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Effect of Ayurvedic Pharmaceutical Brahmi Gritham Residue Based Diet on Haematological and Biochemical Parameters of Malabari Goat Kids

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ABSTRACT

A 90 days study was conducted to observe the effect of ayurvedic pharmaceutical brahmi gritham residue based diet on various haematological parameter in Malabari kids. Fifteen male kids were selected and divided in to three group, T1 (control), T2 and T3 consisting of five animal in each group. The dietary treatments were T1 control diet; T2 and T3 kid starter with 10 and 20 per cent of ayurvedic pharmaceutical brahmi gritham residue, respectively. Haematological parameter of the treatment kids were analysed on 0^{th} day and 90^{th} day of the experiment. On 0^{th} day all the blood parameters were similar between the treatments. On 90^{th} day Brahmi gritham had no effect on haematological parameters, viz., RBC, WBC, Haemoglobin, MCH and MCV and Biochemical parameters, viz., total protein, AST, ALT, total cholesterol and total triglycerides are similar among the treatment and control unsuplimented group.

Keywords: *Ayurvedic pharmaceutical brahmi gritham residue, Malabari kids, Haematological parameter and Biochemical parameter*

INTRODUCTION

The limited availability, high cost and seasonal availability feed, water and pasture constitutes constraint to livestock production (Titi, 2003). Feeding of conventional feed and fodder is adversely affecting the overall profitability of goat rearing system (Aruwayo et al., 2011**)**. Hence, the incorporation of cheaper and unutilised agro-industrial byproducts, as energy sources in feed need to be scrutinized to reduce the feed cost (Chanjula et al., 2011) without affecting the health and welfare of animal (Thakur et al., 2015). Ruminants can effectively utilise this fibre as energy source without competing for human feed resources (Escala & Bestil. 2011).

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Though various agro industrial byproducts and crop residues are being used in animal feeds to reduce feed cost, the potential of byproducts from ayurvedic pharmaceuticals has not been explored widely.

Malabari goats inhabit the Calicut, Kannur, Wayanad and Malappuram districts of Kerala, India. They are medium to small size animals having varied coat colour ranging from white to admixtures and black. These goats are reared mainly for meat (Verma et al., 2009).

Kerala, a state renowned for its ayurvedic tradition has various ayurvedic pharmaceuticals (Roshma 2014). Byproducts from these pharmaceuticals mainly include waste products of medicinal herbs which are rich in fibre (Seethal et al., 2016). Though various agro industrial byproducts and crop residues are being used in animal feeds to reduce feed cost, the potential of byproducts from ayurvedic pharmaceuticals has not been explored widely.

Brahmi gritham residue is a byproduct obtained during the preparation of brahmi gritham oil. This residue is available in considerable quantity and many of the farmers are using this byproduct for feeding goats. The feeding value of these residues as potential non-conventional feed resource (NCFR) are yet to be explored. The main problem with residues from ayurvedic products are unpalatable and probable cumulative toxic effects. As in any ruminant, the micro flora in the rumen of goat can utilise the fibrous residues in the byproducts of ayurvedic preparations and can possibly detoxify the intrinsic factors present in these residues to some extent (Seethal, 2018). Hence the present study is planned to evaluate the effect of dietary incorporation of ayurvedic pharmaceutic residue as a NCFR in the diet of malabari kids, present study is to assess the effect of ayurvedic pharmaceutica residue on haematological parameter in kids

MATERIALS AND METHODS

Fifteen healthy Malabari goat kids of about three months of age were selected from Goat farm, College of Veterinary and Animal Sciences, Pookode. They were divided into three groups of five animals in each, on the basis of their body weight, age and sex following completely randomized design (CRD). These animals were maintained for 2 weeks on a standard diet comprised of concentrate mixture and green grass, before the start of the proper experiment. The kids were housed in sheds of Goat farm, ILFC, Pookode, having facilities for individual feeding and watering.

