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SN Lad
M.Sc., Department of Animal
Husbandry and Dairy Science,
VNMKV, Parbhani,
Maharashtra, India

DV Bainwad
Associate Professor, Department
of Animal Husbandry and Dairy
Science, VNMKV Parbhani,
Maharashtra, India

RA Patil
Assistant Professor, Department
of Animal Husbandry and Dairy
Science, VNMKV Parbhani,
Maharashtra, India

AR Naik
MBA (Marketing), SAV Acharya
Institution of Management
Studies, Karjat, Mumbai
University, Maharashtra, India

Corresponding Author
SN Lad
M.Sc., Department of Animal
Husbandry and Dairy Science,
VNMKV, Parbhani,
Maharashtra, India

Effect of garlic (*Allium Sativum*) supplementation on the growth performance and dry matter intake (DMI) in buffalo calves

SN Lad, DV Bainwad, RA Patil and AR Naik

Abstract

The present investigation was carried out to study “Effect of Garlic (*Allium sativum*) Supplementation on The Growth Performance and Dry Matter Intake in Buffalo Calves at Organized Farm”. Twelve buffalo calves of 5 to 6 months age were selected and distributed into four treatments T₀, T₁, T₂ and T₃ respectively, for the experimental period of 90 days. The objectives of the present research were to study the effect of garlic powder supplementation on growth performance and dry matter intake of buffalo calves. T₀ was considered as control and T₁, T₂ and T₃ were supplemented with garlic powder at the rate of 200, 300 and 400 mg per kg body weight, respectively in concentrate mixture. Results of the present investigation show significant improvement ($P < 0.05$) in the body weight, weight gain, body length, height at wither, chest girth and belly girth of buffalo calves of garlic powder supplemented group over control group and Dry matter intake (DMI) of treatment T₂ and T₁ shows superior significant difference over control treatment T₀. It was observed that the T₂ group showed significant ($P < 0.05$) growth over other two garlic supplemented group i.e. T₁ and T₃.

Keywords: Body weight, buffalo calves, dry matter intake, garlic powder

Introduction

Buffaloes are the backbone of rural economy in India. Buffaloes occupy an important place in the social, economic and cultural life of Indian rural communities and are useful as a triple purpose animal for milk, meat and draft power. Buffalo calves are the future replacement stock of the herd. Calves are often neglected because they required financial investment and they do not result in any immediate returns. However, serious attention should be given to calf rearing because initial growth of an animal is the most important phase of its life and induces immense bearing on the early maturity and production; initial body weight has been found to be associate with later body weight and the growth rates at any stage of development can also be taken as an aid to selection. Further, the sexual development depends mainly on body weight rather than age (Ghose *et al.* 1979) [4]. Overall dairy farm profit can be maximized by reducing calf fatality, better management practices and supplementation of the good nutrients and feed additives. Good supplementation of nutrients and feed additives are of paramount importance for calf growth and health. It is proven that supplementation of rumen function, modulators, liver tonics and immuno modulators, at an early age helps in strengthening the immunity and to prohibit diseases (Prasad *et al.*, 2005) [9].

Garlic (*Allium Sativum*) is one of the most extensive bulb crop in India. The garlic bulb contain a dull, aromatic, and water-soluble component called allicin. Garlic contains enzymes, vitamin B, flavonoids, and various minerals. Garlic is a high quality resource of antioxidants and protein. Garlic supplementation through the feed has lots of encouraging health benefits and scientific effects, which comprise improvement of immune function, revised overseas compound detoxification, restitution of bodily potency, and fighting to diverse stresses cancer-preventive measures of garlic, garlic extracts and its mechanism have been established in the animals. Among the various supplements, aged garlic extract has been analyzed and considered widely for their exalted antioxidant substance and health-protective prospective (Mishra *et al.*, 2020) [8].

