Original Research

Effect of Oral Administration of Urine of Pantja Goats on the Performance of Their Kids

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Abstract

Pantja goats are newly recognized breed of Himalayan basin with accession no. INDIA_GOAT_2420_PANTJA_06024. An experiment, during autumn and winter seasons of 2016-17, was made to study the effect of oral administration of Pantja goat urine (10 ml, on alternate days for 30 days) on about 2 months old kids. The comparison of growth parameters (body weight, chest girth, body length), rectal temperature and immune response was made between urine administered (6 kids, treatment group) and control group (6 kids) at 0, 15, 30 and 90 day of experiment. Significant increase in body weight (P<0.05) (12.81 ± 0.26 vs. 12.18 ± 0.10 kg); chest girth (P<0.01) (56.37±0.14 vs. 55.82±0.32 cm); body length (P<0.01) (52.56 ± 0.15 vs. 51.48 ± 0.29 cm); relative body weight (P<0.05) (99.75 ± 2.49 vs. 92.01±2.21%) and relative body length (P<0.01) (39.35 ± 0.28 vs. 36.43±0.91%) of kids became evident at 90 days of experiment. The treatment group kids also showed significant (P<0.01) pronounced reaction (skin thickness) to Phytohaemagglutinin (PHA) injection (3.55 ± 0.05 vs. 2.54 ± 0.03 mm) at 12 hours, indicating that administration of urine in kids boosted their immune response. The urine administered and control group Pantja kids recorded 38.36±0.01 vs. 38.44±0.02; 38.55±0.03 vs. 38.29± 0.02^{0}C; 38.60± 0.04 vs. 38.45± 0.02; 38.75± 0.02 vs. 38.78± 0.03^{0}C indifferent rectal temperature at 0, 15, 30 and 90 day of experiment, indicating that urine intake was non-toxic to them.

Key words: Growth, Oral Administration, Pantja Goats, Phytohaemagglutinin, Urine

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Introduction

Urine as a therapy was used from ancient times and it is available to everyone free of charge. One animal produces 17 to 45 ml of urine per kilogram of body weight per day (Kaneko *et al.*, 1997). Urine is not a toxic product and this has been scientifically proven by various workers. Majority of urine is water (95%), consists of urea (2.5%) and the remaining (2.5%) is a mixture of minerals, salt, hormones and enzymes

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(Bhadauria, 2002). Urine is formed to keep the composition of extracellular fluid (ECF) constant, most of the substances present in ECF are also present in the urine, but varies depending upon whether these substances are required to be conserved or excreted (Erickson *et al.*, 2004.). There were significant difference ($P<0.05$) in performance characteristic in terms of weight gain, feed intake among birds on administration of Aloe-vera and birds treated with combination of *Gomutra Ark* (GoA) and Aloe-vera (Kumar *et al*., 2004). Urine therapy can, therefore, alone or in combination with any other natural medicines yield good results. Although the literature on the applications of cow urine in human are liberally available in Ayurveda, but literature with respect to utility of goat urine is scanty. Hence, present study was undertaken to ascertain the effect of oral administration of the urine of Pantja goats on the performance of their kids.

Materials and Methods

The work was carried out on Pantja goats and their kids at goat unit of Department of Livestock Production Management, College of Veterinary & Animal Sciences, G. B. Pant University of Agriculture & Technology, Pantnagar (Uttarakhand), managed under AICRP-Uttarakhand Goat Unit, sponsored by C.I.R.G (I.C.A.R), Farah, Mathura. A total of 12 male kids (6 in control and 6 in treatment group) were used. The procedure of urine administration (Fig. 1 & 2) (The urine and normal saline were administered to the treatment and control group kids, respectively, using plastic syringe for ease of administration) to kids as adopted during the experiment period of 30 days (Table 1).

Fig. 1: Collection of urine from Pantja goats

Fig. 2: Oral administration of urine in Pantja goat kid

All the kids were raised under standard feeding and management practices (Table 2). They were kept in kids' pen during night and in kids' cradle during day with sufficient bedding materials. Growth of kids in terms of gain in body weight (in kg), body measurements (chest girth and body length in centimeters) and rectal temperature (^{0}C) were recorded at 0, 15th, 30th and 90th day of experiment.

