

Original Research Article

<https://doi.org/10.20546/ijcmas.2019.802.398>

Late Pregnancy Allowances in Does on Haemato Biochemical Response in Kids

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ABSTRACT

Forty five extensively reared pregnant Ganjam does were randomly distributed into three treatment groups (T₁, T₂, T₃), 15 in each for evaluating the effect of late pregnancy allowances to them on haemato-biochemical profiles of their kids. All the does were maintained on browsing besides additional concentrate supplementation @ 200 g /day and @ 300 g/day in T₂ and T₃, respectively. Additional allowances were fed to the treatment groups 2 months prior to the expected date of kidding. Immediate after kidding, blood samples were collected from the day old kids for analysis of hemoglobin, PCV, TEC, MCV, MCH, MCHC, TLC, serum glucose, urea, total protein, albumin, globulin, A:G, cholesterol, triglyceride, urea and creatinine. The lambs in T₂ and T₃ showed significantly (P<0.05) higher haemoglobin (g/dl) (T₂: 9.95 ± 0.18; T₃: 9.84 ± 0.30) and PCV % (T₂: 29.59 ± 1.16; T₃: 29.04 ± 1.32) than those in T₁ group. Other haematological parameters remained statistically similar (P>0.05) between groups. Significant differences (P<0.05) were observed for serum glucose in T₂ (56.94 ± 1.46 mg/dl) and T₃ (55.99 ± 1.32mg/dl) as compared to T₁ (49.82 ± 2.16 mg/dl). For both total protein and albumin (g/dl), T₂ (8.59 ± 0.06 and 4.34 ± 0.04) and T₃ (8.97 ± 0.04 and 4.66 ± 0.08) showed significantly (P<0.05) higher value than T₁ (7.15 ± 0.04 and 3.14 ± 0.11) while serum globulin remained statistically similar between groups. Other Serum biochemical parameters were found to be non significant (P>0.05) among groups. It was concluded that late pregnancy allowances @ 200 g/day/doe in extensively reared does is required to maintain the glucose and protein level in day old kids, may help for their further growth.

Keywords

Concentrate,
Pregnancy, Doe,
Blood profile, Kids

Article Info

Accepted:
26 January 2019
Available Online:
10 February 2019

Introduction

Ganjam goat sometimes called as “Golla goat” locally, is distributed in eastern region of India and specifically in the whole of

Ganjam district along with parts of Gajapati district of southern Odisha (Sahu *et al.*, 2013). Justifying Indian goats as “poor man’s cow”, this breed has been a major source of livelihood of Golla tribe of its native tract

since generations. These goats are reared under extensive system of management without any supplementary feed. Nearby range and forest land mostly serve as the feed source for these goats (Sahu *et al.*, 2015). Nutritional inadequacy in the extensive system specifically to the pregnant does is a major challenge. Rapid rate of foetal growth during the final 6-8 weeks of pregnancy imposes a metabolic challenge to the doe which is met by the mobilisation of maternal body tissue (Osuagwuh and Aire, 1990) and this may result in weight loss of doe if the dietary supply of nutrients is inadequate (Martin *et al.*, 2005 and Rafiq *et al.*, 2003). An increased plane of nutrition during late gestation has been reported to have various advantages, such as; reduced incidence of pregnancy toxemia (Fraser *et al.*, 1938; Charismiadou *et al.*, 2000), less metabolic stress (Kerslake *et al.*, 2010). Some encouraging results have been obtained by many workers by prepartum supplementation (Chaturvedi *et al.*, 2008 and Dawson *et al.*, 2005). Besides the above benefits, maternal nutrition significantly affect the birth weight of kids (Sahu *et al.*, 2018) which in-turn maintain proper pre-weaning growth and good health of kid. Nutrition of dam during pregnancy influences blood metabolites of kids which serve as an excellent tool for prediction of the metabolic status of animal and their future performance. Considering the above facts in mind the present study was undertaken to study the effect of late pregnancy allowances in does on haemato biochemical response in kids.

Materials and Methods

The present investigation was carried out in Chhatrapur block of Ganjam district of Orissa where AICRP on Goat Improvement (Ganjam Field Unit) is operating. These areas are dominated by 'Golla' people, who rear Ganjam goats traditionally in large number in

range system. The animals selected were from the flocks of registered goat farmers of the project. For this study, pregnant does of similar body weight (33.91 ± 0.70 kg to 34.59 ± 0.75 kg), age and parity (3rd to 5th parity) were selected. The expected dates of kidding were estimated as per the breeding history of goat given by the flock man. A total of 45 healthy pregnant does were taken for this study. The selected does were randomly allotted to three treatment groups based on complete randomized design, each comprising 15 pregnant does and kept in different feeding regimens viz. (T₁): Control; normal browsing at range system; (T₂): Control with daily supplementation of 200 g concentrate mixture and (T₃): Control with daily supplementation of 300 g concentrate mixture. This concentrate mixture contained 22% crude protein (estimated) with 72% Total Digestible Nutrients (calculated). Concentrate feeding was done in very early morning by confining the goats in partition wall made up of bamboo and taken to the nearby forest thereafter, for the purpose of browsing (Average duration was 8 hours, from 9am to 4pm) as it was a routine practice of the flock man. Concentrate feeds were offered upto parturition and average daily Dry Matter Intake (DMI) was 163 g/doe/day and 224.0 g/doe/day in T₂ and T₃ respectively. Immediately after kidding, blood samples were collected from the kid by jugular vein puncture before suckling.

