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Research Article

Effect of Ayurvedic Pharmaceutical Kottamchukkadi Tailam Residue Based Diet on Haematological and Serum Biochemical Parameters of Malabari Kids

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ABSTRACT

An in vivo experiment was carried out to ascertain the impact of Kottamchukkadi tailam residue (KTR), an Ayurvedic byproduct, on haemato-biochemical parameters of Malabari kids. Using a completely randomized study design, 18 experimental kids were selected and divided into three groups based on their sex, age, and body weight. Dietary treatments were T1 (control diet), T2 and T3 kid starter with 0, 10 and 20 percent KTR, respectively. All three groups were fed isonitrogenous and isocaloric rations. The study was carried out for a total period of 90 days. At the conclusion of the feeding trial, analytical results were obtained for the hematological parameters (RBC, WBC, Hb, MCH, MCV) and serum biochemical parameters (total protein, AST, ALT, cholesterol, and total triglycerides).On statistical analysis, haemato-biochemical parameters were comparable (p>0.05) across the treatment group and falls within the normal range indicating that KTR can be safely included in kid starter without compromising the health status of the animal.

***Keywords**: Haematological, Serum biochemical, Malabari kids, Kottamchukkadi tailam residue.*

INTRODUCTION

Goat farming has been recognized as an important part of the pastoral economy since the prehistoric periods (Singh, 2018). Since goats can withstand harsh weather and sparse foliage, goat farming has historically been one of the most profitable livestock operations, particularly in arid and semi-arid regions.

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Goats contribute to about 27.80 per cent of the total livestock population in India (GOI, 2019), and are mostly used for meat purposes. Goat meat or chevon is considered to be the costliest meat and has a great demand in India, especially in Kerala (Chacko & Anugna, 2023).

The biggest constraints currently confronting this production sector are rising feed costs and paucity of nutrient-rich feed resources. Hence, most of the farmers often fail to meet the nutritional requirements of the animal and hence fail to utilise their maximum genetic production potential. As a result, the necessity of strategies to lower the feed cost is clearly emphasized. The most potential solution to this dilemma is the dietary integration of non-conventional feed resources (NCFR), which are cost effective and easily available.

Tailam is a medicated ayurvedic preparation in which oil of *Sesamum indicum is treated with herbal paste and extracts.* Kottamchukkadi tailam *is a medicated oil preparation mainly used in humans for* joint inflammation. *Some of the medicinal herbs used in the preparation includes,* kottam (*Saussurea costus*), chukku (*Zingiber officianale*), tailam (*Sesamum indicum*), sarshapa tailam (*Brassica juncea*), nimba tailam (*Azadirachta indica*), chinchapatra (*Tamarindus indica*), vayampu (*Acorus calamus*), sigru (*Moringa oleifera*), lasunam (*Allium sativum*), karttotti (*Hugonia mystax*), devadrumam (*Cedrus deodara*), siddhartha (*Brassica juncea*), suvaha (*Alpinia galangal*) and dahi (curd). The state of Kerala is home to such ayurvedic medicinal pharmaceuticals, and the majority of waste products generated after preparation of such medication are generally a rich source of fibre. Hence, this fibre can be effectively utilised in ruminants as an energy source, which otherwise will be wasted. Hence, the current study is planned to analyse the potential of Kottamchukkadi tailam residue as an unconventional feed source in the ration of Malabari kids and to determine its effect on haemato-biohemical parameters in kids.

MATERIALS AND METHODS

Selection and housing of experimental animals

Eighteen healthy Malabari kids (3- 6 months) were selected from the Goat Farm of ILFC, Pookode. They were divided into three groups consisting of six animals, on the basis of their body weight, age and sex, following a completely randomised design. An adaptation period of two weeks was given prior to the actual experiment, where animals were provided a standard diet of kid starter and green grass. The kids were kept in well-ventilated sheds with separate areas for drinking and feeding. Throughout the trial, strict management and hygiene procedures were implemented. Deworming was done at regular intervals, and all the kids were provided with clean water *ad libitum*. All the animals were maintained in uniform managemental conditions prevailing in the farm.

