

EFFECT OF POLYHERBAL FEED SUPPLEMENTATION ON GROWTH PERFORMANCES OF ASSAM HILL GOAT

ABSTRACT

In the current investigation, 36 nos of Assam Hill goat were selected and divided randomly into three groups. Polyherbal feed was supplemented in treatment groups @ 1 and 2 g/Kg body weight from 4 month of age till 12month of age, respectively. Data on various parameters were analysed at fortnightly interval for a period up to 9 months. The average body weight at 19th fortnight *i.e.*, at 12months of age were 13.84 ± 0.032 , 14.47 ± 0.021 and 16.24 ± 0.040 kg in control and the two treatment groups, T₁ and T₂ respectively. The overall body weight (kg) of two treatment groups were significant higher ($p < 0.01$) than that of control group. In respect of sex, the male animals attained higher bodyweight than that of female animals at all the stages of experiment. Significant differences ($p < 0.01$) among control and two treatment groups were observed for body length and chest girth of the animals. The study indicated that polyherbal feed supplementation improve the overall growth of the Assam Hill goats.

Keywords: Polyherbal, Body weight, Growth, Assam Hill goat

1.Introduction

Currently, India has a total livestock population of 536.76 million out of which 148.88 million are genetically diverse goats, accounting for approximately 27.8% of the total livestock. The goat population has seen a growth of 10.14 % compared to the previous livestock census conducted in 2012. India recognizes 34 officially registered goat breeds as per NBAGR including one from Assam namely the Assam Hill goat. All the goats are well adapted to their respective home tract. According to the 20th Livestock census by DAHD, Government of India., the goat population in Assam is 4.315 million. *i.e.*, 24% of the Assam's total livestock population of 18.092 million.

Goat farming is a crucial livelihood activity in rural Assam and across the nation, playing a key role in supporting the national and rural economy. It serves as a crucial source of income for farming families, particularly for those without land. Goats also offer essential dietary protein through their meat and milk. However, many Indian farmers, especially those living below the poverty lines struggle to adequately feed their goats and other animals under traditional, low-input systems. This results in poor nutritional intake and reduced productivity. There is a need to improve goat production system in the villages as it was usually the poorest farmers who own goats. It is nicely termed as - poor man's cow by our father of the nation Mahatma Gandhi. The supply of quality feed together with proper hygiene, potable water and management can ensure the production of nutritious animal products with desired organoleptic properties (Saxena, 2008).

Studies on animals have shown that many herbal supplements help in improving growth and production in goats and supporting their overall health and well-being (Langeroudi et al., 2008; Hashemi and Davoodi, 2010; Sanchez et al., 2009). In developing countries, including India, medicinal plants are easily accessible to get than manufactured drugs. Some of these herbs are known to have positive effects on the animals' growth, breeding, and health (Mirzaei, 2012). Many herbs and plant extracts have antimicrobial activities against a wide range of bacteria, yeasts, and molds (Thompson, 1986; Voda *et al.*, 2003). In the current study, it was hypothesized that herbal feed supplement may greatly enhance these performances of the goat population in Assam. The present research work was taken to investigate the effect of feeding Assam Hill goat with a polyherbal feed supplement consist of Shatavari, Methi and Ajwain on their growth performance.

2. MATERIALS AND METHODS

2.1 PLACE OF EXPERIMENT

The experiment was carried out in Goat Research Station, Assam Agricultural University, Burnihat, Assam. The geographical location of Goat Research Station, Burnihat is $20^{\circ} 1'$ to $26^{\circ} 5' 1''$ N latitude and $85^{\circ} 4' 9''$ to $92^{\circ} 5' 2''$ E longitude.

2.2. EXPERIMENTAL DESIGN

A total of 36 healthy weaned Assam Hill kids (18 male and 18 female) of similar body weight were taken from the farm flock of GRS, Burnihat and were utilised for the experiment. The kids were divided randomly into three equal groups with 12 kids each (6 male and 6 female) and constituted the three experimental groups, viz. Group- I (control group-C0), Group-II (treatment group-T1) and Group-III (treatment group-T2). The kids of all the three groups were raised on similar feeding regimes under semi-intensive management system while the two treatment groups were fed polyherbal feed supplement daily at the rate of 1 g/kg Body weight (bwt) and 2 g/kg bwt. respectively T1 and T2 (Table 1). The polyherbal supplement was constituted of Shatavari root (*Asparagus racemosus*), Fenugreek seed (*Trigonella foenum-graecum*) and Ajwain seed (*Trachyspermum ammi*) powder mixed at 1:1:1 ratio (Figure 1).

