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Research Article

THE EFFECT OF *Aloe vera* ON FEED INTAKE EFFICIENCY AND INTERNAL PARASITE LOAD IN CROSS BRED CALVES

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Abstract: The experiment was conducted at Instructional Dairy Farm, Nagla, G. B. Pant University of Agriculture and Technology, Pantnagar of district U.S. Nagar, Uttarakhand to see the effect of *Aloe vera* on feed intake efficiency and internal parasitic load on twelve newborn female crossbred calves. The weekly mean for DMI of crossbred calves fed on ration with or without *Aloe vera* supplementation. The DMI in the initial phase were almost equal (2.44±0.01, 2.48±0.07 and 2.52±0.01 kg) in control and treatment groups. In the end of experiment DMI in groups were 6.87±0.03, 7.83±0.18 and 9.30±0.15 kg in control, treatment group 1 and treatment group 2 respectively. The results show that the *Aloe vera* had the statistically significant effect ($P<0.05$) on DMI in treatment groups. Treatment groups started trend of significantly ($P<0.05$) higher intake over control from 4th week onwards and retain until the end of experiment. Beside this, treatment group 2 (T_2) also showed significantly ($P<0.05$) higher intake as compare to treatment group 1 (T_1) from the same extant. There was no internal parasitic load in groups in the beginning of experiment. At the end of experiment lower egg per gram was observed in treatment group 2(87.5±23.93) as compare to treatment group1 (100±20.41) and control (100±14.43).

Keywords: *Aloe vera*, Feed intake, Crossbred Calf, Parasitic load

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Introduction

Aloe, also known as Ghigwar (urdu) and Kawar gandal (local name), is genus of shrubby, scattered, succulent plant of the family *Xanthorrhoeaceae/Liliaceae*. *Aloe vera* is an African native plant and has more than 360 species all over the world. Today two species are grown commercially, namely Aloe barbadensis Miller, also called *Aloe vera*, and Aloe arborescence. The main ingredient of Aloe is called gel, which covers inner portion of the leaves. In appearance, it is a cactus like plant that grows readily in hot, dry climates and now a day, because of demand for many purposes, it is cultivated in large quantities [12]. Detailed studies explored Aloe's several other characteristics, including that of antibacterial, anti-inflammatory, and antiseptic properties of *Aloe vera*. *Aloe vera* may penetrate injured tissue, relieve pain, dilate capillaries, and work as an anti-inflammatory agent. It has also been shown by [2,3,4] that certain amino acids, vitamins, RNA act as anti-inflammatory. Grindlay and Reynolds, 1986 revealed that *Aloe vera* seems to promote healthy-cell growth. [18] found that fresh *Aloe vera* leaves contained lectin-like compound, which enhanced the growth of normal human cells. It is pointed out that *Aloe vera* gel promotes the regeneration of normal tissue [1] reported that supplementation of *Aloe vera* at the rate of 0.5 per cent level in broiler diet resulted in better feed efficiency. In Ayurvedic medicine, the traditional medicine of India, Aloe has multiple uses inclusive of laxative, antihelminthic, gastrointestinal disorders, including peptic ulcer. A large number of chemical substances have been identified, which act as cathartic, emollients, accelerator of wound-healing and modulator of immune response. A number of efforts have been made to explore the nutritional and therapeutic value of *Aloe vera* in man and animals with satisfactory outcome regarding the nutritive value, anthelmintic, antimicrobial, wound healing and anti diabetic properties.

So, keeping in view of the nutrients composition and other facts mentioned above, Present experimental study was designed an aim to the effect of *Aloe vera* on feed intake efficiency and internal parasitic load in cross bred calf.

Material and methods

The experiment was conducted at Instructional Dairy Farm, Nagla, G. B. Pant University of Agriculture and Technology, Pantnagar of district U.S. Nagar, Uttarakhand. The experiment was conducted on twelve newborn female crossbred calves to assess the effect of *Aloe vera* on feed intake efficiency and internal parasite load. The trial was conducted for 10 weeks (from February 18, 2012 to April 28, 2012) including first week as acclimatization feeding period.

The details of materials and techniques used during course of investigation are given below:

A total of twelve newborn crossbred (Holstein Friesian × Sahiwal) female calves (5-day-old) weaned after birth and were divided into three groups of four animals in each group on the basis of their body weight as follows (4). T_0 (Control), T_1 (*Aloe vera* supplementation @ 2 g per kg body weight), T_2 (*Aloe vera* supplementation @ 4 g per kg body weight). A feeding trial of 10 weeks was conducted. Roughages and calf starter were fed to all the groups of crossbred calves both in the morning and evening hours from 15th day onwards. Ad libitum water was provided twice a daily at 8 AM and 3 PM to the animals throughout the experimental period. The milk was first boiled and then cooled to body temperature before feeding. The quantity of whole milk to be fed to each calf was divided into two equal halves and was fed in morning and evening.