Experimental feed

Throughout the 90-day feeding trial, the kids in the three experimental groups were fed isonitrogenous and isocaloric kid starter feed containing 70% TDN and 24% crude protein (ICAR, 2013). The three experimental feeds are as follows:

T1 – kid starter feed (control)

T2 - kid starter incorporated with 10 per cent KTR

T3 - kid starter feed incorporated with 20 per cent KTR

The experimental rations were prepared at the School of Animal Nutrition and Feed Technology (SANFT), Mannuthy. The ingredient composition of experimental kid starters of groups T1, T2 and T3 are listed in Table 1.

Haemato-biochemical parameters

Blood samples were collected at the end of the experimental period to analyse the plasma protein (Jong & Vegeter, 1950), haemoglobin (International committee for standardization in haematology, 1967), total cholesterol (Lie et al., 1976), triglycerides (McGowan et al., 1983), AST (Bergmeyer et al., 1986a) and ALT (Bergmeyer et al., 1986b) using standard kits supplied by Agappe Diagnostics, Maharashtra, India. All the above parameters were analysed using an auto analyser (Merck Microlab, 300) at College of Veterinary and Animal Sciences, Pookode.

Statistical analysis

Data of blood biochemical parameters were analyzed through one-way ANOVA as per Snedecor and Cochran (1994) using Statistical Package for Social Sciences (SPSS) version 24.0.

Table1. Ingredient composition (%)

Ingredients	T1	T2	T3
Maize	33	20	6
Soyabean meal	38	33	29
Deoiled rice bran	26	34	42
Calcite	2	2	2
Tailam residue	0	10	20
Salt	1	1	1
Total*	100	100	100

*To every 100 kg of all the kid starters, 10 g of Vitamin AD_3E supplement (containing 10 lakh IU of Vitamin A, 2 lakh IU of Vitamin D_3 and 1 lakh IU of Vitamin E), 50 g of trace mineral mixture, 20 g of commercial Vit E and 100g toxin binder were added.

RESULTS AND DISCUSSION

Haematological parameters

Blood was collected at the end of the experimental period, and all the parameters were analysed; results are presented in Table 2 and graphically represented in Figure 1. The values were similar (*p>0.05*) among treatment groups and were within the normal range.

Haemoglobin (Hb)

At the end of the trial, the average haemoglobin levels for Malabari kids in groups T1, T2, and T3 were 9.98, 10.37, and 9.65 g/dL, respectively. The results were within the normal range and statistically similar (p>0.05) across the treatment groups. The findings of the current study are similar to the observations of Kajagar et al. (2020b) and Ayisha (2023), who reported that inclusion of Brahmi and Sukumara ghritam residues in the diets of Malabari kids at levels of 0, 10, and 20 percent, respectively, resulted in a statistically similar (*p>0.05*) haemoglobin concentration in all treatment groups.

Red blood cells (RBC)

The mean RBC values of Malabari kids in the three experimental diets of T1, T2 and T3 were17.84, 18.45 and 16.48 million per µl. The present findings were similar to the observations of Kajagar et al. (2020) and Seshidhar et al. (2022), who reported that dietary incorporation of Brahmi and Saraswatha gritham residues at 10 and 20 per cent levels in kid starter resulted in similar (*p>0.05*) RBC concentrations.

Mean corpuscular volume (MCV)

The average MCV values of kids at the end of the experimental period were 16.70, 17.00 and 17.93fl in T1, T2 and T3, respectively. Statistical analysis revealed that the values across the three treatment groups were similar. The findings of the present study were in accordance with the observations of Anugna et al. (2020), Febinaet al. (2022) and Seshidhar et al. (2022), who incorporated Panchagavya, Tiktaka and Saraswathagritham, respectively, at 0, 10 and 20 per cent levels in Malabari kid starter. Similarly, Febina et al. (2022) reported MCV values ranging from 17.14 to 16.82 fl in Malabari kids. However, the MCV values were higher than those of Anugna et al. (2020) and Seshidhar et al.

