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DIAGNOSIS OF CAPRINE KETOSIS USING HUMAN HAND HELD KETONE METER

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ABSTRACT

The objective of this study was to use human held ketone meter for the estimation of β-hydroxybutyrate (ketone body) for the diagnosis of sub-clinical ketosis in goat. A total of 210 samples from pregnant and lactating doe in Guwahati, Assam and nearby area were collected in aseptic condition from the Jugular Vein. Goats having blood ketone level more than 0.4 mmol/l and glucose level less than 30 mg/dl were considered positive for sub-clinical ketosis. Total 24 goats were diagnosed sub-clinical ketotic.

Key words: Goat, sub-clinical ketosis, β-hydroxybutyrate, human hand held ketone meter.

INTRODUCTION

India possesses not only numerous breeds and varieties of goats but is also having large population, 157 million (GOI, 2012). Goat also suffer from various infectious, non-infectious, metabolic and deficiency diseases that may have profound effects on their health and productivity. Out of various metabolic diseases of goats pregnancy toxemia or ketosis or twin lamb disease is an important multi factorial disorder of energy metabolism. Out of various metabolic diseases of goats, pregnancy toxemia or ketosis or twin lamb disease is an important multi factorial disorder of energy of metabolism. Goats are at risk of developing the metabolic condition termed "ketosis" at two stages: viz. at the end of gestation (Pregnancy toxemia) and during early lactation (lactational ketosis) whereas pregnancy toxemia more common than lactational ketosis and occurs predominantly in improved breeds (Smith and Sherman, 2009). In late gestation, the liver increases to facilitate glucose availability to the fetuses. Each fetus requires 30-40 g of glucose in the late gestation, which represents a significant percentage of the doe's glucose production and which is preferentially directed to support the fetus than the dam. In late gestation fat mobilization increased for assuring adequate energy in the face of increased demand of developing fetuses and impending lactation. However, in a negative energy balance this increase mobilization may overwhelm the liver capacity and result in hepatic lipidosis with subsequent impairment of function. Ketosis is always accompanied by ketoacidosis (Pugh, 2002). Advancement in the knowledge of physiology and biochemistry has drawn attention of clinicians towards the clinico-biochemical aspects of production diseases in cattle and sheep but the same have not been extensively studied in goat. There are three major ketone bodies produced in the course of ketosis: β-hydroxybutyrate, acetoacetate and acetone. Earlier these were measured together and reported as total ketone. Presently most stable ketone in blood (β-hydroxybutyrate) receives the attention in the diagnosis of this metabolic disease (Smith and Sherman, 2009). Eighty five percent of the total ketone in sheep with pregnancy toxemia is β-hydroxybutyrate (Bostedt and Hamadeh, 1990). In the initial stage of ketosis, ketone bodies are easily detectable in urine. When urine is not available, blood, plasma or serum can be estimated with the ketone pills, powders or strip. Recently, the hand held ketone meter, designed to estimate β-hydroxybutyrate in human blood, has been successfully applied to estimate β-hydroxybutyrate in goats (Smith and Sherman, 2009; Dore *et al.,* 2013; Picler *et al.,* 2014). Specific β-hydroxybutyrate reference value has not been established for goat[6] but values established for sheep have been used by default. Goats having blood ketone level more than 0.4 mmol/l and glucose level less than 30 mg/dl were considered positive for sub-clinical ketosis (Gupta *et al.,* 2008).

Accompanied with ketone and glucose there is also alteration of others haemato-biochemical parameters in sub-clinical ketotis and ketotis of goat (Gupta *et al*., 2008; Albay *et al*., 2014; Souto Rodolfo *et al*., 2013; Dore *et al*., 2015).

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This is disease that needs to be prevented rather than treated. By using preliminary data, prophylactic measures can be taken in future for protecting productive animal and economic loss. No systematic study was carried out on the sub-clinical ketosis in goat in this region of the country and there is paucity of literature. Few systemic studies have been reported from other part of India.

MATERIALS AND METHODS

The estimation of β-hydroxybutyrate was done by using commercial available β-ketone meter (Nova Biomedical PVT. LTD.) (Figure 1). 2-3 drops of blood was applied to end strip of the β-ketone meter. The concentration of β-hydroxybutyrate was read on display screen of the device. The Results were expressed in mmol/l. The estimation of glucose was done by using commercial available glucose kit and results were expressed in mg/dl**.**

Figure 1. β-Ketone meter (NOVA Biomedical)

RESULTS AND DISCUSSION

In the present study, the blood samples were collected from the suspected animal during the period from July 2014 to June 2015 (Table 1) from 2 locations namely a) the Goat Research Station, Burnihat and b) Private Farms in and around Guwahati city. A total of 210 pregnant and lactating goats irrespective of age and breed were screened for the sub-clinical ketosis. Out of 210 goats screened throughout the study period, a total of 30 (14.29%) goats were positive for sub-clinical ketosis, the overall percentage being 14.29. Out of 30 positive case, 6 (2.86%) and 24 (11.43%) goats were lactating and pregnant respectively.

The present study indicates that the human hand held ketone meter can be applied to estimate the β-hydroxybutyrate in blood sample of the goats given to the fact there is non-availability of any other method of β-hydroxybutyrate estimation in goats, which is an essential requirement for management of ketosis in goats in field condition.

Table 1. Source and distribution of animals

Sl. No.	Location of goats examined	No. of goats examined
1.	Goat Research Station, Burnihat (Assam)	40
2.	Private farms in and around Guwahati (Assam)	170
	Total No. of goats examined	210

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