

## Use of alkanes to estimate dry matter intake of beef steers grazing high quality pastures

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**Introduction** Pastures remain the most important source of nutrients for ruminant livestock and nutrition is critical to optimize animal production. The daily quantity of dry matter that is consumed by an animal is a critical measurement to make nutritional inferences about feed and subsequent animal response. Researchers are facing the dilemma that, while estimates of individual animal performance are readily obtained, it is still difficult to estimate the herbage intake of individual animals. The objectives of this experiment were to estimate forage intake in beef steers grazing tall fescue (*Festuca arundinacea* Schreb.) and alfalfa (*Medicago sativa*)/tall fescue pastures and to measure the recovery rate of artificial alkanes from a controlled release device under these conditions.

**Materials and methods** The experiment was conducted on two pastures: a pure stand of tall fescue and a mixture of alfalfa and tall fescue. Six steers (330±11 kg) were allotted to each pasture (0.61 ha). Steers were previously trained to the use of a harness and a faecal collection bag, so that the expected negative effect on animal behaviour could be minimized. A controlled-released capsule (Nufarm, Auckland, NZ) containing alkanes (C<sub>32</sub> and C<sub>36</sub>; release rate: 400 mg/d) was administered on d 0 to all 12 steers. During the experimental period (d 8 to 14) faecal collection bags were fitted to all steers in the fescue pasture and to three steers in the fescue/alfalfa pastures. Collection bags were emptied twice daily (at 0830 and 1630). Faeces were weighed, mixed, and an aliquot of 0.5 kg frozen. Rectal grab samples were obtained twice daily from each animal at the time of switching bags. Forage mass in each pasture was estimated from two 3-m strips obtained on d 8 using a push mower. From d 6 to 12 forage samples for alkane determination were obtained by walking the pasture in an "X" and clipping every 20 steps with a set of hand-held clippers at a height of 2.54 cm from the ground. Faecal and forage samples were freeze-dried and ground through a 0.5 mm screen. Alkane determination and dry matter intake estimation (using C<sub>31</sub> as odd-chain alkane) followed the method described by Mayes *et al.* (1986). The effect of pasture on herbage intake was estimated by analyses of variance. A paired *t*-test was used to compare herbage intake estimated from grab and bag samples. All statistical analyses were conducted using SAS (SAS Institute, Cary, NC).

**Results** Forage availability (3078 vs. 3088 kg DM) and quality (CP: 19 vs. 17.5%; NDF: 50 vs. 55%; ADF: 31 vs. 29%) were similar for fescue/alfalfa and fescue pastures, respectively. Similar concentrations of C<sub>32</sub> (mg/kg of faeces) were found in grab and bag samples, with an average ratio (C<sub>32</sub> grabs/ C<sub>32</sub> bags) of 0.99 and 0.92 for alfalfa/fescue and fescue pastures, respectively. The recovery rate of C<sub>32</sub> in faeces was higher than previously reported elsewhere (Mayes *et al.*, 1986; Dove and Mayes, 1991) with an average of 0.985 and 0.991 for fescue/alfalfa and fescue pastures, respectively. Using information obtained from faecal samples collected from bags there was no difference (*p*>0.05; SEM=0.48) in the average daily dry matter intake of steers grazing fescue/alfalfa (10.8 kg DM) and fescue pastures (10.3 kg DM). Similarly, no differences (*p*>0.05) were detected in average daily dry matter intake when using C<sub>32</sub> from grab samples (9.9 vs. 9.6 kg DM for steers grazing fescue/alfalfa and fescue pastures, respectively; SEM=0.39). When sampling method was compared (grabs vs. bags) there was no difference (*p*>0.05) in the estimation of dry matter intake for steers grazing fescue or fescue/alfalfa pastures.

**Conclusions** The results of the present study demonstrate that knowing the recovery rate of the marker used (in this case C<sub>32</sub>) faecal grab samples can be used to estimate dry matter intake in beef steers under grazing conditions. However, the recovery rate for C<sub>32</sub> observed in this experiment was 5 – 15% higher than those found in the literature. Therefore, further research is needed to study the effectiveness of the controlled-release capsules under different conditions and factors that might be affecting the release rate of the marker.

### References

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