(2022), and the values observed were 15.54 to 16.54 fl and 13.46 to 16.82, respectively.

Mean corpuscular haemoglobin (MCH)

Similar results for MCH values were observed among the three experimental groups, with the values being 5.37, 5.63 and 5.90, respectively. The findings of the present study were in accordance with observations of Kajagar et al. (2020), Seshidhar et al. (2022) and Febina et al. (2022).

White blood cells (WBC)

The mean WBC values of Malabari kids in the three experimental diets T1, T2 and T3 were 16.15, 23.79 and 18.68 thousand per µl. The values of present study were comparable with the findings of Kajagar et al. (2020) and Seshidhar et al. (2022), who observed similar (*p>0.05*) WBC values for Malabari kids fed with diets incorporated with 0, 10 and 20 percent levels of Brahmi and Saraswatha gritham residues, with values being in the range of 14.20 to 20.36 and 19.14 to 17.34 thousand per µl, respectively.

Serum biochemical parameters

The serum biochemical parameters estimated at the 90th day of the feeding trail are presented in Table 3 and graphically represented in Figure 2. Statistical analysis revealed that the values were similar (*p>0.05*) across the three treatment groups.

Serum Total Protein

The mean total protein value of Malabari kids at the end of the experiment was statistically similar across the three treatments, with the values being 8.16, 7.16 and 6.22 g per dL in groups T1, T2 and T3, respectively. All the values were within the normal range. The findings follow a similar trend to Febina et al. (2022) and Seshidhar et al. (2022), who reported that dietary incorporation of Tiktaka and Saraswatha ghritam residue in the ration of Malabari kids, at 0, 10 and 20 per cent inclusion levels, respectively, resulted in statistically similar total protein values across the three treatment groups.

Serum AST and ALT

The mean serum AST and ALT values of kids in groups T1, T2 and T3 were statistically similar (*p>0.05*) across the groups and within the normal range. The values being 66.81, 58.50, 66.61 IU/L and 19.36, 18.46, 22.04 IU/L, respectively for the three treatment groups. The current findings are in accordance with the observations of Kajagar et al. (2020b), Febina et al. (2022) and Ayisha et al. (2023), who reported that Malabari kids fed with rations incorporated with Brahmi, Tiktaka and Sukumara ghritam residue, at 0, 10 and 20 per cent level, respectively, resulted in similar AST and ALT values. The AST values were lower than the observations of Kajagar et al. (2020b), Febina et al. (2022) and Ayisha et al. (2023), who reported AST values of 16.22 to 21.34 IU/L, 16.89 to 18.81 IU/L (Febina et al. 2022) and 90.53 to 98.16 IU/L. However, the ALT values of the present study were comparable with the findings of the above researchers.

Total cholesterol

The total cholesterol values of kids in the three treatment groups were 82.30(T1), 80.31(T2) and 89.25(T3) mg per dL, respectively. Statistical analysis of the data revealed that the values at the end of the experiment were similar (*p>0.05*) among the groups and were within the normal range. The findings agree with the observations of Anugna et al. (2020), who reported that dietary supplementation with Panchagavya ghritam residues at 0, 10 and 20 per cent levels, respectively, had no effect on serum total cholesterol concentration of kids. The serum concentration of total cholesterol in the present study was higher than that of Anugna et al. (2020), with the values being in the range of 58.00 to 79.60.

However, the present findings were in contradictory to the observations of Febina et al. (2022) and Seshidhar et al. (2022), who reported that Malabari kids fed on diets incorporated with Tiktaka and Saraswatha ghritam residue at 0, 10 and 20 percent level, respectively, resulted in a significantly higher total cholesterol concentration at 20 percent dietary incorporation compared to other groups.