TABLE 1: EXPERIMENTAL GROUPS AND FEEDING SCHEDULE

Experimental group	No. of animal	Feeding treatment
Group I (C ₀)	12 (6 male + 6 female)	Routine feeding and managerial regime
Group II (T ₁)	12 (6 male + 6 female)	Routine feeding and managerial regime plus poly herbal feed supplement @ 1g/kg bwt.
Group III (T ₂)	12 (6 male + 6 female)	Routine feeding and managerial regime plus poly herbal feed supplement @ 2g/kg bwt.

2. 3 PRE-CONDITIONING OF EXPERIMENTAL ANIMALS

After selection of the healthy kids, 10-day adjustment period was given to help them adjust to the new environment. Each goat was weighed, checked for health, and given identification to each animal by ear tagging. Thereafter, all the experimental kids were dewormed by an oral dewormer (Panacur suspension 2.5 % (Fenbendazole) @ 5 mg/kg) to eliminate endo parasitic infestation before the onset of experiment. The experimental kids were

reared in semi-intensive system in elevated conventional slatted wooden floor shed which had provision of natural cross ventilation with proper feeding amenities.



FIGURE 1: SHATAVARI ROOT POWDER, FENUGREEK SEED POWDER AND AJWAIN SEED POWDER

2.4 FEEDING MANAGENENT OF EXPERIMENTAL ANIMALS

The routine ration was prepared with roughage and concentrate mixture (Table 2), where 1/3rd was concentrate ration and 2/3rd was roughage on a DM basis to fulfil the nutrient requirement of kids as per ICAR, (2013). The grasses fed to the animal were constituted of Para (*Bracharia mutica*) and Napier (*Pennisetum purpureum*) grass in a ratio of 50:50 on a DM basis. The control group (C₀) received only the concentrate, while the two treatment groups were given a polyherbal supplement along with the concentrate. Fresh, clean water was also provided to all the goats in the experiment.

TABLE 2: FEEDING INGREDIENTS OF CONCENTRATE RATION

INGREDIENTS	PARTS
Maize crush	40
Wheat bran	12
Rice polish	10
Ground nut cake	35
Mineral mixture	2
Salt	1
Total	100

2.5 PARAMETERS FOR GROWTH PERFORMANCE

2.5.1 Body weight at fortnightly interval

Individual body weights of the kids were measured initially and then at fortnightly intervals. The weighing was done in the morning before feeding, using a 25 kg capacity spring balance and expressed in kilogram (kg).

2.5.2 Body length: Body length was measured between point of shoulder and point of hip.

2.5.3 Chest girth: The measurement was taken as the circumference of the chest immediately behind the shoulder joint.

2.5.4 Neck girth: Circumference of neck was measured at the middle position of neck.

3. RESULTS AND DISCUSSION

3.1 GROWTH PERFORMANCE

3.1 Body weight

The means of the overall body weight at 12 months (i.e., 19th fortnight of the experiment) was 13.84 ± 0.032 , 14.47 ± 0.021 and 16.24 ± 0.040 kg for control (C₀), treatment T₁, and T₂ groups respectively. During initiation of the experiment, the mean value of initial body weight of kids in different treatment groups were almost similar. The results showed significant difference ($P < 0.01$) in overall average values of body weight (kg) of treatment groups than that of control group. The highest body weight was found in T₂ group, followed by T₁ than that of C₀ throughout the period of this study. In respect of sex, the male animals were found to have higher bodyweight than that of female animals at all the stages of experiment (Table 3).