A. Showing distribution of crossbred calves in different groups

Group	Calf Number	Initial Body Weight (kg)
Control Group (T_0)	C_1	28
	C_2	27.2
	C_3	27.934
	C_4	27.28
Treatment group-1 (T_1)	A_1	29.2
	A_2	28.18
	A_3	26.92
	A_4	26.89
Treatment group-2 (T_2)	B_1	28.64
	B_2	27.97
	B_3	27.957
	B_4	25.998

B. Common Feeding schedule for all groups

Age (week)	Milk (part of body weight)	Calf Starter	Roughage
0-1	1/10	-	-
2-4	1/10	*ad libitum* 15th day onwards	*ad libitum* 15th day onwards
5-7	1/15	*ad libitum*	*ad libitum*
7-10	1/20	*ad libitum*	*ad libitum*

Description of *Aloe vera* (procurement, processing and feeding)

Aloe vera leaves were procured from Medicinal Research Development Center (MRDC) situated at outskirt of G. B. Pant University of Agriculture and Technology, Pantnagar. Procured *Aloe vera* leaves were subjected to thorough washing and then dried in the shed before processing. These leaves were minced in the electric operated mixer to prepare the crude extract so that loss of some active ingredients like enzymes, hormones and vitamins could be avoided. Procurement and processing of *Aloe vera* were done daily. Now this processed *Aloe vera* was fed to the treatment groups of animals twice a day at 4.30 AM and 4.30 PM throughout the experimental period. Details of inclusion levels and feeding are given below:

There were two experimental treatments and one control feeding schedule designed for crossbred calves to conduct the research trial which are described as follows:

Control Group (T_0)

Feeding schedule as per the Table A was followed.

Treatment group-1 (T_1)

Along withthe Feeding schedule of Table A, *Aloe vera* supplementation @ 2 g per kg body weight in milk was done.

TreatmentGroup-2 (T_2)

Along with the Feeding schedule of Table A, *Aloe vera* supplementation @ 4 g per kg body weight in milk was done.

Estimation Feed Intake Efficiency

Data regarding the feed intake were taken daily and total dry matter intake was estimated at the end of week. Fodder, calf starter and milk offered to the animals individually in separate pens. Weighed quantity of fodder and calf starter given to the animal and residue were collected and weighed separately. Calves consumed all the milk offered to them so no residue is there. Dry matter of feed offered and their residues were estimated to calculate dry matter intake efficiency. Following protocol was followed in estimating the dry matter:

Determination of Dry Matter

For determination of dry matter, 100 g of feed sample was weighed in the tray. Tray was placed in the hot air oven maintained at 70ºC and dried till a constant weight was obtained. The dry matter was then calculated as per following formula:

$$Dry\ Matter\ (\%) = \frac{W_2 - W}{W_1 - W} \times 100$$

Where,

W = weight of empty tray (g)

W1= weight of tray with sample before drying (g)

W2= weight of tray with dried sample (g)

Dry matter intake of animal was calculated as per following formula:

Dry Matter in Feed, g (X_1) = Fresh Weight of Feed × Dry Matter (%) in Fresh Feed

Dry Matter in Feed Residue, g (X_2) = Weight of Feed Residue × Dry Matter (%) in Feed Residue

Dry Matter Intake of Animal, g = X_1- X_2

Estimation of Internal parasitic Load: Egg per gram

Faecal samples were collected directly per rectum or freshly voided faeces in sterilized poly bags, twice a month from crossbred calves. Collected samples were brought to the departmental laboratory for further processing. Egg per gram was calculated as follows to estimate the internal parasitic load in study groups of crossbred calves. Samples were quantified by using modified Mc Master Egg counting technique [10]. One gram of faeces was weighed and triturated with 14 ml of saturated salt solution in pastle and mortar and then sample was filtered through tea strainer into wide mouth bottle. The egg counting chamber was then charged with this filtrate. Then filtrate was allowed to settle down for 2 minute, so that, the eggs float to the under surface of the upper side and they were in focused against the ruled area under compound microscope. The total number of eggs was multiplied by 50(dilution factor) represented the number of eggs per gram of faeces. Dilution factor was obtained by applying formula below:

Egg per gram of Faeces (EPG)=(No.of Eggs Counted ×Total Vol.of Sample (ml)) / (Vol.of Chamber (ml)×Wt.of Faeces (g))

Statistical Analysis

The experimental data obtained during the study were analyzed statistically using completely randomized design with the simple analysis of variance technique. Weekly and fortnightly mean with standard error where estimated for respective treatments separately. The difference among the treatment means for each character was further tested (16).

