

APPARENT RELATIONSHIP OF THE PROTEIN CONTENT OF NATIVE HAY TO ITS NUTRITIVE VALUE

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Determinations of the apparent digestibility of individual feeds and rations involve so much time and expense that it has become a general practice to estimate their nutritive value from published tables of average digestibility values. Among the errors involved in such a procedure are those associated with variations in chemical composition. Concentrate feeds and grains vary less in composition, and probably in nutritive value, than do roughages. Native grass, cured for hay, varies widely in composition and there is reason to believe that its nutritive value, expressed in terms of dry-matter digestibility, is closely related to the percentage of one or more of its major nutrients. If such a relationship could be established it would offer a means of calculating its nutritive value from proximate analysis data.

A high percentage of crude fiber in hay is usually considered to be indicative of low nutritive value, although for ruminants the digestibility of the fiber may be reasonably high and may be further enhanced by the presence of liberal amounts of protein. Crampton (1944), working with steers, failed to find a correlation between the nutritive value of mixed growing forage and its content of crude fiber. The protein content of native hay unlike that of growing grass is usually so low as to be the limiting factor in its supply of total digestible nutrients (Hobbs, Gallup, and Taylor 1945).

EXPERIMENTAL

The relationship of protein content to the dry-matter digestibility of hay has been determined in a series of digestion trials conducted with steers receiving rations of native hay varying from 3.0 to 5.8 percent in protein. The digestibility of total dry matter in each lot of hay was determined with four or more steers during 20-day feeding periods.

The protent content (dry-matter basis) of eight lots of hays was 3.0, 3.2, 3.8, 3.9, 4.0, 4.6, 4.7, and 5.8 percent. The average daily amount of hay consumed by the steers varied from 6.6 to 8.6 pounds. The digestibility of total dry matter in the hays generally increased with each increase in protein content and when arranged in this manner was 46.9, 48.0, 45.8, 50.8, 54.1, 56.5, 57.8, and 60.5 percent, respectively. There was no relationship between dry-matter digestibility and content of crude fiber or other proximate constituents of the hay.

The results provide evidence that, at least over a considerable range, the digestibility of native hay can be calculated with a high degree of accuracy from a knowledge of its protein content. It is believed that similar relationships between digestibility and chemical composition can be established for other classes of feeds, and that extensive use can be made of such results in the calculation of nutritive values.

LITERATURE CITED

- Crampton, E. W., and I. R. C. Jackson. 1944. Seasonal variation in chemical composition of pasture herbage and the relation to its digestibility by steers and sheep. *J. Animal Sc.* 3: 333-339.
- Hobbs, C. S., W. D. Gallup, and B. R. Taylor. 1945. The composition and apparent digestibility of bluestem grass in the growing stage, and in the dry and hay stages when supplemented with cottonseed cake. *J. Animal Sc.* 4: 395-402.