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# Use of Flower of *Spilanthes paniculata* Wall. ex DC as Growth Promoter in Divyan Red Poultry Birds

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## ABSTRACT

**Background:** In view of abundant availability of *Spilanthes paniculata* in flora of Jharkhand and widely reported benefits of its dried flowers, the current study aimed to explore the possibility and to quantify the effect of use of flowers of *S. paniculata* as feed additives in stimulating body growth in poultry birds.

**Methods:** A four week experiment consisting of 60 numbers of poultry birds (Divyan Red) of five months old subjected to four treatments consisting of 15 birds in each treatment distributed equally with 5 replications, was undertaken during 2016-19 following randomized block design to observe the effect of feeding dried flowers of *S. paniculata* on body weight increase in poultry birds.

**Result:** Feeding of dried flowers of *S. paniculata* @ 10 g/bird/day resulted in a gradual increase in rate of weight gain up to 14 days of feeding, whereas feeding @ 15 g and 20 g/bird/day resulted in increase in body weight gain up to 7 days. Feeding @ 10 g/bird/day resulted in highest body weight increase after feeding for four weeks and improved in the feed conversion ratio (FCR) significantly ($P \leq 0.05$) than the other 3 treatments. It is advisable for poultry owners to incorporate dried flowers of *S. paniculata* at a dose of 10 grams per bird per day for three weeks for attaining maximum growth in body weight in poultry birds.

**Key words:** *Acmella*, *Athronia*, *Akarkara*, *Bidens,* Body growth, Feed supplement, Poultry feed, *Spilanthes*.

## INTRODUCTION

*Spilanthes paniculata* Wall. ex DC, syn. *S. acmella* Murr., a medicinal plant, commonly known as "*Phakphet, Akarkara* or toothache plant", belongs to Asteraceae family, frequently available in most of the areas of India, Sri Lanka, Bangladesh, China, Japan and Thailand; is apparent in the indigenous system of medicine for its use in toothache, rheumatic fever (Asma *et al.,* 2019), throat and gum infections (Chung *et al.,* 2008) and wound healing (Hossan *et al.,* 2010). In literature, it has been found to be mentioned under the generic names of *Acmella*, *Athronia, Bidens* and *Anacyclus* (Flann, 2009). The flowers are yellow in colour and consist of a number of disc florets. The plants, growing ubiquitously in the plateau region, are generally considered as weed. All the plant parts are used in medicinal formulations but mostly flower buds and leaves are the major sources. A range of pharmaceutical content such as spilanthol, alkaylamide, affinin, proteins, butylated hydroxy toluene (BHT), stigmasterol, saponine, β-sitosterol, α and β-amyrin and fatty acids (n-hexadecanoic acid and tetradecanoic acid) *etc.,* have been reported to be found in this species. Hence, the high demand of pharmaceutical industries for these drugs has led to over exploitation of plants and in future it may go under endangered or threatened category (Hemant and Dnyanoba, 2019). The plant is also reported as aphrodisiac (*vajikarna*) and restoring premature ejaculation (*veeryastambhana*) in ancient ayurvedic texts by repairing neurological problems (Jani, 2007). Many literatures reported the biochemical constituents of flower heads of *S. paniculata* and their ethno-botanical and ethno-medicinal uses mainly in human health management. Several workers have highlighted different properties like anticancer (Ferrazzano *et al.,* 2011; Lopez-Alarcon and Denicola, 2013), antidiabetics (Yadav *et al.,* 2011), anti-inflammation, analgesics (Chakraborty *et al.,* 2010), antifungals (Khatoon *et al.,* 2014), antimicrobials, antibacterials (Sahu *et al.,* 2011; Sharma *et al.,* 2012), antioxidants (Tanwer *et al.,* 2010), antiallergic, antiulcer, anticonvulsant, antiobesity, antiprotozoal, antihypertension (Paulraj *et al.,* 2013; Dubey *et al.,* 2013), immunomodulatory (Sahu *et al.,* 2011), appetizer (Leng *et al.,* 2011) and antiaging properties with improved blood circulation in the body (Paulraj *et al.,* 2013). In addition, Sharma *et al.* (2011) has reported its effect on rats as well. In spite of plethora of literature emphasizing the medicinal value of all plant parts and their important role in human and animal health, there is complete lack of literature indicating its use for feeding

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livestock and poultry. Plants of *S. paniculata* are found growing abundantly in wild flora of Jharkhand.