For estimation of haematological parameters like Haemoglobin, Haematocrit (PCV), TEC, MCV, MCH, MCHC and TLC, 2 ml blood collected in blood collection tube containing EDTA as described by Benjamin (1985). For analysis of biochemical parameters, 6 ml blood was collected in sterilized dry centrifuge tubes and kept in slanted position at room temperature for some time and centrifugation was done at 5000rpm for 10 minutes at 4°C. The supernatant (serum) was

separated in airtight serum storage vials and kept at -20°C till analysis of biochemical parameters. Analysis was done after thawing for various biochemical profiles (total protein, albumin, globulin, urea, creatinine, cholesterol and triglyceride) except glucose which was done soon after collection of serum, as per the standard protocol.

Data, thus obtained were subjected to suitable statistical analysis following standard methods described by Snedecor and Cochran (1994) using the SAS 9.2 package.

Results and Discussion

As a means of metabolic indicator in the new born kids and their future performance, the effect of late pregnancy allowances in does on haemato biochemical response in kids are presented in table 1 and 2. The haemoglobin level ranged from 9.01 ± 0.21 to 9.95 ± 0.18 g/dl in various treatment groups under study. Kids in T_2 (9.95 ± 0.18 g/dl) and T_3 (9.84 ± 0.30 g/dl) showed significantly ($P < 0.05$) higher haemoglobin than those in T_1 group (9.01 ± 0.21 g/dl) (Table 1). Similar to the above findings, kids under T_1 group showed significantly lower PCV ($26.01 \pm 1.48\%$) as compared to T_2 ($29.59 \pm 1.16\%$) and T_3 ($29.04 \pm 1.32\%$). For both the parameters, kids under T_2 and T_3 revealed statistically similar result. No significant variation was observed between groups for the other haematological parameters viz. Total Erythrocyte Count (TEC: 12.89 ± 0.47 to 13.12 ± 0.39), Total Leucocyte Count (TLC: 7.98 ± 0.31 to 8.19 ± 0.25), Mean Corpuscular Volume (MCV: 19.41 ± 0.89 to 20.15 ± 0.65), Mean Corpuscular Haemoglobin (MCH: 8.31 ± 0.12 to 8.54 ± 0.14) and Mean Corpuscular Haemoglobin Concentration (MCHC: 30.54 ± 1.68 to 32.14 ± 2.76) (Table 1). Decreased concentration of Hb and PCV % in kids under extensively reared groups could be due to the fact that non supplementation of the does with concentrate mixture during pregnancy limits

the normal physiological function and decrease the PCV and Hb values in the blood of day old kids (Sahoo *et al.*, 2016). Serum glucose level in the day old kids after 60 days of feeding trial to their dams ranged between 49.82 ± 2.16 to 56.94 ± 1.46 mg/dl in the different treatment groups under study (Table 2). The glucose concentrations recorded in the present study is well within the normal range of 45-60 mg/dl (Altman and Dittmer, 1961) but lower than 63.35 ± 7.70 mg/dl (Sandabe *et al.*, 2004). This might be due to the differences in breed, environment and nutritional status of the experimental animals in the two studies.

A significantly higher value of serum glucose in T_2 (56.94 ± 1.46 mg/dl) and T_3 (55.99 ± 1.32 mg/dl) as compared with T_1 (49.82 ± 2.16 mg/dl) might be due to the effect of concentrate supplementation resulting in production of higher amount of propionate, a gluconeogenic substrate, in the rumen fermentation resulting in elevated serum glucose as reported by Thomas *et al.*, (1988) which somewhat compensates the extra energy required by the growing foetus, in-turn might enhance the blood glucose level in the day old kid at birth.

The average serum total protein ranged from 7.15 ± 0.04 to 8.97 ± 0.04 g/dl during the experimental period in the three treatment groups of Ganjam goats. The result of the present study was in agreement to the value of Kumar *et al.*, (2008) and Kaushik and Bugalia (1999). These differences might be due to the effect of breed, environment and nutritional status of the experimental animals in the above studies. For both total protein and albumin (g/dl), T_2 (8.59 ± 0.06 and 4.34 ± 0.04) and T_3 (8.97 ± 0.04 and 4.66 ± 0.08) showed significantly ($P < 0.05$) higher value than T_1 (7.15 ± 0.04 and 3.14 ± 0.11). In between two supplemented groups, T_3 were found to have more value as compared to T_2 .

