

Estimating pasture intake by cattle using alkanes and a known amount of supplement

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Introduction The alkane ratio method for estimating pasture intake involves calculating the fecal ratio of plant (endogenous) and exogenous alkanes. This method is effective for sheep, although the delivery mechanism for the exogenous alkanes has presented challenges in cattle (Charmley *et al.* 2003). Dove *et al.* (2003) have shown that the relative concentration of components in a mixed diet can be estimated from fecal alkane concentrations using least squares methods. Further, if the amount of one dietary component is known, then the amount of all components, and hence intake, can be determined. In this trial beeswax was added to barley (BWB) giving the mixture a unique alkane composition. Known amounts of this mixture were then fed to cattle grazing three sward types.

Materials and methods In a balance study with 6 steers, intake of silage and BWB was measured, and used to estimate alkane recovery by collecting total faeces. Least squares methods were used to estimate the proportion of BWB consumed from concentrations of alkanes in faeces, BWB and silage. Knowledge of the proportion and amount of BWB fed was then used to estimate forage intake. In the grazing study, cattle were given 4 kg BWB/d while rotationally grazing one of three pasture types; native (a mixture of *Poa pratensis*, *Phleum pratense* L., *Festuca pratensis* Huds. and *Trifolium repens* L.); timothy/red clover (*Trifolium pratense*) and tall fescue (*Festuca arundinacea* Shreb.). Each sward was grazed by 5 heifers (450 kg LW) and replicated twice. Pasture intake was measured over 4 d on two occasions. Intakes based on the difference in DM yield at the beginning and end of the 4 d grazing period (sward method). This method was compared with DM intake estimated from alkane concentration in faecal grab samples taken daily over the 4 d period (alkane method) using least squares as described above.

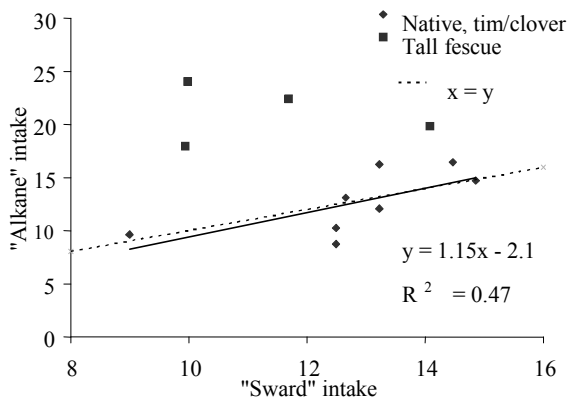


Figure 1 Relationship between predicted and pasture DM intake. Equation does not include tall fescue

Results Fecal alkane recovery ranged from 64 to 100%. Estimated silage intake in the metabolism study was 4.0 kg/d (SD±0.43), similar to the observed value of 3.83 kg/d (SD±0.008). The variation in discrepancy ranged from 0.07 to 0.96 kg. On pasture, the alkane method was unable to predict intake of the tall fescue sward. However, within native and timothy/red clover swards the relationship between predicted and observed methods was close, although the R^2 was only 0.47 (Figure 1).

Conclusions Least squares methods successfully estimated supplement and forage proportions in silage-based diets, and complex swards with at least 3 forage types and was thus a useful method for predicting intake from the known amount of supplement fed. Surprisingly, in the simplest sward, comprising over 95% of tall fescue, the method did not work. This may be due to the inability to measure accurately pasture DM yield in tall fescue and selection for minority species due to low palatability of tall fescue.

References

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