Materials and Methods

Experimental site and materials

The experiment was conducted at Buffalo Unit, Department of Animal Husbandry and Dairy

Science, College of agriculture, Vasantrya Naik Marathwada Krishi Vidyapeeth, Parbhani during the 1 march 2021 to 31 may 2021. Garlic was purchased from local mandi and then dried. After drying outer husk was separated and the bulbs were grind to powder by electric grinder.

Experimental animals and design

Total 16 Buffalo calves of same age and similar conformation were selected from the Buffalo Unit to conducted the experiment. Calves were grouped under same weight and average age in four treatments groups and four calves in each group. T₀ was considered as control and T₁, T₂ and T₃ were supplemented with garlic powder at the rate of 200, 300 and 400 mg per kg body weight, respectively in concentrate mixture. All the calves were free from diseases and physiological disorders. The experimental period was 90 days and 15 days pre-experimental period.

Parameters studied

Live body weight (kg), average body weight gain (kg), daily weight gain (kg), body length (cm), height at wither (cm), chest girth (cm), belly girth (kg) and dry matter intake were recorded during the experimental period.

Statistical analysis

The data obtained was analyzed by using Complete Randomized Design (CRD). The standard errors (SE) and critical differences (CD) at 5 per cent level of significance

were worked out for comparison of treatments and presented in the respective table.

Results and Discussion

Growth Performance

From the Table 1 It was observed that the live body weight (kg), average total body weight gain (kg) and daily body weight gain (gm) found significant in garlic powder supplemented treatments compared to the control group. Garlic powder supplementation at 300 mg per kg body weight (T₂) showed significant improvement than the other to supplemented groups.

From the Table 1 it was similar findings were observed by Balamurugan *et al.*, (2014) [1] studied that garlic supplementation groups increased significantly higher in final body weight and overall body weight gain in crossbred calves. The result obtained in this experiment agreement with the results of Duvvu *et al.*, (2018) [2] who observed that the increase in body weight in Murrah buffalo calves fed with garlic powder. Overall weight gain in Murrah buffalo calves were higher in group T₂ (300 mg/kg b.wt.), T₁ (250 mg/kg b.wt.) and T₀ (0%). Mishra *et al.*, (2020) [8] who also reported that the average overall Body gain differed significantly ($P < 0.05$) with highest in the T₂ (90.00±8.52kg) followed by T₄ (84.50±10.12kg), T₃ (80.82±9.17kg) and lowest in the T₁ (72.67±8.12kg) group. Ghosh *et al.*, (2010) [5] reported that the dietary garlic extract supplementation significantly improved growth performance in crossbred calves.

Table 1: Effect of Garlic (*Allium sativum*) Supplementation on body weight gain of Buffalo Calves

Particulars	T ₀	T ₁	T ₂	T ₃	C.D	S.E
Initial body weight(kg)	82.48	82.25	82.50	82.38	NS	1.349
Final body weight(kg)	127.13 ^c	130.80 ^{ab}	132.95 ^a	128.38 ^{bc}	3.380	1.097
Average total body weight gain(kg)	44.65 ^b	48.55 ^{ab}	50.45 ^a	46.00 ^b	4.220	1.370
Daily body weight gain(g)	0.496 ^b	0.539 ^{ab}	0.560 ^a	0.511 ^{ab}	0.048	0.015

Note: The means with different superscript in the same row differed significantly ($P < 0.05$)

Body conformation parameters

It was observed from Table 2 that the final body length (cm), height at wither (cm), chest girth (cm) and belly girth(cm) of buffalo calves at end of the experiment differed significantly ($p < 0.05$) with highest in the T₂ followed by T₁, T₃ and T₀, respectively. 300 mg/kg body weight garlic (*Allium sativum*) powder supplementation boosts body length, height at wither, chest girth and belly girth of calves than 0 and 400 mg/kg body weight.