Results and discussion

Feed Intake Efficiency

The results pertaining to effect of *Aloe vera* supplementation on Dry Matter Intake (DMI) has been discussed underneath: The weekly mean for DMI of crossbred calves fed on ration with or without *Aloe vera* supplementation has been presented in [Table-1] and trend depicted in [Fig-1]. Trend reveals that the DMI in the initial phase were almost equal (2.44±0.01, 2.48±0.07 and 2.52±0.01 kg) in control and treatment groups. In the end of experiment DMI in groups were 6.87±0.03, 7.83±0.18 and 9.30±0.15 kg in control, treatment group 1 and treatment group 2 respectively.

Table-1 Average weekly dry matter intake (DMI) (kg) through feed in crossbred calves

Week	Control Group (T_0)	Treatment Group 1 (T_1)	Treatment Group 2 (T_2)
I	2.44±0.01	2.48±0.07	2.52±0.01
II	2.58±0.01	2.60±0.08	2.66±0.02
III	3.00±0.05	3.09±0.08	3.15±0.05
IV	3.28±0.06	3.90±0.14[a]	4.61±0.09[ab]
V	3.68±0.07	4.74±0.19[a]	5.51±0.10[ab]
VI	4.50±0.05	5.16±0.20[a]	5.98±0.10[ab]
VII	5.62±0.03	5.77±0.20[a]	6.57±0.11[ab]
VIII	6.03±0.03	6.57±0.18[a]	7.39±0.12[ab]
IX	6.87±0.03	7.83±0.18[a]	9.30±0.15[ab]

The results show that the *Aloe vera* had the statistically significant effect ($P<0.05$) on DMI in treatment groups. Treatment groups started trend of significantly ($P<0.05$) higher intake over control from 4th week onwards and retain until the end of experiment. Beside this, treatment group 2 (T_2) also showed significantly ($P<0.05$) higher intake as compare to treatment group 1 (T_1) from the same extant. Average daily DMI were higher in treatment groups (669 g in T_1 and 757 g in T_2) as compare to control (603 g).

