



Effect of Dietary Incorporation of *Moringa oleifera* Leaves on Haemato-biochemical Parameters of Marwari Goat Kids

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ABSTRACT

Moringa oleifera is considered as a miracle tree due to the presence of abundant nutrients, high protein biological value, and good feeding effects. As a new protein feedstuff, *Moringa oleifera* has great potential in alleviating the feeding crisis in animal feeding system. To explore the beneficial properties and practical utility of *Moringa oleifera* tree leaves, the present study had been performed on 12 male Marwari goat kids, randomly distributed in to two groups control and treatment. Kids were fed on ground nut straw based complete feed, whose composition was kept similar in both the groups except the incorporation of *Moringa oleifera* leaves in the diet of treatment group, at the level of 15% of complete feed as a replacement of equal proportions of cotton seed cake. A feeding trial of ninety days was conducted to observe the effect of supplementation of *Moringa oleifera* leaves on haemato-biochemical parameters of experimental kids. Blood samples were collected at monthly intervals and analyzed by UV spectrophotometer. The study reported no significant difference of *Moringa oleifera* leaves supplementation on haemato-biochemical parameters of experimental kids. The study concluded that the *Moringa oleifera* leaves can be used in the diet of goats up to 15% level of incorporation.

Key words: *Moringa oleifera*, Marwari goat kids, Haemato-biochemical Parameters, UV-Spectrophotometer.

INTRODUCTION

Scarcity of animal feeds in India is the major issue in livestock sector. A large gap exists between requirements and availability of animal feed in the country. Limited feed supply and poor quality of the available feeds are the major constraints for optimal productivity of animals. Incorporation of low cost feed ingredients, with high nutritive value, in animal feed can serve as a helpful approach to overcome this problem. Such feeds could partly fill the gap in the feed supply, decrease competition for food between humans and animals, reduce feed cost, and contribute to self-sufficiency in nutrients from locally available feed sources.

Moringa oleifera has been characterized as a potentially useful animal feed owing to its high content of protein, carotenoids, several minerals and vitamins such as iron and ascorbic acid and certain phytochemicals like kaempferitrin, isoquercitrin,

rhamnetin, kaempferol and quercetin (El-Hack *et al*, 2018). Additionally, the leaves are reported to contain various antioxidant compounds, such as ascorbic acid, flavonoids, phenols, and carotenoids (Razis *et al*, 2014). *Moringa oleifera* contains 16–19 amino acids, including the 10 essential amino acids, namely, threonine, tyrosine, methionine, valine, phenylalanine, isoleucine, leucine, histidine, lysine, and tryptophan (Moyo *et al*, 2011). Leaves contain negligible amount of anti-nutritional factor indicating its higher nutritional quality than other leafy vegetables or fodders. *Moringa oleifera* leaves can be used as a feed supplement, to improve feed efficiency and livestock performance, or as a replacement for conventional feed stuffs to obtain more economically sustainable, environmentally friendly and safer production. Keeping in view all these qualities of *Moringa oleifera* and scarcity of feed and fodders for livestock, the present study has

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been planned to assess the effect of supplementation of *Moringa oleifera* leaves on haemato-biochemical parameters of Marwari goat kids.

MATERIALS AND METHODS

The experiment was conducted at Department of Animal Nutrition, CVAS (RAJUVAS) Bikaner. A feeding trial of ninety days was conducted to observe the effect of supplementation of *Moringa oleifera* leaves on haemato-biochemical parameters of experimental kids.

Experimental Animals

Twelve male Marwari goat kids of almost same age group (3-4 m) and of uniform conformation were procured and kept in well ventilated and hygienic sheds under intensive system of rearing for conducting feeding trial. Individual feeding of kids was undertaken during experimental trial. Kids were divided into two groups T_0 and T_1 by randomized block design having 6 kids in each group. Group T_0 and T_1 served as control and treatment groups, respectively.

Experimental Feed

Measured quantity of experimental feed and *ad libitum* water were provided to kids throughout the experimental period. Experimental complete feed was prepared by taking roughage source and concentrate mixture in the ratio of 60:40. Ground nut straw was used as sole source of roughage while concentrate mixture was prepared by mixing barley, de oiled rice bran, guar korma, cotton seed cake, mineral mixture and salt in different proportions. Leaves of *Moringa oleifera* were added in the complete feed of treatment group (T_1) at 15% level after drying under shed and in the form of mesh after grinding by replacing equal proportions of cotton seed cake.