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Table 1: Details of kids under control and treatment groups

Groups	Kids' details at the start of experiment				Experimental procedure adopted (at 8 am on alternate days for a month period)	Observations recorded on dayth of oral administration of urine/ normal saline			
	Sex	Ear Tag No.	Age (days)	Body Weight (kg)					
A	B	C	D	E	F	0th	15th	30th	90th
Control	Male	33, 35, 105,117, 129, 204	63.37 ±1.20	6.35 ±0.12	Administered 20 ml normal saline orally	d+0	d+15	d+30	d+90
Treatment	Male	21, 23, 31, 105a, 106a, 106b	64.50 ± 0.99	6.42 ±0.14	Administered 10 ml Pantja goat urine diluted with10 ml distilled water orally	d+0	d+15	d+30	d+90

Before conducting the experiment, body weight (kg), body length (cm) and chest girth (cm) of all control and treatment group kids were recorded at around 8.00 AM for three consecutive days and their average were taken as initial values. The body weight and body measurements were taken when the animal was standing squarely comfortably on smooth, hard, concrete floor (Singh *et al*., 1994). These traits were further recorded at 15 days interval till 90 days of experiment, to get final values. The study under this head covered increase in body weight, body measurements and relative growth rate (RGR) in body weight and body measurements during experimentation period. RGR is the percentage increase in body weight/ chest girth/ body length during a given time interval in relation to their initial values at the beginning of the experiment (Karna *et al*., 2002).

Table 2: Feeding management of kids during the experiment

S. No.	Particulars/Components	Details	Remarks
1	Milk	Allowed to suckle the doe maximum for 10 minutes, or even early in case rejected by dam	Twice a day
2	Green fodder as leaves	Oats (*Avena sativa*)	Provided Ad libitum, offered twice as per availability in the silvi-pasture
		Ber (*Zizphus indicus*)	
		Guava (*Psidium guajava*)	
		Neem (*Azadiracha indica*)	
		Berseem (*Trifolium alexandrium*)	
3	Compounded concentrate feed*	30 g in mash form	Offered individually in plastic tub at 3 pm daily
4	Water	Freshly drawn bore well water	Made available during day time

***** *contained crushed maize (300 g), wheat (200 g), gram-chuni (200 g), groundnut cake (200 g), Mineral mixture (20 g) and Salt (10 g).*

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Cell mediated immune response was studied by increase in skin fold thickness to intra-dermal injection of Phytohemagglutinin (PHA) at 30th day of experiment using standard test procedure in a total of 12 kids (6 urine administered and 6 non urine administered) (Agazzi *et al*., 2007). For this PHA (5 mg) was dissolved in 10 ml sterile phosphate buffer solution (PBS). Its 0.1 ml solution, containing 50µg of PHA, was injected intra-dermally on a top shaved area of right neck using insulin syringe to act as treatment. Also 0.1 ml of PBS was injected on similar site on left side of neck of the same animal to act as control. Then skin thickness was measured at 0, 12 and 24 hour after intra-dermal injection of PHA and PBS using a constant tension caliper. Increase in skin thickness was calculated by difference in skin thickness between left and right side at 0, 12 and 24 hour. Least-squares analysis of data and test of significance were attempted as per routine statistical procedures (Harvey, 1990; Snedecor and Cochran, 1994).

Results and Discussion

The finding emanating out of the experiment are presented and discussed under following headings-

Body Weight

The values recorded at the end of experiment (90 days period) in urine administered Pantja goats kids and control group kids were 12.81±0.26 and 12.18±0.10 kg, respectively. A significant ($P<0.05$) increase in body weight of kids of treatment group was observed at 90 days of experiment. The increase in body weight of treatment group kids may be due to the ready availability of various micro- and macro-minerals in solution and probably in simpler form and many of these might be acting as cofactors for a number of enzymatic reactions in the body, when urine was administered orally. Also urea and uric acid might have acted as sources of non-protein nitrogen which could be utilized by rumen microbes for synthesizing their protein. Also some growth factors that are present in plasma may leak into urine and utilized either in same form or may provide raw material for their re-synthesis after oral administration of urine.

The increase in the size of rumen in goats can be observed, from 37.5% (at 3 weeks of age) to 65% (at 6 weeks of age). Kids started consuming grass from 10-12 days of age, at 5 weeks of age their digestive system starts preparing for roughage and the fore-stomach develops (Mgasa *et al.*, 1994). Present experiment was initiated in about two months' old kids: treatment group (64.50±0.99 days) and control group (63.37±1.20 days). Hence, it could be assumed that the experiment was initiated in kids whose rumen was developed to utilize non-protein nitrogen from nitrogenous substrates, like urea and uric acid.