Backyard poultry production and management of poultry birds on commercial scale is one of the major livelihood components in Jharkhand for rural farming community. However, no recorded information could be traced on use of flowers of *S. paniculata* as a feed supplement in poultry birds. In the light of above facts, an experiment was conducted during 2016-19 to explore the possibility and to quantify the effect of use of flowers of *S. paniculata* as feed additive in stimulating body growth in poultry.

## MATERIALS AND METHODS

An experiment was conducted in the Poultry unit of ICAR Research Complex for Eastern Region, Farming System Research Centre for Hill and Plateau Region, Plandu, Ranchi, Jharkhand during 2016-19 to study the effect of flower of *S. peniculata* used as feed additives in stimulating body growth in poultry birds. In total, 60 numbers of poultry birds (Divyan Red) of five months old were subjected to four treatments *i.e.,* $T_1$ (Control), $T_2$ (feeding birds with 10 g dried flowers per bird), $T_3$ (feeding birds with 15 g dried flowers per bird) and $T_4$ (feeding birds with 20 g dried flowers per bird) (Table 1), consisting of 15 birds in each treatments distributed equally in each 5 replications following randomized block design (RBD).

For this experiment, fresh flowers (*i.e.* flower head excluding flower stalk) of *S. paniculata* (Fig 1) were collected from the research farm during the months of March-April, 2016 and then kept for one week in loosely knit plastic bags for air drying. The dried flowers were then ruffled by hand using cotton cloth (Fig 2). The flower mixture (dried flower) was then weighed and added to the daily feed of recommended doses (*i.e.,* the feed composition formulated as per institutional guidelines balancing all the nutritional ingredients, mentioned in Table 2) given to the birds at varying proportions based on the treatments (Table 1) and number of birds. The measured quantity of feed offered once in a day at morning 10: 00 A.M. in hanging feeder to the birds during the period of experiment @ 140 g/bird/day (with or without treatments). Water was provided *ad libitum* throughout the experimental period. Routine vaccination and

**Table 1:** Daily use of dried flowers of *Spilanthes paniculata* as feed additives.

| Treatments | Control |
|---|---|
| $T_1$ | (0 g/bird) |
| $T_2$ | 10 g/bird |
| $T_3$ | 15 g/bird |
| $T_4$ | 20 g/bird |

**Fig 1:** Flowering stage of *Spilanthes paniculata.*

**Fig 2:** Dried flowers of *S. paniculata,* ready to be mixed with poultry feed.

**Table 2:** Nutritional composition of poultry feed.

| Feed composition* | Feed proportion (%) | Moisture (%) | CP (%) | CF (%) | Ash (%) | N (%) | P (%) | K (%) | Ca (%) | Mg (%) | Na (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Yellow crushed maize | 44.00 | 10.5 | 9 | 2.0 | 1.0 | 1.44 | 0.30 | 0.32 | 0.05 | 0.11 | 0.060 |
| Ground nut cake | 16.00 | 8.0 | 42 | 10.0 | 1.0 | 6.88 | 0.65 | 1.34 | 0.13 | 0.34 | 0.017 |
| Wheat bran | 15.00 | 10.5 | 13 | 10.0 | 2.5 | 2.24 | 1.01 | 1.18 | 0.07 | 0.61 | 0.002 |
| Fish beal | 6.00 | 15.0 | 55 | 2.5 | 5.0 | 8.8 | 2.86 | 0.85 | 4.47 | 0.24 | 1.142 |
| Bone beal | 1.50 | 0.1 | 0 | 0 | 99.4 | 0 | 14.00 | 0.02 | 31.00 | 0.12 | 0.300 |
| Rice polish | 15.00 | 10.0 | 11 | 4.0 | 1.5 | 1.76 | 1.19 | 1.49 | 0.05 | 0.78 | 0.005 |
| Salt | 0.45 | | | | | | | | | | |
| Vitamins | 0.05 | | | | | | | | | | |
| Mineral mixture | 2.00 | | | | | | | | | | |

CP = Crude Protein; CF = Crude Fibre; N = Total Nitrogen; P = Total Phosphorus; K = Total Potassium; Ca = Calcium; Mg = Magnesium; Na = Sodium

*****Feed was formulated as per institutional guidelines balancing all the nutritional ingredients.

treatment was provided as and when required. Deworming of birds was done at the beginning of experiment. Before feeding the birds, their initial body weight was recorded following weekly measurements fixed on 7$^{th}$ day, 14$^{th}$ day, 21$^{st}$ day and 28$^{th}$ day of experiment. The final bodyweight of each bird of same age group were then compared treatment-wise. The feed conversion ratio (FCR) was calculated as the ratio of total amount of feed consumed to the amount of weight gained. Lesser the FCR value, better is the treatment's effect on increased body weight in birds. The same procedure was repeated in two consecutive years *viz.,* 2017-18 and 2018-19. The nutrient composition in the dried flowers was analyzed in laboratory using standard methodology (A.O.A.C., 1980).

