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Antipyrine for In Vivo Body-fat Estimations in Pasture-grazing Animals

SUMMARY

R. R. WHITE and M. A. McDONALD,
Ruakura Animal Research Station, Hamilton.

THE antipyrine technique has been used to investigate the in vivo determination of body-fat percentage in grazing cattle. The method has been previously been reported as giving accurate and repeatable estimates in non-ruminant species and stall-fed cattle.

The technique consists of a determination of total body water by intravenous injection of antipyrine and subsequent chemical estimation of the drug in blood serum. Antipyrine is uniformly diffusible in body water and a knowledge of the amount injected and its subsequent degree of dilution give the weight of water into which it has diffused. This weight bears an inverse relationship to total body-fat content.

In 92 determinations on normal, mature animals only approximately 55 per cent of results were reasonable on comparison with accepted normal standards and visual appraisal. Many antipyrine estimates led to negative total body-fat percentages. Tests repeated at weekly intervals on six animals showed only fair repeatability and reports of such inconsistent results from use of the method have been received in correspondence with overseas workers.

In calculating fat percentages the live weight of the animal is used, following a 24 hour period of withholding from food and water, and preliminary investigations indicate that the weight of alimentary contents under these conditions may still be sufficiently large to affect the results appreciably.

The simplicity and potential value of the method make it worthwhile to investigate further the alimentary fill and other factors possibly responsible for the introduction of errors, with a view to discovering corrections or techniques whereby their effects can be eliminated.

Discussion

Mr. LAMBOURNE: Has the possibility been considered that a single specimen taken at a fixed time after injection might give information less liable to error than a series of specimens such as are used for drawing extrapolated lines?

Mr. WHITE: No, however, we have found such differences in slopes of lines and such irregularities within the same animal that we feel it is unlikely that a single specimen would give higher accuracy than is obtainable by the drawing of a full line.

Mr. McFARLANE: I do not think there are many of us here who know what you propose to do with this technique. Could you please explain?

Mr. WHITE: Subjective methods of assessing the type of body tissue being laid down in animal feeding experiments are of poor accuracy. There are numerous nutritional investigations in which it is important to have accurate information on the rate of fat deposition in animals and this technique is supposed to give such information. We were originally intending to use it in an investigation involving growth studies on a group of beef cattle.

Dr. FILMER: We believe that we have got to build up a number of these techniques to study the grazing animal. Most of the work of animal nutrition, animal growth and related subjects has been done on stall fed animals which is of little interest to us in New Zealand. We are fortunate in having chemists and others who are prepared to work on the grazing animal and develop these valuable techniques.

Mr. WHITE: We were surprised to find such a large amount of fill left in the digestive tract after 24 hours' starvation. If this fill differs markedly from 73 per cent in water content it is likely to result in large errors in fat determinations. We should like to know if anybody has any further information on how much alimentary fill one would expect in animals starved for various periods.

Dr. EDGAR: It is considered necessary to starve a ruminant for much longer than 24 hours before any appreciable emptying of the rumen occurs. Because Kraybill was using animals that were stall fed the alimentary tract contents are likely to have more closely approached 73 per cent water content.