya 3% produced the tallest plant height (26.75 cm), higher number of leaves (14.0) as compared to other treatments in Radish.

Somasundaram and Amanullah (2007) reviewed that panchagavya shows positive effect on growth and productivity of crops.

Mohanalakshmi and Vadivel (2008) concluded that application of poultry manure (5 t ha⁻¹) + panchagavya (3%) resulted in the highest root yield of 1354.5 kg ha⁻¹ and produced higher leaf number per plant in aswagandha.

Sanjutha *et al.*, (2008) concluded that the application of FYM @ 15 t/ha + NPK @ 75: 75: 50 kg/ha + panchagavya @ 3% foliar spray recorded the highest plant height (54.10 cm), number of branches (27.40), number of leaves (105.67) and highest Leaf Area Index (LAI) (1.03) when compared to other treatments in Kalmegh.

Tharmaraj *et al.*, (2011) concluded that panchagavya containing plant growth substances results in the change in phenotypes of plants rapidly for better growth and productivity of crops.

Vennila and Jayanthi (2008) concluded that spraying of 2% panchagavya + 100% recommended dose of fertilizer resulted in enhanced plant height (131.7 cm) and production of dry matter (5.9 g / plant) in okra.

Gore and Srinivas (2011) concluded that significant increase in the plant height and root-length was recorded with the application of recommended dose of fertilizer + beejamruth + panchagavya + jeevamruth in *Lycopersicon esculentum* (Tomato).

Nileema *et al.*, (2011) observed that the soil treatment of RDF + beejamruth (seed treatment) + jeevamruth (soil application) + panchagavya 3 % foliar spray showed improvement in plant height (143.21 cm), root length (19.80 cm) and dry matter (7.94 g/plant) compared to other treatments and control in tomato.

Saranraj *et al.*, (2011) concluded that application of 3% panchagavya foliar spray increase physiological growth, leaf area index, dry matter production, chlorophyll content, N content, yield, yield attributes and economics of black gram.

Suresh *et al.*, (2011) concluded that the foliar application of panchagavya resulted in significant improvement in plant height (42.6 cm), number of branches (10) when compared with N, P, K and control in black gram.

Patil *et al.*, (2012) reported that the application of panchagavya 3% at 15 days after flowering increased plant height (37.01 cm), number of branches per plant (5.22), higher leaf area index (1.31) and root nodules (20.50) in chickpea.

Vijaykumari *et al.*, (2012) concluded that the seeds soaked in panchagavya (1%) and humic acid (1%) for 8 hours gave higher protein content of the harvested seeds (1.25 mg/g tissue) and ascorbic acid content of the harvested seeds (0.48 mg/ g tissue) as compared to other treatments in Soybean.

Amalraj *et al.*, (2013) concluded that the seed treatment with panchagavya resulted in enhanced root and shoot length of 19.4 cm and 16.9 cm respectively along with dry mass (147 mg), high leaf area (14.57 cm²), chlorophyll content (23 spad units) and photosynthetic activity after 15 DAS in pigeonpea.

Naik *et al.*, (2013) concluded that

panchagavya either in foliar or media application gave better results in growth and spike production in Cymbidium hybrid.

Jain *et al.*, (2014) concluded that panchagavya application increases germination percentage, germination index, root and shoot length, fresh and dry weight of the seedlings, plant height and chlorophyll content besides effecting available macro and micro nutrients like Zn, Cu, Mn and microbial activity as compared with FYM and vermicompost.

Pagar *et al.*, (2016) reported that application of panchagavya influenced the plant height, dry matter accumulation, total and effective tillers significantly in wheat.

Ananda and Murthy (2017) found that the treatment with enriched bio digester at 25 kg N equivalent per hectare + panchagavya at 3% gave higher leaf area index (3.20) at 60 DAS when compared to other treatments in groundnut and finger millet.

Choudhary *et al.*, (2017) reported that application of panchagavya gave the maximum plant height, higher dry matter accumulation, maximum leaf area index at branching and flowering stages in black gram.

By the above data, we can understand that panchagavya enhances the root length, formation of root nodules, plant height, number of branches, number of leaves, chlorophyll content and leaf area index (LAI) contributing to the higher photosynthetic activity thereby increasing fresh and dry weight which might be due to the presence of various growth enzymes which favours rapid cell division and cell- multiplication contributing to the overall growth and development of plants resulting in better yields. Thus, panchagavya plays an important role in the growth and development of plants.

Effect of Panchagavya on yield and yield attributes

Vivekanandan (1999) concluded that the spray of panchagavya resulted in doubling the stick yield apart from pest and disease resistance in moringa.

The increased yields were also observed in crops like Chilli by Subhashini *et al.*, (2001); in Moringa by Beulah *et al.*, (2002); in Green gram by Somasundaram *et al.*, (2003) and in French bean by Selvaraj, (2003) with the use of panchagavya.

Kanimozhi, (2003) observed that spraying of 4% panchagavya was found to give superior yield with respect to root yield i.e., 2.5 times kg/plot, when compared to control in *Coleus forskohili*.

