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Non-steroidal hormonal levels during ante and post-partum periods in goats

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ABSTRACT

Estimations of T_3, T_4, insulin, growth hormone were carried out in twelve Tellicherry goats by RIA. Results indicated that T_3 and T_4 were increased on the day of parturition and there after. The insulin showed a declining trend up to 10 day after postpartum, whereas the growth hormone showed a steady increase from day prepartum till 15th day parturition.

Key words: T_3, T_4, Insulin, Growth hormone, Prepartum and Postpartum, Tellicherry goats.

Goats as classes of animals are well adopted to hot environment with low humidity suitable for day tropics, especially in southern parts of India. Among the different breeds it is found that Tellicherry goats are the best suitable animals for South India. The reproductive functions and studies on endocrine aspects have been extensively reported with regards to estrogen, progesterone and cortisol. Little availability in the literature in non-steroidal hormones namely Growth hormone, Insulin and thyroid hormones have necessitated the present study.

MATERIALS AND METHODS

Blood samples from 12 does, maintained at LRS, Katupakkam formed the subject of study. Blood samples from animals were collected on 135th, 140th days of gestation, day of parturition and on 5, 10 and 15th day postpartum by jugular vein puncture.

The serum was separated. T_3 and T_4 were estimated using RIA kit obtained from BARC, Mumbai. Insulin was estimated using DPC coat - A-Count method by Diagnostic product Corporation - Los Angles, U.S.S. Growth hormone was estimated using DPC's Double Antibody RIA kit. Data were analyzed by CRD as per Snedecor and Cochran (1994).

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RESULTS AND DISCUSSION

The results obtained in the present study are presented in Table.

Thyroxine (T_4)

The values recorded a fall on the day of parturition, which could be due to the inhibitory effect of glucocorticoids on TSH. The values are similar to the reports of Battacharya *et.al.*, (1994) during late pregnancy in goats. Khurana and Madhan (1986) have found that increased cortisol level decreases thyroxine level in buffaloes. The increase in the level of T_4 during postpartum periods is similar to the observation of Patel *et.al.*, (1993) in Marwari goats. The increased level during this period suggest the mammary development, lactogenesis which warrants for higher T_4 concentration similar to the observations of Agarwal *et.al.* (1992) in camel.

Triiodothyronine (T3)

The T_3 level was higher on 135th day, decreased significantly and was lowest on the day of parturition then started raising during early days of postpartum periods. Similar results were recorded for goats by Battacharya *et. al.*, (1994) and for sheep by Eswari *et.al.*, (1999). Chen and Walfish (1978) stated that during later stages of pregnancy a raise in glucocorticoids secretion produced an inhibitory effect on pituitary - thyroid axis. Rao *et al.* (1978) reported that low T_3 profile during parturition was attributed to gonadal hormonal

Table: Non-steroidal hormonal (T_3, T_4, Insulin and Growth hormone) levels during ante and post-partum periods in goats (ng/ml)

S.No.	Hormones	Antepartum		Parturition (145-147 days)	Postpartum		
		135 days	140 days		5 days	10 days	15 days
1	Thyroxine ng/ml	56.31 ±2.3[a]	48.62 ± 0.1[b]	45.82 ± 0.38[b]	63.31 ± 0.17[a]	65.83 ± 0.40[c]	79.13 ±0.45[c]
2.	Triiodothyronine ng/ml	1.09 ± 0.16[a]	0.62 ± 0.04[b]	0.43 ± 0.04[c]	0.87 ± 0.10[d]	0.87 ± 0.09[d]	0.87 ± 0.06[b]
3.	Insulin ng/ml	1.54 ± 0.05[a]	0.92 ± 0.04[b]	0.76 ± 0.07[c]	0.64 ± 0.02[c]	0.64 ± 0.03[c]	0.76 ± 0.04[c]
4.	Growth hormone ng/ml	10.12 ± 0.80[a]	12.81 ± 0.93[a]	15.63 ± 0.49[b]	23.95 ± 1.6[c]	28.10 ± 1.22[d]	30.70 ± 1.48[d]

Superscripts with different alphabets varies significantly (P< 0.01)

secretion. Raise in T_3 level during postpartum period is similar to the finding of Patel *et al.*, (1993) and the same was attributed to the influence of estrogen on the initiation and maintenance of lactation, which in turn demands more T_3 for its metabolic activities.

Insulin

The insulin values were found more during 135th day of pregnancy and showed a decreasing trend till 10th day postpartum. Comparison of insulin values with literatures could not be made since no research has been carried out. Reynold *et. al.*, (1990) observed the insulin values decline from 7th month of gestation in dairy cows. Reason for the fall is due to the maternal and foetal requirements of glucose met by facilitated anabolism of b - cell sensitivity of pancreas. When foetus gain its 50% of final weight during last quarter of gestation has a higher uptake of glucose from uterine pool.

The insulin level during postpartum and lactating goats are similar to the observation of Vernon *el. al.* (1981). The hypoinsulinemia during postpartum period is attributed to the continued lipid mobilization during lactation and insulin is being removed by the mammary gland as per Beck and Tucker (1978).

Growth hormone

In contrast to the above three hormones, growth hormone level showed a non significant increase during 135 and 140 days of gestation followed by a significant increase on the ay of parturition and further increase was observed during postpartum periods. Athanasiou and Phillips (1978) found higher levels of growth hormones on the day of parturition in crossbred cows. The increase was attributed to the emotional stress, which increased a marked growth hormone in circulation. The increase free fatty acid concentration during parturition and latter periods could increase the concentration of growth hormone.

Vernon *et.al.* (1981) recorded a two fold increase in growth hormone levels on 18th day of lactation ewes that continued up to 50th day of lactation. Somatotrophin is a hormone of lipolysis, which help in adipose tissue metabolism. Growth hormone and insulin ratio plays an important role in regulating the partitioning of nutrients between adipose tissues in lactating ruminants. Earlier research indicated that during lactation growth hormone enhanced the rate of fat metabolism from adipose tissue, oxidation of non - esterified fatty acids (NEFA) and subsequent ketogenesis by the liver.

It may be concluded that thyroxine and triiodothyronine concentrations were low during pregnancy and parturition. The levels showed progressive rise during postpartum period. The growth hormone showed a definite and significant increase on the day of parturition and further increase was observed during postpartum period.

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