A noticeable gain in body weight (kg) was seen from the fourth fortnight and continued until the nineteenth fortnight. Both treatment groups grew faster than the control group. The graph (Fig. 3) showed that by the end of the study, the difference in average body weight among the three groups (C₀, T₁, and T₂) became clearer, likely due to different levels of polyherbal supplements (0g, 1g, and 2g per kg body weight). This increase in weight agrees with findings by Mirzaei and Prasad (2011), who also saw higher weaning weights in goats with polyherbal supplements. Similarly, Muralidhar et al. (1993) found that rats fed a Shatavari-based herbal mix gained more weight than those in the control group. Mader et al. (1987) also reported better weight gain in pigs and steers fed saponin, a part of Shatavari. On the other hand, Kumar (2018)

found no effect on buffalo growth from feeding Ajwain, and noted that weight changes over time could also be due to environmental factors like temperature, fodder quality, and nutrient use.

In this study, the better growth rate was found in group T₂, followed by T₁ with supplementation of polyherbal preparation (Shatavari root powder, Fenugreek seed powder, Ajwain seed powder at ratio 1:1:1) in basal ration at the dose rate of 2gm and 1gm per kg bodyweight for 9 months was responsible for better growth due to digestive, hepatoprotective, antibacterial, antistressor, antioxidant, anthelmintic and immunomodulatory property of the supplement. These findings were in close conformity with Puri *et al.* (1993), Sethi *et al.* (2004), Ankita (2010), Mondal *et al.* (2011) and Pandit *et al.* (2013).

TABLE 3: FORTNIGHTLY BODY WEIGHT (MEAN±SE) OF ASSAM HILL GOAT OF DIFFERENT TREATMENT GROUPS

Fortnight	Body weight (kg)				
	C ₀	T ₁	T ₂	M	F
Initial	4.79 ± 0.022	4.78 ± 0.022	4.79 ± 0.021	4.80 ± 0.022	4.78 ± 0.021
1	5.26 ± 0.022	5.26 ± 0.022	5.27 ± 0.021	5.29 ± 0.023	5.24 ± 0.021
2	5.73 ± 0.021	5.74 ± 0.021	5.77 ± 0.020	5.79 ± 0.022	5.71 ± 0.019
3	6.22 ± 0.023	6.23 ± 0.024	6.29 ± 0.021	6.31 ± 0.022 ^a	6.19 ± 0.023 ^b
4	6.72 ± 0.022 ^a	6.74 ± 0.024 ^a	6.88± 0.022 ^b	6.86 ± 0.022 ^a	6.71 ± 0.023 ^b
5	7.23 ± 0.024 ^a	7.25 ± 0.025 ^a	7.50± 0.020 ^b	7.42 ± 0.024 ^a	7.23 ± 0.023 ^b
6	7.74 ± 0.025 ^a	7.77 ± 0.022 ^a	8.14± 0.020 ^b	8.00 ± 0.022 ^a	7.77 ± 0.023 ^b
7	8.24 ± 0.024 ^a	8.29 ± 0.022 ^a	8.82± 0.025 ^b	8.60 ± 0.021 ^a	8.30 ± 0.026 ^b
8	8.73 ± 0.021 ^a	8.82 ± 0.022 ^a	9.53± 0.026 ^b	9.22 ± 0.021 ^a	8.84 ± 0.024 ^b
9	9.21 ± 0.022 ^a	9.36 ± 0.021 ^b	10.26±0.030 ^c	9.84 ± 0.023 ^a	9.38 ± 0.026 ^b
10	9.68 ± 0.023 ^a	9.90 ± 0.022 ^b	10.95±0.029 ^c	10.44± 0.022 ^a	9.91 ± 0.027 ^b
11	10.15± 0.023 ^a	10.44±0.024 ^b	11.62±0.028 ^c	11.04± 0.022 ^a	10.44±0.028 ^b
12	10.62± 0.023 ^a	10.97±0.024 ^b	12.29±0.026 ^c	11.63± 0.022 ^a	10.96±0.027 ^b
13	11.08± 0.024 ^a	11.49±0.022 ^b	12.95±0.025 ^c	12.21± 0.020 ^a	11.48±0.028 ^b
14	11.55± 0.024 ^a	12.01±0.022 ^b	13.59±0.023 ^c	12.79± 0.020 ^a	11.98±0.026 ^b
15	12.01± 0.026 ^a	12.52±0.023 ^b	14.19±0.019 ^c	13.34± 0.019 ^a	12.48±0.027 ^b
16	12.47± 0.027 ^a	13.02±0.021 ^b	14.74±0.022 ^c	13.86± 0.020 ^a	12.97±0.027 ^b
17	12.93± 0.028 ^a	13.51±0.023 ^b	15.26±0.027 ^c	14.37± 0.022 ^a	13.43±0.030 ^b
18	13.39± 0.031 ^a	14.00±0.022 ^b	15.76±0.032 ^c	14.88± 0.022 ^a	13.88±0.034 ^b
19	13.84± 0.032 ^a	14.47±0.021 ^b	16.24±0.040 ^c	15.37± 0.023 ^a	14.33±0.039 ^b