Somasundaram *et al.*, (2003) observed that there was significantly higher number of seeds per pod (12.9) and grain yield (17.87 q/ha) recorded with panchagavya 3 % as compared to other treatments in green gram.

Birendra and Christopher, (2007) noted that the foliar application of 3% panchagavya resulted in significant increase in yield attributes.

Swaminathan *et al.*, (2007) concluded that foliar application of 3% panchagavya at 15, 25 and 40 DAS recorded the highest grain yield (1195 kg/ha) in black gram.

Mohanalakshmi and Vadivel, (2008) concluded that application of poultry manure (5 t ha⁻¹) + 3% panchagavya registered the highest root yield of 1354.50 kg ha⁻¹ in aswagandha.

Sanjutha *et al.*, (2008) concluded that the application of FYM @ 15 t ha⁻¹ + NPK @ 75:75: 50 kg/ha + panchagavya @ 3% foliar spray recorded significantly higher dry leaf

yield (619.06 kg/ha) and dry herbage yield (1993.10 kg/ha) as compared to other treatments in Kalmegh (*Andrographis paniculata*).

Vennila and Jayanthi, (2008) observed that application of panchagavya resulted in the increase of fruit number per plant, fruit weight (gram/fruit) and yield (quintals/hectare) in Okra.

Mudigora *et al.*, (2009) concluded that among different treatments, panchagavya + NSKE (5%) recorded highest yield of 14.16 q/ha followed by NSKE + cow urine (5%) (12.59 q/ha), panchagavya + *V. negundo* (12.45) and *V. negundo* + cow urine (12.04 q/ha) and panchagavya + *P. glabra* @ 5% (12.40 q/ha).

Kumawat *et al.*, (2010) concluded that the foliar application of neem + panchagavya increased yield in cluster bean and cumin. In comparison to cluster bean - cumin system, higher cumin equivalent yield was recorded under groundnut – cumin system with neem + panchagavya (1259 kg/ha) followed by tumbo + panchagavya (1068 kg/ha).

Ravi *et al.*, (2011) concluded that the treatment RDF + panchagavya spray 3 % at 30, 60 and 75 days after sowing showed higher oil percentage (40.7), protein percentage (22.4), oil yield (685.1 kg/ha) and protein yield (377.7 kg/ha) as compared to other treatments in ground nut

Sunil *et al.*, (2012) reported that application of neem + panchagavya spray at 30 %, 54 % and 80% at 55 and 80 days after sowing recorded higher plant dry matter compared to control in cumin crop.

Vimalendran and Wahab (2013) observed that four sprays of panchagavya 3% at 15, 25, 35 and 45 DAS showed higher number of cobs (2.95), cob length (26.66 cm), cob width (4.46 cm), individual cob weight (29.69 g) and

yield (7476 kg/ha) as compared to other treatments in baby corn.

Sakubai *et al.*, (2014) recommended that the organic treatment (VAM + panchagavya + amritpani @ 3% drench and spray) for enhanced growth and yield of buck- wheat.

Waghmode *et al.*, (2015) found that treatments with cow urine spray 10 % and panchagavya spray 3% at grand growth period and tasseling stages gave higher protein content (9.27% and 9.21%), higher fresh cob yield (5078 kg/ha and 5262 kg/ha), fresh grain weight (166.1 g and 169.8 g), dry grain weight per plant (69.85 g and 70.66g), cob girth (13.89 cm and 13.71 cm) and cob length (13.29cm and 12.88 cm) compared to other treatments in sweet corn.

Boraiah *et al.*, (2017) concluded that panchagavya spray resulted in the attainment of significant yield per hectare and higher shelf life of 18.58 days and higher capsaicin content of 0.32% in capsicum.

Gopal *et al.*, (2017) stated that the panchagavya (4%) spray showed significantly higher dry matter, leaf area index (LAI), number of pods, number of seeds, seed yield, straw yield and biological yield in black gram.

Suchitra *et al.*, (2017) observed that 3% panchagavya spray resulted in the highest number of fruits (19) and fruit weight (30.67 mg/fruit) when compared with other treatments in *Abelmoschus esculentus*.

By the above data, the crops treated with panchagavya resulted in the attainment of better and higher yields. The yield also showed better yield quality parameters like higher dry matter content, protein content, fresh and dry weights, root yield, number of fruits, fruit weight, seed and grain weight,

cob- length and girth, oil content, and protein content. Thus, Panchagavya plays an important role in the yield and yield attributes of a wide variety of crops.

In conclusion the panchagavya enhances the productivity through the increase in growth of roots, stems, branches and leaves and related parameters like root length, stem length, number of branches, number of leaves, leaf area index, chlorophyll content, oil content, protein content and other quality and yield parameters. Thus, Panchagavya plays a very important role in the growth and development of plants and contributes to better yield and yield attributes when compared with other treatments. Preparation of panchagavya is easy and decrease the investment cost and on the other hand it gives high net- returns which helps to attain high B:C ratio to the farmer. Panchagavya is safe and eco-friendly and contributes to sustainability.

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