PHYSIOLOGY & REPRODUCTION

ESTIMATION OF TOTAL BODY WATER IN SHEEP AND GOATS USING ANTIPYRINE FOR DETECTION OF HEAT ADAPTABILITY COEFFICIENT

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ABSTRACT

Information on the body water of the live sheep and goats is important for research either the research involves nutrition, physiology, genetic, disease or meat production. Body weight alone provides a poor index of the metabolically active tissue or the mass of tissue available for meat. Live body weight including total solids and total body water. Water retention is known to vary considerably between animals during growth due to differences in the rate of accumulation of the less hydrated, fat, collegen and fibrous tissues in replacement of the more hydrated functioning protoplasmic mass and to the age difference in response to nutritional and climatic factors. Chemical analysis of the whole bodies of animals is a tedious, time-consuming and expensive operation. The high cost of animal analysis have created an interest in indirect methods of estimating body water. Indirect methods also can provide repeated estimates of body composition for the same animal whereas slaughter and chemical analysis obviously can only be done once. Estimating the total body water using antipyrine in live sheep and goats and consequently detection of the heat adaptability coefficient can be done by any one from the 3 techniques as following:

1 - Total body water (TBW) using Antipyrine dilution technique: The percentage increase in TBW due to heat stress conditions may be used as index for heat tolerance coefficient (HTC) as following: HTC =100 - [TBW_2 -TBW_1 / TBW_1 x 100] where TBW_1 and TBW_2 are the total body water during thermoneutral (TN) and hot (HS) climates, respectively. The most heat tolerant animals are those with the highest values.

2 - Total body solids (TBS) (Live body weight-TBW): Total body solids loss due to heat stress which includes lean body mass and body fat may be used as HTI. TBW is determined using Antipyrine before and after heat exposure and each value subtracted from the corresponding live body weight to obtain TBS at TN and HS climates as following: HTC = 100 – [TBS at TN –TBS at HS /

TBS at TN x 100]

3 -TBW/ TBS ratio: The heat induced changes in TBW (ml) / TBS (g) as heat tolerance index in animals. Daily body weight gain (DBWG) had significantly negative correlation with TBW / TBS as follows:

DBWG = 920.4 – 252.2 x TBW / TBS {r = - 0.8925, P < 0.002}