Theme 9 | Ruminant nutrition and production

Validation of the n-alkane technique to estimate dry matter intake in sheep

Jusiane Rossetto*[1], Teresa Cristina M. Genro[2], Paulo C.F. Carvalho[1], Mônica V. Reffatti[3],
Carolina Bremm[1]
[1]Federal University of Rio Grande do Sul, Porto Alegre/RS, Brazil; [2]Embrapa South
Livestock, Bagé/RS; [3]Universidade estadual do Rio Grande do Sul, Cachoeira do Sul, RS.
*Doctoral student – jusiane.rossetto@colaborador.embrapa.br

The objective of this work was to evaluate the accuracy of the n-alkanes marker to estimate the dry matter intake in sheep. The experiment was conducted at the agronomic experimental station of the Federal University of Rio Grande do Sul (Eldorado do Sul, RS, Brazil). Twelve male sheep with an average live weight of 35 kg were housed in metabolism cages, provided with feed and drinking troughs. Twice a day, at 9 am and 6 pm, the animals were fed with annual ryegrass (*Lolium multiflorum*) in four levels: 1.5, 2, 2.5% of live weight and ad libitum during two experimental periods. Each period had 10 days for adaptation to handling and diet, and 12 days to the evaluation of dry matter intake (DMI). The observed DMI was measured by subtracting leftovers from the total of dry matter offered. The estimated DMI was performed using the double n-alkanes technique. Each animal received orally, for 12 days in the morning feed, a cellulose pellet impregnated with about 63 mg of the external marker dotriacontane (C_{32}). Forage sample was collected daily (from day seven to day 12) from the forage offered to the animals, and then all daily samples were homogenized to compose a single sample. From the seventh to the twelfth day of dosing, before pellet administration, fecal samples were collected per rectum, identified individually and frozen. At the end of the collection period, the samples from each animal was thawed and homogenized to compose one sample per animal. The estimated DMI was calculated from the concentration of n-alkane present in the forage and feces (C_{31} and C_{33}) and its homologous pair dosed orally C_{32}, using the C_{31}-C_{32} and C_{32}-C_{33} pairs. The DMI values were expressed as a percentage of live weight (%LW). The data were submitted to the regression analysis by the statistical program JMP (JMP Pro Version 12.0.1, 2015). The DMI estimated by the n-alkane C_{31} the equation generated was DMI= 0.4122 + 0.6152 * x, with r^2 = 88.95 (P<0.0001) and the DMI estimated using the n-alkane C_{33} the equation was DMI = 0.5655 + 0.6832 * x, r^2 = 87.69 (P<0.0001). Regardless of the pair used to estimate the dry matter intake, the values of the determination coefficient obtained were high showing accuracy when using the double n-alkanes technique to estimate sheep intake. However, estimated DMI was overestimated for both C_{33} and C_{31} n-alkane, with averages of 0.066 and 0.536% of the live weight, respectively. The accuracy of the intake estimates depends on the similarity of the fecal recovery rate of the natural and dosed n-alkane. In this work, C_{33} had a fecal recovery rate closer to that of C_{32}, which showed a smaller difference between observed and estimated intake. Therefore, it can be concluded that the C_{32}-C_{33} n-alkane pair can be used to estimate the dry matter intake of sheep fed with annual ryegrass.

Keywords: annual ryegrass, dotriacontane (C_{32}), hentriacontane (C_{31}), tritriacontane (C_{33}), marker