### Statistical analysis

Data recorded were analysed using Systat-12 software (Wilkinson and Coward, 2007) for computation of descriptive statistics (*i.e.,* mean, standard deviation and critical difference). ANOVA test for computing the significant differences between different treatments was also carried out.

## RESULTS AND DISCUSSION

The nutrient composition in the flowers of *S. paniculata* was analyzed before adding the dried flowers into already given recommended feeds to poultry. The moisture content in the fresh flowers was measured as 69.32 ± 1.68%. Whereas, the minerals (ash content) and organic matter content in dry flowers were recorded as 7.04% and 92.96%, respectively (Fig 3). On dry weight basis the result showed that, the flowers were having crude fibre (66.09 ± 1.70%), crude fat (7.39 ± 0.58%), protein (9.74 ± 0.51%) and antioxidants (0.18 ± 0.02%) on dry weight basis. The nutrient contents *viz.,* Nitrogen (1.56 ± 0.09%), Phosphorous (0.63 ± 0.02%), Potassium (2.05 ± 0.14%), Calcium (0.4 ± 0.01%), Magnesium (0.12 ± 0.01%) and Sodium (0.42 ± 0.02%) in dried flowers were also analyzed (Table 3).

The result revealed that, there were significant differences among different treatments (Table 4). The increased body weight of 570 ± 25 g in birds was recorded as the maximum increase due to feeds added with dried flowers of *S. paniculata* when compared with the control (269 ± 37 g). The feed conversion ratio (FCR) was found minimum (6.93 ± 0.30) in treatment $T_2$ (10 g of dried flower per bird per day *i.e.,* 10 g/bird/day) and was considered as best while compared with other treatments. Among all the treatments, treatment $T_2$ (*i.e.,* 10 g/bird) was found the best dose of dried flower of *S. paniculata* added daily in the recommended poultry feed when compared with the control ($T_1$), followed by treatments $T_3$ (*i.e.,* 15 g/bird) and $T_4$ (*i.e.,* 20 g/bird) in that order.

The percent increase in body weight of poultry after feeding different doses of dried flowers of *S. paniculata* daily for four weeks revealed that, there was a significant effect on their body weight of each bird (Fig 4). Among all the treatments, $T_2$ (*i.e.,* 10 g/bird) had stimulated maximum growth of 25.11% increase over the initial body weight of birds, followed by $T_3$ (19.99 %), $T_4$ (16.68 %) and the least growth was recorded as 12.11% in T1 (Control).

No mortality was observed in any of the experimented birds. When compared the increased body weight of poultry attained from different feed constituents on weekly basis, initially there was a sudden and maximum increase of body weight of birds after one week of feeding dried flower of *S. paniculata* @ 20 g/bird (*i.e.,* $T_4$) which gradually decreased in the following weeks (Fig 5). Whereas, treatment $T_2$ (*i.e.,* 10 g/bird) was found to be a good growth stimulant, which had induced maximum body weight in the birds after feeding for 4 weeks (Table 4). The increased body weight of birds may be attributed to combined effects of properties like antioxidants (Tanwer *et al.*, 2010), hepatoprotective (Ali *et al*., 2013), diuretic (Yadav *et al.,* 2011), immunomodulatory (Sahu *et al.,* 2011), antifungal (Rani and Murty, 2006), antibacterial (Sahu *et al.,* 2011), aphrodisiac (Jani, 2007; Sharma *et al.,* 2010), anti-inflammatory and analgesic (Chakraborty *et al*., 2010). Moreover, the biochemical constituent like spilanthol present in the flower might have helped in increasing salivation and improving appetite in birds. Similar observations have been reported in human beings by Barbosa *et al.* (2016). They mentioned that spilanthol present in the flower extract increases salivation, which improves appetite in human beings. The effect on

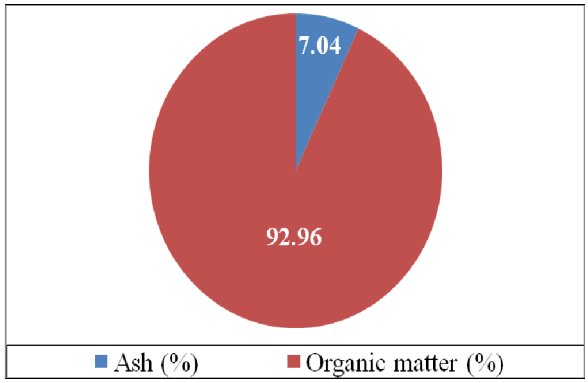


**Fig 3:** Proportion of minerals and organic matter in dry flower of *Spilanthes paniculata.*

**Table 3:** Nutrient composition in flower of *Spilanthes paniculata* used as a constituent in poultry feed on dry weight basis.