Overall	9.05 ± 0.024^a	9.69 ± 0.022^b	11.45 ± 0.025^c	10.57 ± 0.022^a	9.55 ± 0.026^b
---------	--------------------	--------------------	---------------------	---------------------	--------------------

Means with similar superscript in a row or column do not differ significantly among themselves

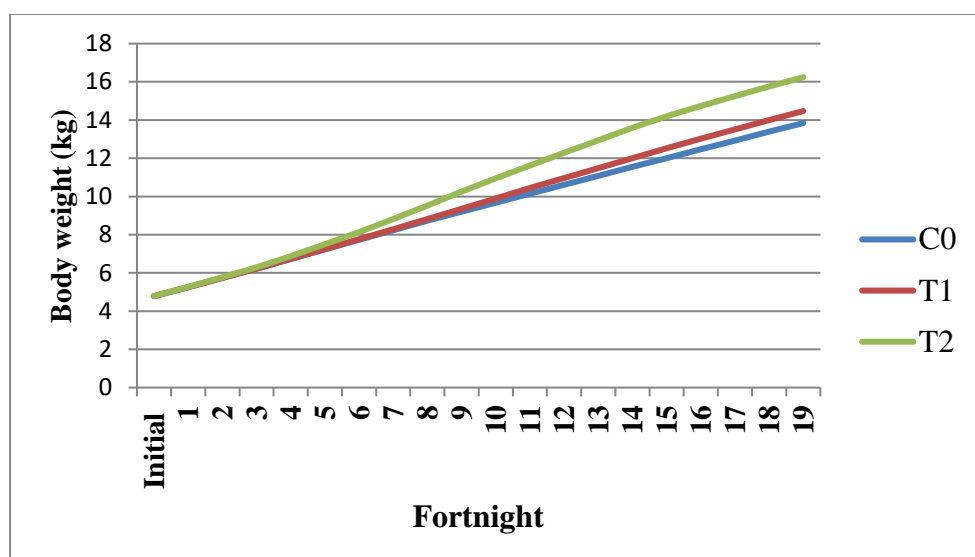


FIGURE 2: FORTNIGHTLY BODY WEIGHT OF ASSAM HILL GOAT OF DIFFERENT TREATMENT GROUPS

3.2 Body length

During initiation of the experiment, the mean body length of animals in different treatment groups was almost similar. At the end of experiment (19th fortnight) group T₂ (45.77 ± 0.259) showed significantly highest ($P < 0.01$) body length (cm) followed by groups T₁ (45.10 ± 0.259) than C₀ (42.56 ± 0.222). Similarly, the male goat has higher body length than female animals. Similar findings were observed by Park et al. (2000) who reported a positive effect of herb mixture on growth performance in weaned pigs.

TABLE 4: AVERAGE (MEAN \pm SE) FORTNIGHTLY BODY LENGTH OF ASSAM HILL GOAT OF DIFFERENT TREATMENT GROUPS

Fortnight	Body length(cm)				
	C ₀	T ₁	T ₂	M	F
Initial	30.43 ± 0.194	30.56 ± 0.212	30.62 ± 0.196	30.57 ± 0.193	30.50 ± 0.208
1	31.40 ± 0.185	31.65 ± 0.204	31.71 ± 0.194	31.60 ± 0.179	31.55 ± 0.209
2	32.36 ± 0.182	32.40 ± 0.190	32.50 ± 0.192	32.43 ± 0.163	32.41 ± 0.213
3	33.35 ± 0.167	33.43 ± 0.182	33.52 ± 0.195	33.46 ± 0.148	33.42 ± 0.214

