

Objective measurement of fodder quality across animal species

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Objectives

The objectives of this project are to measure and compare the ranking of *in vivo* digestibility, total intake, preference, and short-term intake rate of a series of hays across beef cattle, lactating dairy cows, horses, and sheep and to use the 'standard' fodder samples obtained as a basis for a uniform, objective procedure for specification of fodder quality.

Background

Two earlier RIRDC projects (DAV-104A and CSJ-1A) led to broad industry agreement on the major indicators of fodder quality and the standard methods for their measurement, together with a set of 16 'standard' hays to calibrate laboratory estimation of digestibility. However, this work was confined to sheep. The dairy, beef, and horse industries need to know whether laboratory predictions of fodder quality based on sheep data can be applied across animal species. There is also an industry demand for rapid estimation of relative animal preference for hay.

Research

Preference and short-term intake rate were measured with dairy cows, sheep, steers, and horses on a set of cereal and legume hays. The ranking of both measurements was compared, and correlations were attempted with nutritive value estimates. A smaller set of hays was also fed to all four animal species for measurement of *in vivo* digestibility (DMD) and *ad libitum* intake (DMI), and comparisons were made between the animal species.

Outcomes

Within each animal species, there were significant differences in preference between hays but also some overlap. The preference ranking between hays was clearly different across animal species. There was a strong relationship between preference and short-term intake rate. For the specific set of hays studied, the laboratory estimates of DMD and neutral detergent fibre (NDF) appeared to be better indicators of preference than either crude protein (CP) or water-soluble carbohydrates (WSC). *In vivo* DMD of the hays

measured were the same for dairy cows as for steers, but those for horses were different to steers. *Ad libitum* DMI of hay by steers was directly proportional to that for both dairy cows and horses.

Implications

This project has shown that it is not possible for sheep to be used as a model to estimate preference rankings of hay in dairy cows, steers, or horses. Across a range of hay quality, DMD and NDF are likely to be better predictors of preference than CP or WSC. A new set of hay 'standards', with measured *in vivo* DMD and DMI across four animal species, is now available as a basis for laboratory prediction of these parameters in unknown samples. It appears that future *in vivo* DMD measurements on hays intended for dairy cows can be made with steers, representing a considerable cost saving. It is not fully clear from the limited data obtained whether *in vivo* DMD measurements on fodder using sheep can be used for the other animal species. It may also be possible to use steers for measuring *ad libitum* intake on hays intended for either dairy cows or horses.

Acknowledgment

This project is sponsored by the Rural Industries Research and Development Corporation (project DAV-187A).

Publications

Knott, S. A., Cummins, L. J., Dalley, D., Flinn, P. C., Kearney, G., and Hannah, M. 2002. Preference rankings for legume and cereal hays across livestock species. *Animal Production in Australia* 24:320.

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