Table.1 Effect of late pregnancy allowance of does on haematological profiles in kids

| Parameters | T ₁ | T ₂ | T ₃ |
|---|--------------------------|---------------------------|---------------------------|
| Haemoglobin (g/dl) | 9.01 ±0.21 ^B | 9.95 ± 0.18 ^A | 9.84 ± 0.30 ^A |
| Packed Cell Volume (%) | 26.01 ±1.48 ^B | 29.59 ± 1.16 ^A | 29.04 ± 1.32 ^A |
| Total Erythrocyte Count (10 ⁶ /μl) | 13.12 ±0.39 | 12.89 ± 0.47 | 12.91 ± 0.51 |
| Total Leucocyte Count (10 ³ /μl) | 8.07 ±0.18 | 7.98 ± 0.31 | 8.19 ± 0.25 |
| Mean Corpuscular Volume (fL) | 19.4 ±0.89 | 20.15 ± 0.65 | 19.87 ± 1.04 |
| Mean Corpuscular Haemoglobin (pg) | 8.54 ±0.14 | 8.32 ± 0.38 | 8.31 ± 0.12 |
| Mean Corpuscular Haemoglobin Concentration (g/dl) | 31.80±2.10 | 30.54 ± 1.68 | 32.14 ± 2.76 |

Means with different superscripts in a row (A,B) differ significantly (P<0.05).

Table.2 Effect of late pregnancy allowance of does on blood biochemical profiles in kids

| Parameters | T ₁ | T ₂ | T ₃ |
|----------------------|--------------------------|---------------------------|---------------------------|
| Glucose (mg/dl) | 49.82 ±2.16 ^B | 56.94 ± 1.46 ^A | 55.99 ± 1.32 ^A |
| Total Protein (g/dl) | 7.15 ±0.04 ^C | 8.59 ± 0.06 ^B | 8.97 ± 0.04 ^A |
| Albumin (g/dl) | 3.14 ±0.11 ^C | 4.34 ± 0.04 ^B | 4.66 ± 0.08 ^A |
| Globulin (g/dl) | 4.02 ±0.16 | 4.25 ± 0.09 | 4.31 ± 0.21 |
| A/G ratio | 0.78 ±0.05 ^B | 1.02 ± 0.03 ^A | 1.08 ± 0.07 ^A |
| Urea (mg/dl) | 23.98±1.58 | 25.18 ± 0.95 | 24.91 ± 1.36 |
| Creatinine (mg/dl) | 0.61±0.03 | 0.59±0.05 | 0.65±0.03 |
| Cholesterol (mg/dl) | 72.45±3.58 | 69.94±5.08 | 70.76±3.97 |
| Triglyceride (mg/dl) | 33.57±2.11 | 34.81±2.95 | 31.79±3.08 |

Means with different superscripts in a row (A,B,C) differ significantly (P<0.05).

Significantly higher total protein concentrations were observed in kids of supplemented ewes suggesting that improved nutritional status in T₂ and T₃ does (Sahoo *et al.*, 2016) might have resulted in more nutrients availability for the foetus in turn in day old kids. Contrary to the above protein parameters, serum globulin concentration (g/dl) was statistically similar (P>0.05) in T₁ (4.02 ±0.16), T₂ (4.25 ± 0.09) and T₃ (4.31 ±

0.21), however it remained within the normal physiological range. Non significant difference in serum globulin concentration in different groups might be due to inability of the immunoglobulin to cross the placental barrier (Castro *et al.*, 2011). The mean serum A/G ratio was statistically higher (P<0.05) in T₂ (1.02 ± 0.03) and T₃ (1.08 ± 0.07) as compared to T₁ (0.78 ±0.05). Significant difference in A/G ratio is due to a significant

increase in albumin concentration in supplemented groups as compared to non supplemented groups. The values for other serum biochemical values (Table 2) viz. urea (23.98 ± 1.58 in T₁ to 25.18 ± 0.95 mg/dl in T₂), creatinine (0.59 ± 0.05 in T₂ to 0.65 ± 0.03 mg/dl in T₃), cholesterol (69.94 ± 5.08 in T₂ to 72.45 ± 3.58 mg/dl in T₁) and triglyceride (31.79 ± 3.08 in T₃ to 34.81 ± 2.95 mg/dl T₂) did not show any significant difference ($P > 0.05$) between the groups, but were in line with standard values of the available literature.

It can be concluded that an extra allowances of concentrate @200g/day/doe besides normal browsing to the pregnant doe improved birth weight and metabolic profile of kids.

Acknowledgement

Authors are highly thankful to Vice Chancellor and OIC, AICRP on Goat Improvement, O.U.A.T., Bhubaneswar for providing all the facilities to carry out this research work at Ganjam, Odisha, India.

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How to cite this article:

Sahu, S., L.K. Babu, Archana Sarangi, Amit and Karna, D.K. 2019. Late Pregnancy Allowances in Does on Haemato Biochemical Response in Kids. *Int.J.Curr.Microbiol.App.Sci.* 8(02): 3416-3421. doi: <https://doi.org/10.20546/ijcmas.2019.802.398>