Serum triglycerides

The serum triglyceride levels across T1, T2 and T3 were 45.75, 33.00 and 47.62 mg per dl, respectively. Statistical analysis revealed that the values were similar (*p>0.05*) and within the normal range. The findings of the current study follow a similar trend to the observations of Kajagar et al. (2020b), Febina et al. (2022), and Seshidhar et al. (2022), who reported that Malabari kids fed on kid starter diets incorporated with Brahmi, Tiktaka and Saraswatha ghritam residue at 0, 10 and 20 per cent level, respectively, observed similar triglyceride concentrations across the treatment groups.

Nevertheless, the results of the present study tend to diverge from Adegun et al. (2018), who concluded that the triglyceride values of Yankasa rams fed on diets containing 0.00, 0.50, 1.00, 1.50 and 2.00 per cent levels of *Panicum maximum* were significantly higher, compared to the control group.

Table 2. Haematological parameters of Malabari kids fed on the three experimental rations, at the end of the study

Parameter[1]	T1	T2	T3	F-value (P-value)
Haemoglobin, (g/dL)	9.98 ± 0.36	10.37 ± 0.33	9.65 ± 0.48	0.827[ns] (0.456)
RBC(10^6/µL)	17.84 ± 0.65	18.45 ± 0.49	16.48 ± 1.09	1.654[ns] (0.224)
MCV(fL)	16.70 ± 0.613	17.00 ± 0.573	17.93 ± 0.6146	1.147[ns] (0.344)
MCH(pg)	5.37 ± 0.1308	5.63 ± .19	5.90 ± 0.15916	2.704[ns] (0.099)
WBC(10^3/µL)	16.15 ± 1.8417	23.79 ± 5.797	18.68± 2.694	1.028[ns] (0.382)

ns - non-significant (*P>0.05*)
[1]Average of six values with SE

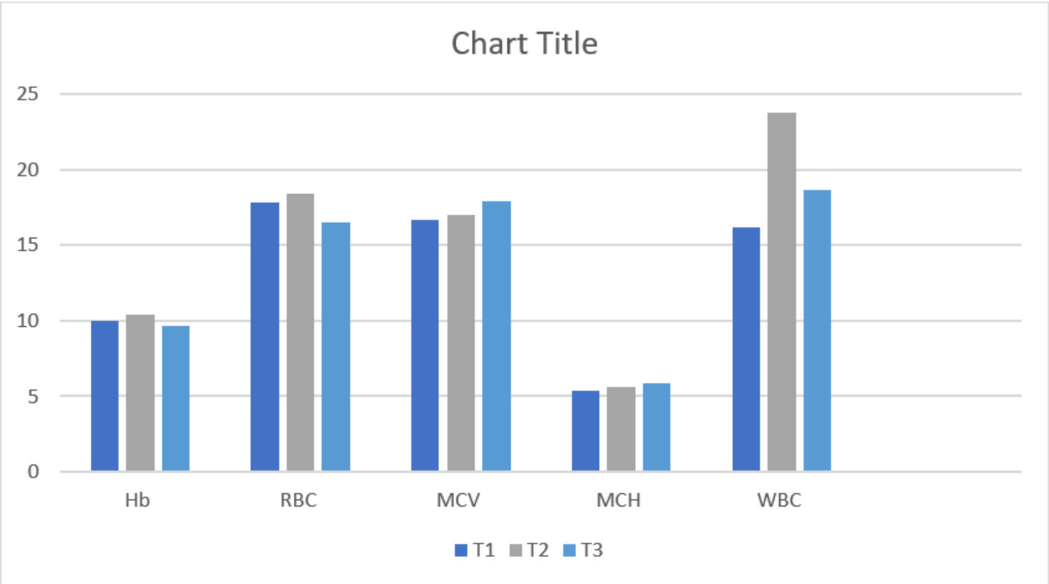

Fig 1: Haematological parameters of experimental kids

Table 3. Serum biochemical parameters of Malabari kids fed on the three experimental rations, at the end of the study