4	34.33 ± 0.161	34.52 ± 0.171	34.62 ± 0.196	35.50 ± 0.134	35.48 ± 0.218
5	35.30 ± 0.176	35.41 ± 0.159	35.62 ± 0.201	35.45 ± 0.132	35.43 ± 0.225
6	36.28 ± 0.181	36.30 ± 0.153	36.41 ± 0.201	36.33 ± 0.131	36.31 ± 0.226
7	37.32 ± 0.177	37.62 ± 0.177	37.70 ± 0.239	37.55 ± 0.155	37.55 ± 0.241
8	37.83 ± 0.176	38.15 ± 0.170	38.20 ± 0.229	38.05 ± 0.152	38.04 ± 0.231
9	38.32 ± 0.179	38.56 ± 0.170	38.70 ± 0.218	38.55 ± 0.151	38.49 ± 0.227
10	38.83 ± 0.179	39.00 ± 0.172	39.20 ± 0.214	39.10 ± 0.150	38.94 ± 0.227
11	39.33 ± 0.189	39.70 ± 0.171	39.73 ± 0.219	39.60 ± 0.159	39.55 ± 0.227
12	39.84 ± 0.199 ^a	40.19 ± 0.173 ^a	40.20 ± 0.223 ^a	40.50 ± 0.164 ^a	39.65 ± 0.233 ^b
13	40.37 ± 0.209 ^a	40.71 ± 0.172 ^a	40.75 ± 0.239 ^a	41.00 ± 0.176 ^a	40.19 ± 0.237 ^b
14	41.03 ± 0.214 ^a	41.38 ± 0.180 ^a	41.40 ± 0.243 ^a	42.00 ± 0.187 ^a	40.56 ± 0.238 ^b
15	41.68 ± 0.218 ^a	42.00 ± 0.186 ^a	42.00 ± 0.249 ^a	42.50 ± 0.199 ^a	41.27 ± 0.236 ^b
16	42.33 ± 0.220 ^a	42.70 ± 0.205 ^a	42.71 ± 0.247 ^a	42.91 ± 0.209 ^a	42.24 ± 0.239 ^b
17	42.99 ± 0.225 ^a	43.50 ± 0.219 ^b	43.80 ± 0.256 ^b	44.21 ± 0.220 ^a	42.65 ± 0.246 ^b
18	43.66 ± 0.227 ^a	44.12 ± 0.236 ^b	44.90 ± 0.259 ^c	45.26 ± 0.236 ^a	43.20 ± 0.246 ^b
19	42.56 ± 0.222 ^a	45.10 ± 0.259 ^b	45.77 ± 0.259 ^c	45.55 ± 0.253 ^a	43.40 ± 0.240 ^b
Overall	37.98 ± 0.194 ^a	40.09 ± 0.188 ^b	40.18 ± 0.223 ^c	38.61 ± 0.175 ^a	38.04 ± 0.229 ^b

Means with similar superscript in a row or column do not differ significantly among themselves

3.3 Chest Girth

The average mean value of fortnightly measurement of chest girth of the goats (cm) showed that there were significant differences among C₀, T₁ and T₂ were observed from 10th fortnight. During early fortnights of the experiment, the mean chest girth of all the animals in different treatment groups were almost similar. At the end of experiment (19th fortnight) group T₂ (58.47 ± 0.283) showed significantly highest (P<0.01) chest girth followed by groups T₁ (58.31 ± 0.347) and C₀ (53.68 ± 0.334) which may be due to different growth rates in the different treatment groups. These results were in agreement with the result of (Chowdhury and Faruque, 2001) who shown that chest girth of male and female above 12 months of age is 73.2±1.33 and 71.0±1.13 cm, respectively. Similar findings were observed by Park et al. (2000) in weaned pigs.