| Nutrients | Values (%) ± SE* |
|---|---|
| N | 1.56±0.09 |
| P | 0.63±0.02 |
| K | 2.05±0.14 |
| Ca | 0.4±0.01 |
| Mg | 0.12±0.01 |
| Na | 0.42±0.02 |
| Antioxidant | 0.18±0.02 |
| Crude fibre | 66.09±1.70 |
| Crude fat | 7.39±0.58 |
| Protein | 9.74±0.51 |

*SE = Standard Error.

**Table 4:** Comparison of average body weight of poultry (2016-19) attained from different feed constituents.

| Treatments | Control | Increased body weight (g) ± SE | FCR ± SE |
|---|---|---|---|
| $T_1$ | (0 g/bird) | 269±37$^{c}$ | 15.01±1.38$^{a}$ |
| $T_2$ | 10 g/bird | 570±25$^{a}$ | 6.93±0.30$^{c}$ |
| $T_3$ | 15 g/bird | 445±68$^{b}$ | 9.82±1.69$^{b}$ |
| $T_4$ | 20 g/bird | 372±24$^{bc}$ | 10.70±0.68$^{b}$ |
| C.D. (0.05) | | 113 | 3.16 |

Superscripts denote comparison of treatment means with Critical Difference (0.05).

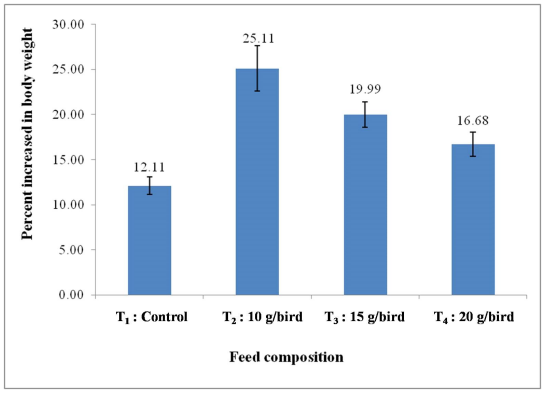


**Fig 4:** Percent increased in body weight of poultry (average of 2016-19) in four weeks.

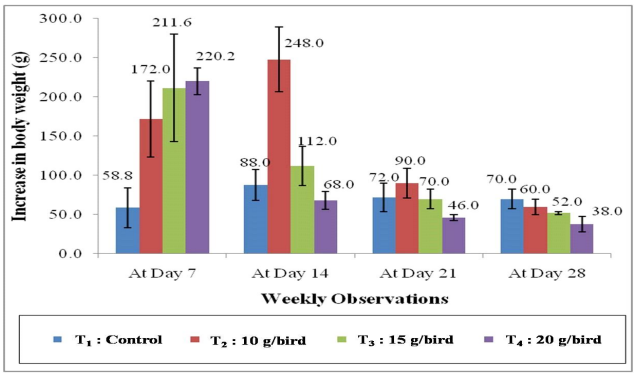


**Fig 5:** Comparison of increased body weight of poultry (average of 2016-19) attained on weekly basis from feed containing different doses of *S. paniculata* flowers.

the growth performances of poultry birds with respect of increased body weight could also be due to having different levels of dietary crude protein (Srilatha *et al.,* 2018). Zia *et al.* (2018) observed that body weight gain and feed conversion ratio (FCR) were improved in Aseel chickens when fed with selenium enriched yeast supplemented diets. Ahmad *et al.* (2019) also opined that fermented rice bran showed beneficial effect on broiler performance and could be used in poultry feed as phytase source.

## CONCLUSION

Marked increase in body weight of poultry birds was observed during the period of observation by feeding dried flowers of *S. paniculata* at all doses *i.e.,* 10, 15, 20 grams per bird per day. There is a gradual decrease in rate of weight increase with increasing duration of feeding *S. paniculata* to poultry birds @15 and 20 g/day while @ 10 g/day there was an increase up to 2nd week and it gradually declined afterwards. A dose of 10 g of dried flowers of *S. paniculata* per bird per day was found the best for inducing weight increase in poultry when fed for 4 weeks regularly. Therefore, poultry owners may be advised to incorporate dried flowers of *S. paniculata* at a dose of 10 grams per bird per day for at least three weeks.

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