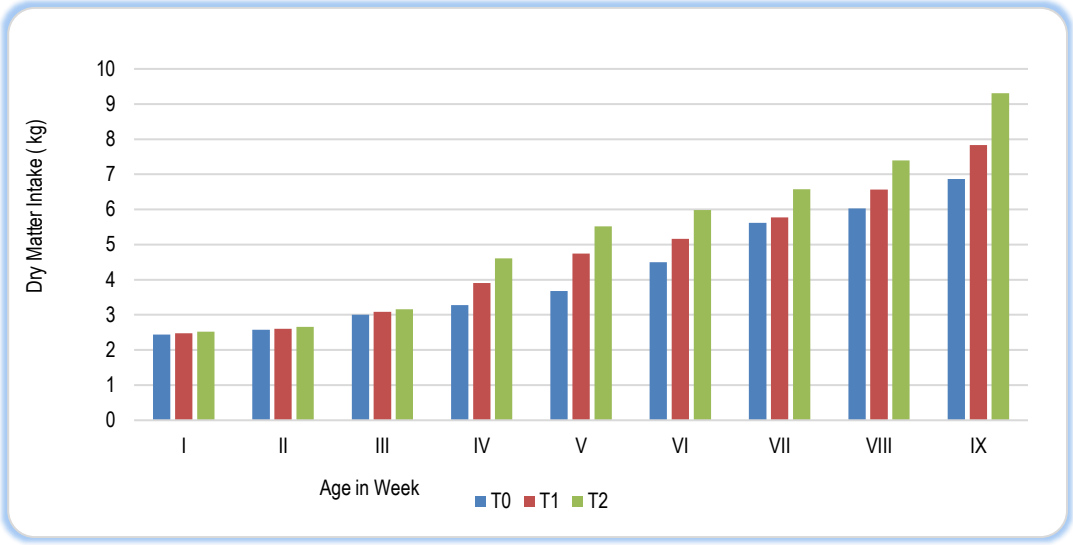

Fig-1 Weekly means of dry matter intake through feed (kg) in crossbred calves

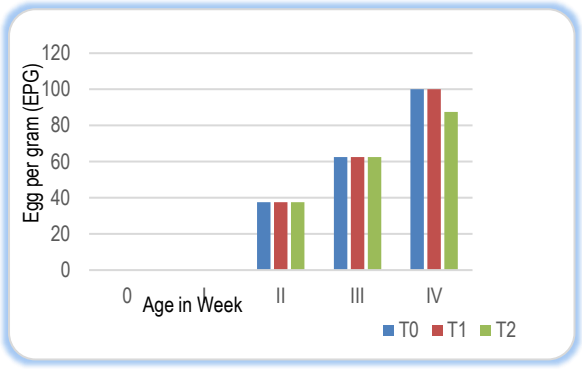

Fig-2 Fortnightly means of egg per gram (EPG) in crossbred calves

It is clear that the body weight of calves increased with passage of time and there-by-there requirements for DMI also increased in that proportion. [1] found similar results in poultry and reported that supplementation of *Aloe vera* at the rate of 0.5 per cent level in broiler diet resulted in better feed intake efficiency. [5] found 665.27 g DM intakes through Feed per calf per day in garlic fed treatment group of pre ruminant crossbred calves as compare to 657.49 g. DM intake per calf per day in control group. [13] reported no significant effect of yeast culture (0.02% Saccharomyces cerevisiae) supplementation on dry matter intake in case of Jersey calves. [9] reported that the total DM intake in pre-ruminant crossbred calves were 68.26 and 74.41 kg and corresponding values for average DM consumption per kg live weight gain were 2.08 and 1.72 kg in control and probiotic supplemented group. [8] reported that the inclusion of yeast culture at 2 per cent of the starter ration significantly increased total dry matter intake and average daily gain when compared with the control group. [15] reported that there was no significant effect of probiotic supplementation on DMI. However, period had the significant effect on DMI of kids. However, [17] reported no significant effect of *Aloe vera* on DM intake. However, it was slightly higher in treatment group (52.4 kg) as compared to control group (52.2 kg).

Table-2 Average fortnightly egg per gram (EPG) in crossbred calves

Fort Night	Control Group (T_0)	Treatment Group 1 (T_1)	Treatment Group 2 (T_2)
0	0	0	0
I	0	0	0
II	37.5±20.41	37.5±12.50	37.5±20.41
III	62.5±12.50	62.5±12.50	62.5±14.43
IV	100±14.43	100±20.41	87.5±23.93

Internal Parasitic Load

The mean EPG in crossbred calves of control and treatment groups have been presented in [Table-2] and trend depicted in [Fig-2] There was no internal parasitic load in groups in the beginning of experiment. At the end of experiment lower egg per gram was observed in treatment group 2(87.5±23.93) as compare to treatment group1(100±20.41) and control (100±14.43).

The analysis of variance indicates that *Aloe vera* had no significant effect on internal parasitic load (P>0.05) in treatment groups. However, the anthelmintic effect of *Aloe vera* was slightly there in treatment group 2 (T_2). [7] fed condensed tannin (@ 1.5% of total dry matter intake) from the different tree leaves for 120 days to see its herbal anthelmintic effect in lambs. He observed the significant difference in treatment groups as compared to control. In contrary to this, [1] fed 0.85% condensed tannin of oak (*Quercus semicarcisolia*) leaves (on dry matter intake basis) for similar period to goats and observed no significant difference in treatment groups as compared to control.

Summary

The DMI (g/d) was significantly higher (P<0.05) in *Aloe vera* supplemented groups (669 g in T_1 and 757 g in T_2) as compare to control group (603 g). The overall DMI was also significantly higher (P<0.05) in *Aloe vera* supplemented groups as compared to control group. Beside this, higher treatment group (T_2) also showed significantly (P<0.05) higher intake as compare to lower treatment group (T_1) from the same extant. The anthelmintic effect of *Aloe vera* was slightly there in higher treatment group only.

Conclusion

Aloe vera supplementation (both @ 2 and 4 g per kg body weight) increased DM intake. *Aloe vera* supplementation was again not effective against internal parasitic load in crossbred calves.

Application of research: used for as reference for further research. Very big beneficial for farmers whose livelihood depends in animal husbandry, they use *Aloe vera* against fedding of calf to increase dry matter intake as well as commercial values.

Research Category: Livestock Production and Management

Abbreviations: DMI- Dry Matter Intake, EPG- Egg Per Gram

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