TABLE 5: AVERAGE (MEAN±SE) FORTNIGHTLY CHEST GIRTH OF ASSAM HILL GOAT OF DIFFERENT TREATMENT GROUPS

Fortni	Chest Girth (cm)				
	C ₀	T ₁	T ₂	M	F
Initial	36.61 ± 0.275	36.43 ± 0.260	36.55 ± 0.242	36.70 ± 0.274	36.36 ± 0.254
1	37.75 ± 0.268	37.57 ± 0.276	37.70 ± 0.246	37.84 ± 0.271	37.50 ± 0.254
2	38.88 ± 0.271	38.72 ± 0.274	38.84 ± 0.243	38.99 ± 0.272	38.64 ± 0.257
3	40.02 ± 0.264	39.87 ± 0.263	39.99 ± 0.234	40.13 ± 0.268	39.78 ± 0.255
4	41.15 ± 0.273	41.01 ± 0.256	41.14 ± 0.238	41.28 ± 0.268	40.92 ± 0.257
5	42.29 ± 0.282	42.16 ± 0.278	42.29 ± 0.247	42.42 ± 0.270	42.07 ± 0.259
6	43.42 ± 0.276	43.30 ± 0.265	43.44 ± 0.254	43.57 ± 0.269	43.21 ± 0.259
7	44.58 ± 0.284	44.45 ± 0.263	44.59 ± 0.258	44.72 ± 0.274	44.35 ± 0.263
8	45.51 ± 0.272	45.59 ± 0.268	45.74 ± 0.264	45.82 ± 0.272	45.41 ± 0.263
9	46.44 ± 0.254	46.74 ± 0.276	46.89 ± 0.257	46.91 ± 0.253	46.47 ± 0.273
10	47.37 ± 0.237 ^a	47.89 ± 0.291 ^{ab}	48.04 ± 0.253 ^b	48.00 ± 0.272 ^a	47.53 ± 0.254 ^a
11	48.30 ± 0.228 ^a	49.03 ± 0.293 ^b	49.19 ± 0.268 ^b	49.10 ± 0.270 ^a	48.58 ± 0.246 ^b
12	49.23 ± 0.214 ^a	50.18 ± 0.302 ^b	50.34 ± 0.262 ^b	50.19 ± 0.269 ^a	49.64 ± 0.255 ^b
13	50.18 ± 0.213 ^a	51.32 ± 0.314 ^b	51.49 ± 0.259 ^b	51.29 ± 0.265 ^a	50.70 ± 0.252 ^b
14	50.76 ± 0.234 ^a	52.47 ± 0.323 ^b	52.63 ± 0.274 ^b	52.25 ± 0.273 ^a	51.66 ± 0.264 ^b
15	51.34 ± 0.239 ^a	53.62 ± 0.326 ^b	53.78 ± 0.279 ^b	53.21 ± 0.273 ^a	52.61 ± 0.273 ^b
16	51.92 ± 0.258 ^a	54.76 ± 0.325 ^b	54.93 ± 0.268 ^b	54.17 ± 0.274 ^a	53.57 ± 0.288 ^b
17	52.49 ± 0.286 ^a	55.91 ± 0.336 ^b	56.08 ± 0.284 ^b	55.13 ± 0.285 ^a	54.52 ± 0.303 ^b
18	53.07 ± 0.312 ^a	57.05 ± 0.341 ^b	57.23 ± 0.287 ^b	56.09 ± 0.289 ^a	55.48 ± 0.313 ^b
19	53.68 ± 0.334 ^a	58.31 ± 0.347 ^b	58.47 ± 0.283 ^b	57.13 ± 0.292 ^a	56.50 ± 0.328 ^b
Overall	46.25 ± 0.274 ^a	47.32 ± 0.294 ^b	47.47 ± 0.261 ^c	47.25 ± 0.278 ^a	46.77 ± 0.271 ^b

Means with similar superscript in a row or column do not differ significantly among themselves

3.4 Neck Girth

The average mean value of fortnightly measurement of neck girth of goats (cm) were calculated and significant differences among overall values at C₀ (24.36 ± 0.086), T₁ (25.68 ± 0.047) and T₂ (26.11 ± 0.028) were observed.