All the experimental kids were housed in a well-ventilated shed with provision of individual feeding. Strict management and hygienic practices were adopted throughout the experimental period. All the kids were de-wormed against ecto and endo parasites before the start of experiment and subsequently at regular intervals. Clean drinking water was provided *ad libitum*.

The kids in the three experimental groups were fed with a diet containing 24 per cent crude protein and 70 per cent TDN for the entire feeding period of 90 days.

The three experimental rations were

T_1 – kid starter (control, BIS (2009))

T_2 - kid starter containing 10 per cent brahmi gritham residue

T_3- kid starter containing 20 per cent brahmi gritham residue

The experimental rations were prepared at feed mixing plant, ILFC. The ingredient composition of experimental kid starter of T_1, T_2 and T_3 are presented in Table-1.

All kids will be housed individually in well ventilated, clean and dry pens. Kid starter and good quality green fodder will be offered to all the kids. Clean drinking water will be made available to all kids throughout the experiment. All animals will be maintained under uniform management conditions. Kids will be fed on isonitrogenous and isocaloric rations formulated as per ICAR feeding standards (ICAR, 2013) and will be maintained on their respective feeding regimen for a period of three months. Data on daily feed and fodder intake and fortnightly body

weight will be recorded during the course of the experiment Blood samples were collected at the beginning and end of the experiment to estimate haemoglobin (cyanomethemoglobin method), plasma protein (direct Biuret method), triglycerides (peroxidase coupled method), total cholesterol (CHOD-PAP method), aspartate aminotransferase (AST) and alanine transaminase (ALT) using standard kits supplied by Agappe Diagnostics, Maharashtra, India. All the haematological parameters listed above were determined using the Auto analyser (Merck, Microlab 300).

STATISTICAL ANALYSIS

All the data were analysed statistically and presented in the table as mean with standard deviation with P <0.05.

RESULTS AND DISCUSSION

Haematological parameter

Haematological parameter of the treatment kids were analysed beginning (0^{th} day) of the experiment, results are presented in Table 2. On statistical analysis no significance difference in between the groups. The values are observed at the end of the experiment (90^{th} day) results are presented in the Table 3. On statistical analysis no significance difference in between the groups.

Haemoglobin

Mean haemoglobin values are similar in within the groups values are 10.18, 9.48 and 10.56 g per 100 ml in T1, T2 and T3, respectively. No significant changes in the values observed at the end of the experiment compared to initial values, similar results were observed by Thakur et al. (2015) in goats, Roshma (2014) and Kotrsh et al. (2018) who observed in Malabari kids

Red blood cells (RBC)

The initial and final values of mean Red blood cells (RBC) were similar in among the treatment and control groups of the experiment. The initial of the experiment the values are ranged from 15.98 to 18.54 million per µl, the final values are ranged from 15.43 to 17.06 million per µl. Present experiment values are higher than results of Jiwuba et al. (2017) who observed that values are ranged from 10.60 to 11.45 million per µl. Mahore and Mahanta (2011) reported lower than the present values in Bhundelikhand goat kids.

White blood cells (RBC)

The initial and final values of mean White blood cells (RBC) were similar in among the treatment and control groups of the experiment. The initial of the experiment the values are ranged from 14.44 to 19.96 thousands per µl. The final values are ranged from 14.20 to 20.36 thousands per µl. on statistical analysis of the values showed no significance difference in among the experimental groups as well as between initial and final values in experimental kids fed of 0, 10 and 20 per cent level brahmi gritham residues in their diets, this residue not affect the WBC counts in experimental kids. Experiment results are comparable with Sunder et al. (2016) who observed that WBC counts in Teressa female goat were 20.70 thousands per µl.

Mean corpuscular volume (MCV)

The initial values of mean mean corpuscular volume (MCV) were similar in among the treatment and control groups of the experiment, and between initial and final values of MCV, T1 had significantly (P>0.05) higher value compared to T2 and T3. The intial values are 15.40, 16.06 and 16.12 fl in T1, T2 and T3, respectively. The final values are 16.40, 16.88 and 17.46 fl in T1, T2 and T3, respectively. Present results are similar with Kotresh et al. (2018) who observed the end values of the experiment are ranged from 15.48 to 20.00 fl in Malabari kids

Present values are lower than the Sunder et al. (2011) in terresa male and female goats values being 42.30 and 40.70 fl, respectively.