Parameters[1]	T1	T2	T3	F-value (P-value)
Total protein(g/dL)	8.16 ± 0.65	7.16 ± 0.68	6.22 ± 0.47	2.573^{ns} (0.109)
AST (U/L)	66.81 ± 8.30	58.50 ± 7.05	66.61 ± 8.61	0.445^{ns} (0.649)
ALT (U/L)	19.36 ± 1.34	18.46 ± 1.59	22.04 ± 2.53	0.97^{ns} (0.402)
Cholesterol(mg/dL)	82.30 ± 10.99	80.31 ± 8.28	89.25 ± 10.56	0.220^{ns} (0.805)
Triglycerides(mg/dL)	45.75 ± 6.8	33.00 ± 3.17	47.62 ± 7.27	1.74^{ns} (0.209)

ns - non-significant (*P>0.05*)
[1]Average of six values with SE

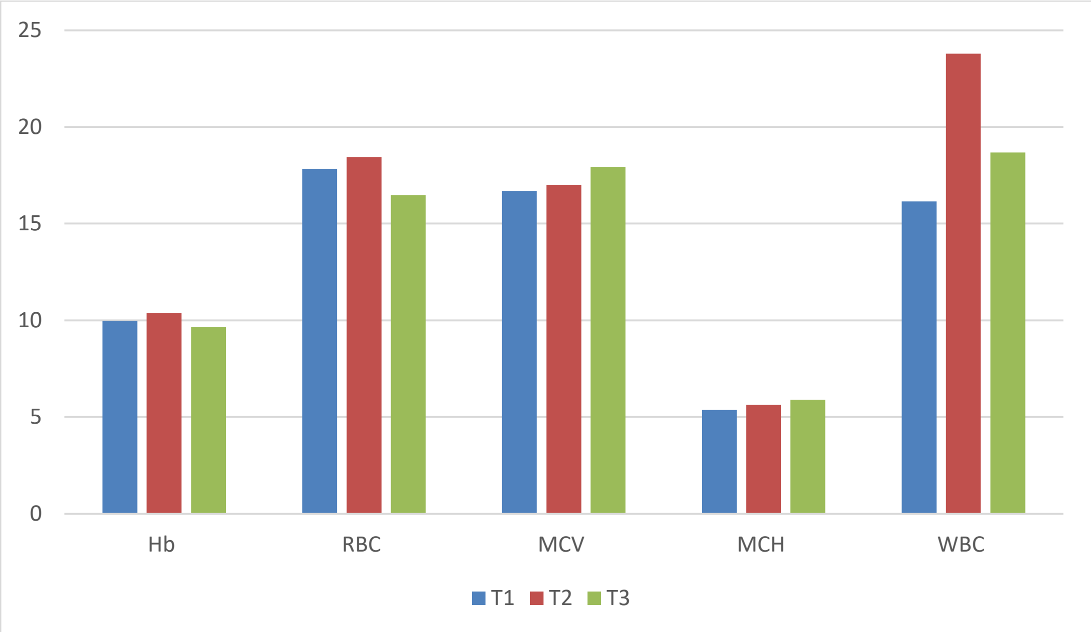

Fig. 2: Serum biochemical parameters of kids maintained on the three experimental rations

CONCLUSION

At the end of the 90-day feeding trail, analysis of blood parameters revealed that all the haemato-biochemical values of kids across the three treatment groups were within the normal range and were similar. Hence, we can conclude that Kottamchukkadi tailam residue can be safely incorporated into the diets of Malabari kids without compromising the health status of animals.

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Conflict of Interest:
The authors declare that they have no conflict of interest.

Author Contribution:
All authors have participated in critically revising of the entire manuscript and approval of the final manuscript.