TABLE 6: AVERAGE (MEAN±SE) FORTNIGHTLY NECK GIRTH OF ASSAM HILL GOAT OF DIFFERENT TREATMENT GROUPS

Fortnight	Neck girth (cm)				
	C ₀	T ₁	T ₂	M	F
Initial	20.09 ± 0.047	20.22 ± 0.057	20.13 ± 0.037	20.28 ± 0.048	20.01 ± 0.047
1	20.54 ± 0.046	20.79 ± 0.056	20.76 ± 0.035	20.85 ± 0.046	20.54 ± 0.045
2	20.98 ± 0.045	21.36 ± 0.053	21.39 ± 0.033	21.42 ± 0.045	21.07 ± 0.043
3	21.44 ± 0.047	21.94 ± 0.051	22.01 ± 0.031	22 ± 0.045	21.6 ± 0.041
4	21.88 ± 0.050	22.51 ± 0.050	22.64 ± 0.029	22.57 ± 0.046	22.13 ± 0.039
5	22.33 ± 0.053	23.09 ± 0.049	23.27 ± 0.027	23.14 ± 0.048	22.66 ± 0.038
6	22.79 ± 0.056	23.66 ± 0.047	23.8 ± 0.025	23.71 ± 0.049	23.19 ± 0.036
7	23.23 ± 0.060	23.84 ± 0.045	24.13 ± 0.023	24.28 ± 0.051	23.72 ± 0.035
8	23.69 ± 0.064	24.31 ± 0.047	24.56 ± 0.022	24.86 ± 0.054	24.25 ± 0.034
9	24.14 ± 0.068	24.79 ± 0.046	25.19 ± 0.021	25.43 ± 0.057	24.78 ± 0.033
10	24.59 ± 0.074	25.26 ± 0.048	25.42 ± 0.024	26 ± 0.060	25.31 ± 0.036
11	25.04 ± 0.080	25.74 ± 0.043	26.05 ± 0.020	26.57 ± 0.064	25.84 ± 0.032
12	25.49 ± 0.084	25.8 ± 0.046	26.38 ± 0.019	27.15 ± 0.066	26.37 ± 0.037
13	25.94 ± 0.088	25.99 ± 0.047	27.01 ± 0.020	27.72 ± 0.069	26.91 ± 0.033
14	26.39 ± 0.095	26.56 ± 0.046	27.24 ± 0.021	28.3 ± 0.074 ^a	27.44 ± 0.034 ^b
15	26.84 ± 0.101	27.14 ± 0.047	27.87 ± 0.022	28.87 ± 0.078 ^a	27.97 ± 0.036 ^b
16	27.29 ± 0.108	27.72 ± 0.049	28.2 ± 0.024	29.44 ± 0.084 ^a	28.50 ± 0.037 ^b
17	27.74 ± 0.114	28.29 ± 0.050	28.83 ± 0.026	30.01 ± 0.088 ^a	29.03 ± 0.039 ^b
18	28.19 ± 0.120	28.87 ± 0.051	29.26 ± 0.027	30.59 ± 0.092 ^a	29.56 ± 0.040 ^b
19	28.65 ± 0.127	29.44 ± 0.053	29.69 ± 0.029	31.16 ± 0.097 ^a	30.09 ± 0.042 ^b
Overall	24.36 ± 0.086 ^a	25.68 ± 0.047 ^b	26.11 ± 0.028 ^c	25.72 ± 0.056 ^a	25.05 ± 0.0324 ^b

Means with similar superscript in a row or column do not differ significantly among themselves

4.CONCLUSION

In the present study 36 Assam Hill goat were selected and divided randomly into three groups. Polyherbal feed was supplemented in treatment groups @ 1 and 2 g/Kg body weight from 4 month of age till 12month of age, respectively. Data on various parameters were analyzed at fortnightly interval for a period up to 9 months. Supplementation of polyherbal (Shtavari root, Fenugreek and Ajwain seed powder) @ 1 g/kg and 2 g/kg live body weight respectively, along with routine basal diet from weaning improved growth performances of Assam Hill goat. It may be concluded that it could serve as potential management tool to improve growth performances in goats. It is also recommended that further studies on combination of different polyherbal constituent and their effect on different glands and their hormone secretion are needed.