Mean corpuscular haemoglobin (MCH)

The mean corpuscular haemoglobin (MCH) were similar in within the treatment and control groups of the experiment, compared to initial values, the final values of T1(P<0.05) and T2 (P<0.01) had significantly higher MCH values. The initial and final values are 5.36, 5.64, 5.74 pg and 5.74, 5.82, 5.92 pg in T1, T2 and T3, respectively. The current results are agree with Kotresh et al. (2018).

Serum biochemical parameter

The serum biochemical parameter of the treatment kids were analysed beginning (0^{th} day) of the experiment, results are presented in Table 3. On statistical analysis no significance difference in between the groups. The values are observed at the end of the experiment (90^{th} day) results are presented in the Table 3.

Total protein

The mean values of serum total protein were similar in within the groups of T1, T2 and T3 in Malabari kids fed on ration incorporated with 0, 10 and 20 per cent level of brahmi gritham, respectively. On statistical analysis there is no significance difference within the groups. Compared to initial values final values are significantly ($P<0.05$) higher T3 only. Present results are similar with Kotresh et al. (2018) who observed in Malabari kids.

Present results are statistically not agree with Aruwayo et al. (2011) who observed no significance difference in the treatment groups fed with Alkali -Treated Neem Kernel Cake, in goats. The values are ranged from 6.23 to 6.50 g per dl.

AST

The mean values of AST were similar in within the groups of T1, T2 and T3 in Malabari kids fed on ration incorporated with 0, 10 and 20 per cent level of brahmi gritham, respectively. On statistical analysis there is no significance difference within the groups and initial and final values. The initial and final values are 78.61, 68.92, 86.70 and 83.65, 76.78, 73.87 U per L, respectively. Present results are similar with Roshma (2014) who reported that there is no significance difference among the groups in Malabari kids fed with Ksheerabala residue at the rate of 0, 10 and 20 per cent in their diets. Lower values are observed by Jiwuba et al. (2017)

ALT

The mean values of ALT were similar in the groups of T1, T2 and T3 in Malabari kids fed on ration incorporated with 0, 10 and 20 per cent level of brahmi gritham, respectively. Compared to initial values, the final values are significantly ($P<0.05$) higher in T2 and T3, similar value in T1. Present experiment values are similar with Aruwayo et al. (2011). This results are not agree with Roshma (2014)

Total cholesterol

The mean values of serum total cholesterol were similar in the groups of T1, T2 and T3 in Malabari kids fed on ration incorporated with 0, 10 and 20 per cent level of brahmi gritham, respectively. In T1 had significantly higher values in initial of the experiment compared to final values of the experiments and both T2 and T3 showed similar values. Similar results are observed by Sundar et al. (2011) and Roshma (2014)

Total triglycerides

The average mean values of serum total triglycerides were similar in both initial and final value and among the experimental groups fed on 0, 10 and 20 per cent level brahmi gritham residues in T1, T2 and T3, respectively. Similar results are observed by Roshma (2014), present values are higher than the sunder et al. (2011).

Table 1: Ingredient composition of Kid starter (%)

Ingredients	T1 (control – without Brahmi gritham residue)-kg	T2 (Treatment – with Brahmi gritham residue 10%)kg	T3 (Treatment – with Brahmi gritham residue 20%)kg
Maize	37	10	1
Soyabean meal	38	35	33
Deoiled rice bran	22	42	43
Calcite	2	2	2
Salt	1	1	1
Brahmi gritham	0	10	20
Total	100	100	100

***** To every 100 kg of all the kid starters, 10 g of Vitamin AD3E (supplement containing 10 lakh I.U of Vitamin A, 2 lakh I.U of vitamin D3 and 1 lakh I.U of vitamin E) and 50 g of trace mineral mixture added