REFERENCES

Adegun, M. K., Fajemilehin, S. O. K., Ajayi, D. D., & Ojo, J. O. (2018). Haemato-biochemical profile of Yankasa rams fed varying levels of *Panicum maximum* concentrate mix under intensive feedlot in southwestern Nigeria. *Journal of Animal Science Research,* *2*(2), 1–7. https://doi.org/10.16966/2576-6457.113

Anugna, R. (2019). *Effect of dietary incorporation of ayurvedic pharmaceutical residues on growth performance of Malabari kids* (Master's thesis). Kerala Veterinary and Animal Sciences University, Pookode.

Anugna, R., Chacko, B., Sunanda, C., Senthil Murugan, S., Bunglavan, S. J., Ranjith, D., & Kajagar, M. (2020). Effect of dietary incorporation of ayurvedic Panchagavya gritham residue on blood parameters in Malabari goats. *Pharma Innovation Journal*, *9*(1), 34–38.

Ayisha, V. K. (2023). *Effect of ayurvedic pharmaceutical sukumaraghritam residue-based diet on growth performance of Malabari goat kids* (Master's thesis). Kerala Veterinary and Animal Sciences University, Pookode.

Bergmeyer, H. U., Horder, M., & Rey, J. (1986). Approved recommendation on IFCC methods for the measurement of catalytic enzymes. Part 2: IFCC method for aspartate aminotransferase. *Journal of Clinical Chemistry and Clinical Biochemistry*, *24*, 497–510.

Bergmeyer, H. U., Horder, M., & Rey, J. (1986). Approved recommendation on IFCC methods for the measurement of catalytic enzymes. Part 3: IFCC method for alanine aminotransferase. *Journal of Clinical Chemistry and Clinical Biochemistry*, *24*, 481–495.

Febina, C., Chacko, B., Senthil Murugan, S., Bunglavan, S. J., Abraham, J., & Sunanda, C. (2022). Effect of dietary incorporation of pharmaceutical Tiktaka ayurvedic gritham residue on haemato-biochemical parameters of Malabari kids. *Indian Journal of Pure and Applied Biosciences, 10*(4), 14–20. https://doi.org/10.18782/2582-2845.8935

Indian Council of Agricultural Research (ICAR). (2013). *Nutrient requirements of sheep, goat and rabbit*. ICAR.

International Committee for Standardization in Haematology. (1967). Recommendations for haemoglobinometry in human blood. *British Journal of Haematology, 13*, 71–75.

Jong, H. H., & Vegeter, J. J. (1950). Determination of serum proteins with the biuret test. *Pharmaceutisch Weekblad, 85*, 755–764.

Kajagar, M., Chacko, B., Sunanda, C., Shyama, K., Murugan, S. S., Ranjith, D., Sudharsan, C., & Satyasooryan, A. M. (2020). Effect of ayurvedic pharmaceutical Brahmi ghritam residue-based diet on haematological and biochemical parameters of Malabari goat kids. *Indian Journal of Pure and Applied Biosciences, 8*(3), 106–113. https://doi.org/10.18782/2582-2845.7669

Lie, R. F., Schmitz, J. M., Pierre, K. J., & Gochman, N. (1976). Cholesterol oxidase-based determination, by continuous-flow analysis, of total and free cholesterol in serum. *Clinical Chemistry, 22*, 1627–1630.

McGowan, M. W., Artiss, J. D., Strandbergh, D. R., & Zak, B. (1983). A peroxide-coupled method for the colorimetric determination of serum triglycerides. *Clinical Chemistry*, *29*(3), 538–542.

Seshidhar, G., Chacko, B., Senthil Murugan, S., Ananth, D., Balusami, C., Sunanda, C., Kuriakose, A. P., & Ambili, K. (2022). Effect of Dietary Incorporation of Saraswatha Gritham Residue on Haemato-Biochemical Parameters of Malabari Kids, *Ind. J. Pure App. Biosci. 10*(6), 45-52. doi: http://dx.doi.org/10.18782/2582-2845.8945

Singh, A. K. (2018). Nonconventional feed resources for small ruminants. *Journal of Animal Health and Behaviour Science*, *2*, 115.