REFERENCES

- 19th Livestock Census, (2012). Government of India ministry of agriculture department of animal husbandry, dairying and fisheries (animal husbandry statistics division).
- Ankita K. and Handique P.J. (2010). A brief overview of *Andrographis paniculata*., a high valued medicinal plant: boon over synthetic drugs. *Asian Journal of Science and Technology*. **6**: 113-118.
- Chowdhury, S.A. and Faruque, S. (2001). Report on Improvement of Black Bengal goat through selective breeding. Bangladesh Livestock Research Institute, Savar, Dhaka, Bangladesh. pp.1-62.
- Hashemi, S.R. and H. Davoodi, (2010). Phytogenic as new class of feed additive in poultry industry. *J. Anim. Vet. Adv.*, **9**: 2295-2304
- Kumar, K. (2018). Effect of ajwain seed (*trachyspermum ammi*) as feed additive on rumen ecosystem, enteric methane production and nutrient utilization in buffaloes. M.V.Sc. Thesis, Indian Veterinary Research Institute, Izatnagar.
- Langeroudi, A.G.; Estabragh. A.S., Mansouri. B.; Modirsanei, M. and Kiaei, S.M.M. (2008). Comparision of chemical and biological growth promoter with two herbal natural feed additives on broiler chicks performance. *J. Anim. Vet. Adv.*, **7**: 570-57.
- Mader, T. L.; and Brumm, M. C. (1987). Effect of feeding sarsaponin in cattle and swine diets. *Journal of Animal Science*, **65**(1): 9-15.

- Mirzaei, F. and Venkatesh, H. K. (2012). Introduction of five well-known Ayurvedic medicinal plants as feed additive on livestock's performance: a review. *Global Journal of Research on Medicinal Plants & Indigenous Medicine*, **1**(8): 328
- Mirzaei, F.; and Prasad, S. (2011). Influence of dietary phytoadditive as polyherbal combination on performance of does and respective litters in cross bred dairy goats. *Asian-Australasian Journal of Animal Sciences*, **24**(10): 1386-1392.
- Mondal, S.; Varma, S.; Bamola, V. D.; Naik, S. N.; Mirdha, B. R.; Padhi, M. M.; Mehta, N. and Mahapatra, S. C. (2011). "Double-blinded randomized controlled trial for immunomodulatory effects of Tulsi (*Ocimum sanctum* Linn.) leaf extract on healthy volunteers". *Journal of Ethnopharmacology*, **136**(3)
- Muralidhar, T. S.; Gopumadhavan, S.; Chauhan, B. L. and Kulkarni, R. D. (1993). Lack of teratogenicity after administration of d-400, an oral hypoglycemic ayurvedic formulation, during gestation and lactation. *J. Biol. Chem. Res*, **12**(3&4): 151-156.
- Pandit, S.; Chang, K. W. and Jeon, J. G. (2013). Effects of *Withania somnifera* on the growth and virulence properties of *Streptococcus mutans* and *Streptococcus sobrinus* at sub-MIC levels. *Anaerobe*, **19**, 1–8. <https://doi.org/10.1016/j.anaerobe.2012.10.007>
- Park, K.M.; Han, Y.K. and Park, K.W. (2000). Effects of Herb-Mix supplementation on the growth performance and serum growth hormone in weaned pigs. *Asian-Aus J. Anim. Sci.*, **13**(6): 791-794.
- Puri, A.; Saxena, R.; Saxena, R. P.; Saxena, K. C.; Srivastava, V. and Tandon, J. S. (1993). Immunostimulant agents from *Andrographis paniculata*. *Journal of Natural products*, **56**(7): 995-999.
- Sanchez, J.A.O.; Flores, A.C. and Hernandez, J.R.O. (2009). The effect of an herbal growth promoter feed additive on shrimp performance. *Res. J. Biol. Sci.*, **4**: 1022-1024
- Saxena, M. J. (2008). Herbs a safe and scientific approach. *Int. Poult. Prod.*; **16**: 11-13.
- Sethi, J.; Sood, S.; Seth, S. and Talwar, A. (2004). Evaluation of hypoglycemic and antioxidant effect of *Ocimum sanctum*. *Indian Journal of Clinical Biochemistry*, **19**: 152-155.
- Thompson, D.P. (1986). Effect of essential oils on spore germination of *Rhizopus*, *Mucor* and *Aspergillus* species. *Mycologia*, **78**: 482–485.

Voda, K.; Boh, B.; Vrtacnik, M.; Pohleven, F. (2003). Effect of the antifungal activity of oxygenated aromatic essential oil compounds on the white-rot *Trametes versicolor* and the brown-rot *Coniophora putana*. *Int. Biodeter. Biodegrad*, **51**, 51– 59.