Sample collection and Analysis

Blood samples were collected through jugular vein of the experimental goats at monthly interval. All aseptic measures were used during collection. Serum was separated and stored in deep freeze for

further analysis. The blood biochemical parameters such as total serum protein, glucose, enzyme alanine transaminase (ALT), aspartate aminotransferase (AST) and blood urea nitrogen (BUN) were estimated by using commercial kits on UV spectrophotometer following standard procedures. The absorbance of each sample was recorded and results were interpreted. The data obtained in the experiment were analyzed with the help of student t-test as per Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Average values of serum glucose for T_0 and T_1 groups at monthly intervals have been presented in Table 1. Overall mean values of serum glucose in T_0 and T_1 groups were 71.33 and 71.27 mg/dl, respectively which differed non-significantly with each other. The present findings were similar to earlier findings of Ali *et al* (2017), Damor *et al* (2017) and Meel *et al* (2018). However, Khalel *et al* (2014), Azzaz *et al* (2016), Kholif *et al* (2016) and Kholif *et al* (2017) observed significant increase in glucose concentration on supplementation of *Moringa oleifera* leaves in diets of experimental goats.

Average mean values of serum protein obtained for T_0 and T_1 groups were estimated to be 6.93 and 6.83 gm/dl, respectively. No significant difference was reported between the groups. These results agrees well with the earlier reports of Ahmad *et al* (2016), Kholif *et al* (2016), Ali *et al* (2017) and Yusuf *et al* (2017). The findings of present study did not corroborate with findings of Khalel *et al* (2014), Azzaz *et al* (2016), Damor *et al* (2017), Kholif *et al* (2017) and Meel *et al* (2018) as authors reported significant increase in total serum protein levels on *Moringa oleifera* leaves supplementation in diet.

The overall mean values of ALT enzyme for T_0 and T_1 groups were calculated to be 17.23 and 17.10 IU/dl, respectively which differed non-significantly with each other. The present findings were similar with the findings of Khalel *et al* (2014), Ahmad *et al* (2016), Azzaz *et al* (2016), Ali *et al* (2017), Damor

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Table 1. Average monthly haemato-biochemical parameters in experimental goats.

Parameter	Days	Control (T ₀)	Treatment (T ₁)
Serum glucose (mg/dl)	30	71.08	71.67
	60	70.75	70.86
	90	71.33	71.27
	Average	71.05	71.26
Serum protein (g/dl)	30	6.89	6.66
	60	7.04	7.07
	90	6.87	6.77
	Average	6.93	6.83
Serum ALT enzymes (IU/dl)	30	16.68	16.98
	60	17.75	17.17
	90	17.27	17.17
	Average	17.23	17.10
Serum AST enzyme (IU/dl)	30	20.86	21.63
	60	21.34	22.60
	90	18.24	18.72
	Average	20.14	20.98
blood urea nitrogen (mg/dl)	30	40.61	36.97
	60	42.91	40.52
	90	38.25	36.01
	Average	40.59	37.83

et al (2017) and Kholif *et al* (2017). However, Kholif *et al* (2015), Kholif *et al* (2016) and Yusuf *et al* (2017) reported significant increase in serum ALT enzyme levels on *Moringa* leaves supplementation thus they are in disagreement with the present study.

Overall mean values of AST enzyme for T₀ and T₁ groups were found to be 20.14 and 20.98 IU/dl, respectively. The mean values of AST as well as the values at monthly intervals showed no significant difference between groups. The

observations recorded in the present study were similar to earlier findings of Khalel *et al* (2014), Azzaz *et al* (2016), Kholif *et al* (2016), Ali *et al* (2017), Kholif *et al* (2017) and Yusuf *et al* (2017) while Ahmad *et al* (2016) and Damor *et al* (2017) were in disagreement with the present findings as authors reported significant effect of *Moringa oleifera* supplementation on serum AST enzyme levels. Overall mean values of BUN in T₀ and T₁ groups were calculated to be 40.59 and 40.83 mg/dl, respectively. Non-significant difference was observed in BUN values of control and treatment groups. Ahmad *et al* (2016), Kholif *et al* (2017) and Yusuf *et al* (2017) were in agreement to present findings. However, the findings of present study were in disagreement with findings of Khalel *et al* (2014), Kholif *et al* (2015), Azzaz *et al* (2016) and Kholif *et al* (2016) as they reported significant decrease in BUN levels on *Moringa oleifera* leaves supplementation.

CONCLUSION

It could be concluded that supplementation of *Moringa oleifera* leaves in the diets of goats had no adverse effect on haemato-biochemical parameters. Thus it can be used in the ration of goats upto 15% level as a replacement of cotton seed cake.

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