Table 2: Haematological parameters[1] of experimental goats

parameter	treatment	1st day	90th day	t value	p value
Hb	1	10.18±0.46	9.88±0.45	0.686	0.530
	2	9.48±0.75	9.12±0.39	0.580	0.593
	3	10.56±0.84	9.48±0.41	1.332	0.254
	F value	0.597	0.815		
	p value	0.566	0.466		
RBC	1	18.40±1.1	17.06±0.51	1.801	0.146
	2	15.98±2.51	15.43±0.34	0.498	0.644
	3	18.54±2.95	15.93±1.06	2.812	0.048
	F value	1.891	1.383		
	p value	0.193	0.288		
WBC	1	14.44±3.00	16.88±5.51	0.305	0.775
	2	15.82±1.97	14.2±1.83	1.354	0.247
	3	19.96±1.87	20.36±4.85	0.103	0.923
	F value	1.502	0.499		
	p value	0.262	0.619		
MCH	1	5.36±0.19	5.74±0.22	4.4178*	0.012
	2	5.64±0.19	5.82±0.18	4.811**	0.009
	3	5.74±0.10	5.92±0.16	0.715	0.514
	F value	1.341	0.225		
	p value	0.298	0.802		
MCV	1	15.4±0.65	16.4±0.59	4.385*	0.012
	2	16.06±0.57	16.88±0.29	2.655	0.057
	3	16.12±0.22	17.46±0.79	1.601	0.185
	F value	1.341	0.786		
	p value	0.298	0.478		

a, b – means with different superscripts within the same row differ significantly

1- Values are mean ± SE

ns- non- significance

* - significant at 5 per cent level

** - significant at 1 per cent level

Table 3: Serum bio-chemical parameter[1] of experiment animal

parameter	Treatment	1st day	90th day	t value	p value
Total protein	1	9.05±1.752	6.57±0.204	1.370	0.243
	2	7.48±1.947	6.44±0.611	0.576	0.596
	3	9.06±0.698	6.56±0.440	3.314*	0.030
	F value	0.338	0.146		
	p value	0.720	0.866		
SGPT	1	12.33±3.443	21.34±4.678	2.036	0.111
	2	9.06±3.438	19.17±0.763	8.076**	0.001
	3	10.19±4.974	16.22±1.177	5.060**	0.007
	F value	0.852	0.831		
	p value	0.451	0.459		
SGOT	1	78.618±8.086	83.654±10.468	0.293	0.784
	2	68.928±5.182	76.786±5.923	0.767	0.486
	3	86.7±3.946	73.878±10.520	0.983	0.381
	F value	2.203	0.296		
	p value	0.153	0.749		
cholesterol	1	95.6±8.176	58.2±7.990	3.649*	0.022
	2	74.4±1.749	94.6±16.946	1.137	0.319
	3	83±5.805	100.6±9.130	1.420	0.229
	F value	3.292^{ns}	3.636		
	p value	0.073	0.058		
Triglycerides	1	24.2±1.907	26.6±6.185	0.338	0.753
	2	31.25±5.043	28±5.010	0.479	0.657
	3	21.6±1.208	30.6±5.240	1.932	0.125
	F value	2.422	0.136		
	p value	0.131	0.874		

a, b – means with different superscripts within the same row differ significantly

1- Values are mean ± SE

ns- non- significance
* - significant at 5 per cent level
** - significant at 1 per cent level