The results obtained in present study are concordant with

Mishra *et al.*, (2020) [8] who reported the average overall body length, chest girth, height at wither of the female crossbred calves at end of the study differed significantly ($P < 0.05$) with highest in the T₂ followed by T₃, T₄ and lowest in the T₁ group. The data from the Table 2 showed similarities with Kekana *et al.*, (2020) [7] who also shows evaluated the effect of garlic, probiotics, and in combination on levels of immunoglobulin G (IgG) and growth performance in new-born Holstein Calves.

Table 2: Effect of Garlic (*Allium sativum*) Supplementation on body conformation parameters (cm) of Buffalo Calves

Body parameters	Period	T ₀	T ₁	T ₂	T ₃	C.D	S.E
Body length (cm)	Initial	85.50	86.00	85.50	86.75	NS	3.016
	Final	103.75 ^b	107.25 ^{ab}	110.00 ^a	105.25 ^b	4.225	1.488
Height at wither(cm)	Initial	91.50	95.25	93.00	92.00	NS	1.778
	Final	104.25 ^b	107.50 ^{ab}	110.25 ^a	106.00 ^b	4.184	1.358
Chest girth(cm)	Initial	91.75	91.00	92.75	92.50	NS	2.275
	Final	109.25 ^b	113.75 ^{ab}	117.25 ^a	111.25 ^b	5.356	1.738
Belly girth(cm)	Initial	93.75	94.25	95.00	93.50	NS	2.153
	Final	108.25 ^b	110.25 ^b	116.00 ^a	109.75 ^b	4.958	1.609

Note: The means with different superscript in the same row differed significantly ($P < 0.05$)

Dry matter intake (DMI)

The fortnightly interval mean daily dry matter intake ranged from 2.27 to 3.09, 2.28 to 3.16 and 2.28 to 3.02 kg from first to sixth fortnightly interval of experimental period for buffalo

calves supplemented with garlic powder in 200 (T₁), 300 (T₂) and 400 (T₃) mg per kg body weight and control group it ranged from 2.27 to 3.04 kg (T₃). Statistical analysis revealed significant ($P < 0.05$) improvement in dry matter intake of

buffalo calves supplemented various level of garlic powder as compared with control group of calves it was observed in Table 3.

The dry matter intake significantly increased in buffalo calves reason for might be due to sulfur containing compound in garlic powder such as allicin. The results of the present study are in similar with Duvvu *et al.*, (2018) [2] who reported that the dry matter intake higher in T₂ and lower T₀. From the Table 7 it is Similar findings were observed by Balamurugan *et al.*, (2014) [1] who also reported that the monthly mean daily dry matter intake ranged from 0.97±0.02 to 2.00±0.04 kg from first month of experimental trial for calves supplemented with garlic in water (T₁). For the calves supplemented with garlic in concentrate feed it ranged from 0.95±0.01 to 2.03 kg (T₂) and for the calves in the control group it ranged from 0.92± 0.02 to 1.98±0.70 kg (T₂). Results are also corroborated with Ghosh *et al.*, (2009) who investigated the mean of dry matter intake per calf per day in the treatment group were 12.44 per cent higher than control group.

Table 3: Effect of Garlic (*Allium sativum*) Supplementation on fortnightly interval mean daily dry matter intake (kg) of Buffalo Calves

Time interval	T ₀	T ₁	T ₂	T ₃	C.D	S.E
0 -15 th days	2.27	2.27	2.28	2.28	NS	0.067
75- 90 th days	3.04 ^b	3.09 ^{ab}	3.16 ^a	3.02 ^b	0.098	0.032
Overall DM intake	291.6 ^d	296.1 ^b	301.32 ^a	294.12 ^c	6.362	2.064
Daily DM intake	3.24 ^b	3.29 ^{ab}	3.34 ^a	3.26 ^b	0.071	0.023

Note: The means with different superscript in the same row differed significantly ($P < 0.05$)

Conclusion

It was concluded that the supplementation of garlic powder at 300 mg per kg body weight show significant improvement in body growth performance and dry mater intake of buffalo calves.

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