Chest Girth

At the end of experiment the values for chest girth were significantly ($P<0.01$) higher for urine administered kids (56.37±0.14 *vs.* 55.82±0.32 cm). Since body length and chest girth are important measures for body

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weight determination (Pankaj, 2008), the significant increase in body weight may be partly due to the increase in chest girth.

Body Length

The value at the end of experiment were 52.56±0.15 and 51.48±0.29 cm in treatment and control group kids, respectively, being significantly (P<0.01) higher in urine administered kids. Since body length and chest girth are important measures for body weight determination (Pankaj, 2008), the significant increase in body weight may be partly due to the increase in chest girth.

Relative Growth Rate (%)

The relative differences in body weight, chest girth and body length of treatment and control group kids at the end of experiment were 99.75±2.49 *vs.* 92.01±2.21%, 36.95±0.35 *vs.* 34.40±1.17% and 39.35±0.28 *vs.* 36.43±0.91%, respectively. There was significant improvement in relative body weight (P<0.05) and relative body length (P<0.01) of kids administered with urine.

Rectal Temperature

Least-squares means for rectal temperature recorded at 0, 15, 30 and 90 day of experiment in urine administered and control group of Pantja kids were 38.36±0.01; 38.55±0.03; 38.60±0.04; 38.75±0.02 and 38.44±0.02^{0}C; 38.29±0.02; 38.45±0.02; 38.78±0.03^{0}C, respectively. The values recorded were indifferent among treated and control group kids. Recorded rectal temperatures were normal and within range (38.6-40.0 ^{0}C) for goats (Bassert and Thomas, 2014)**.** Since there has not been any significant deviation in rectal temperature between treatment and control group kids, the administration of urine seemed to exert non-toxic effect on this trait up to five months old Pantja kids.

Table 3: Least-squares means and their S.E. for various performance traits of kids of Pantja goats during different stages of experimentation

Particulars	Obs.	On the day of oral administration of urine/ normal saline			
		0	15th	30th	90th
A. Body weight (kg)					
Control	6	6.34±0.12	7.18±0.11	8.23±0.11	12.18^{a}±0.10
Treatment	6	6.42±0.14	7.34±0.21	8.30±0.17	12.81^{b}±0.26
B. Chest girth (cm)					
Control	6	41.13±0.17	44.05±0.18	46.80±0.11	55.82^{A}±0.32
Treatment	6	41.16±0.15	44.30±0.23	47.01±0.28	56.37^{B}±0.14
C. Body length (cm)					
Control	6	37.73 ± 0.21	40.00 ± 0.46	43.49 ± 0.60	51.48^{A} ± 0.29
Treatment	6	37.70 ± 0.15	40.22 ± 0.19	43.56 ± 0.28	52.56^{B} ± 0.15
D. Rectal temperature (^{0}C)					
Control	6	38.44 ± 0.02	38.29 ± 0.02	38 .45 ± 0.02	38.78± 0.03
Treatment	6	38.36 ± 0.01	38.55 ± 0.03	38.60 ± 0.04	38.75± 0.02

Least-squares means followed by same or no letters as superscripts in the column do not differ significantly (a, b: P<0.05), (A, B: P<0.01).

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Skin Fold Test

Skin thickness was measured at 0, 12 and 24 hour after intra-dermal injection of PHA using a constant tension caliper and difference in skin thickness (left and right side of neck) between urine administered and control group kids was observed at '0' hour, following '12' hours and '24' hours of testing. The treatment group kids showed significant ($P<0.01$) pronounced reaction (3.55±0.05 *vs.* 2.54±0.03 mm) at '12' hours, indicating that administration of urine in kids boosted their immune response. However, the reactions at '0'hour (0.12 ± 0.02 *vs.* 0.10 ± 0.03 mm) and 24 hours (1.84 ± 0.16 *vs.* 1.74 ± 0.10 mm) were statistically indifferent. The significant increase in skin thickness at 12 hour in urine administered kids indicated boost in their immune status.

Conclusion

Following oral administration of urine of Pantja goats, the kids showed significant increase in their body weight, chest girth and body length at 90 days of initiation of experiment. Also there was significant improvement in relative body weight and relative body length of urine administered kids. Skin fold test indicated that administration of urine in kids boosted their immune response. Rectal temperature of urine administered kids was within normal range and thus urine administration seemed to exert non-toxic effect. So it could be concluded that oral administration of Pantja goats' urine to kids showed positive and desirable response in terms of their growth and immune response. Such experiments may be further planned with larger dosage of goats' urine for longer duration to ascertain its effect on growth and immunity of kids and ailing goats and for the purpose of standardization.

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