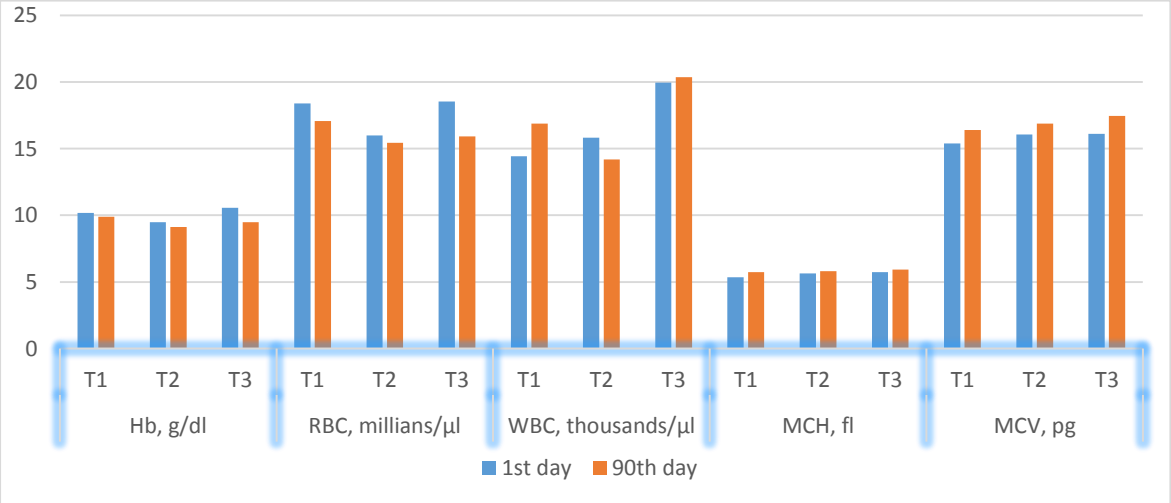

Fig. 1: Blood parameters, initial and final values of three experimental groups

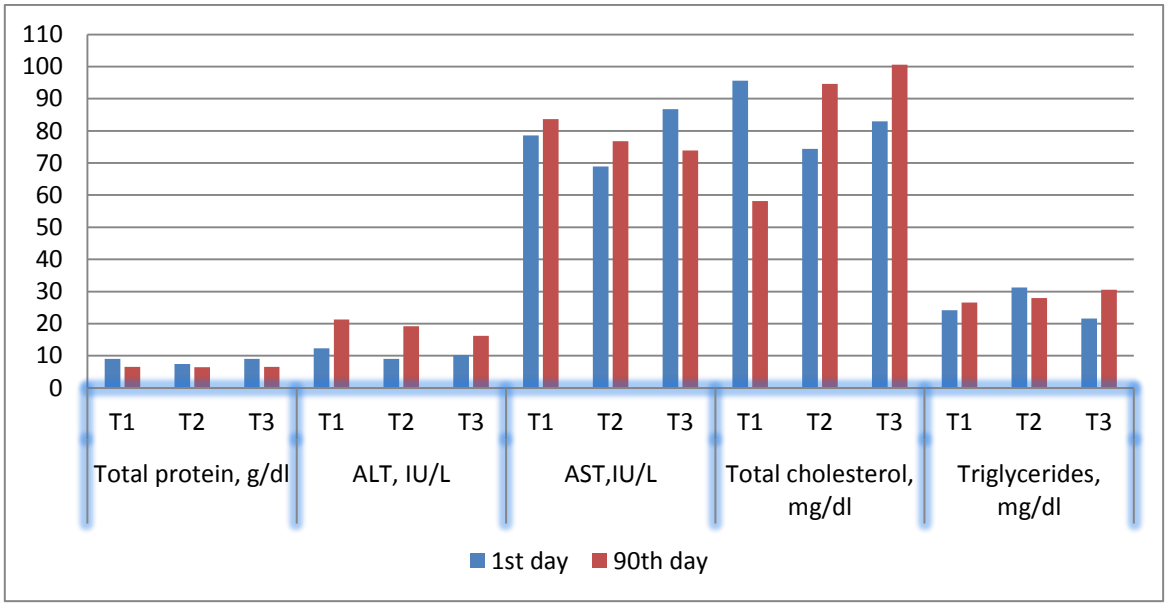

Fig. 2: Serological parameters, initial and final values of three experimental groups

CONCLUSION

All the haematological and serum biochemical values are within the normal range and no considerable changes in the treatment groups compared to control group. This implies the test diet is not harmful, we can feed up to 20 per cent level in Malabari kid starter diet without affecting the haematological parameter.

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