

DIGESTION OF STEAM-FLAKED LUPINS (*LUPINUS ANGUSTIFOLIUS*) BY SHEEP FED OATEN HAY

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Steam-flaked lupins (SFL) were prepared by steaming lupin grain at atmospheric pressure for 15 minutes before flaking between rollers with a 2mm aperture. In vitro organic matter (OM) digestibilities of SFL and unprocessed whole lupin (WL) grains, determined by the pepsin-cellulase enzyme digestion technique, did not differ significantly at 89.6% and 87.3%, respectively ($P > 0.05$, S E D = 1.83)

Six rumen-fistulated wethers (F1 Merino x Border Leicester), adapted to hay and grain legume rations, were used in a switch-over experiment to measure in vivo OM digestibility, ruminal NH_3 and pH and DM disappearance from nylon bags incubated in the rumen. Animals were fed daily a 1:1 mixture of chopped oaten hay (OH) and SFL or WL (three animals each) at 2% (air DM) of body weight. On day 8, ground OH, SFL and WL were incubated in duplicate nylon bags in the rumen of each wether for 6, 12, 24 or 48 hours. Faeces and urine were collected from day 12-17 to measure digestibility. Rumen pH and NH_3 were measured in rumen liquor on days 12 and 14 from each wether at 0, 0.5, 1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, 8, 10 and 12 h after feeding. The diets were changed and the procedures repeated over the next 17 days.

The diet containing 50% WL was significantly more digestible ($P < 0.001$) in vivo than that containing SFL (77.4 vs 74.3; SED=0.13). After six hours of incubation, DM disappearance from nylon bags was higher ($P < 0.001$) for WL (60.0%) than SFL (54.3%) but disappearance was similar after 12, 24 and 48 h. DM loss from OH was not affected by the basal diet ($P > 0.05$) when incubated in the rumen of wethers fed WL or SFL. Rumen pH declined faster and to a lower minimum, of 5.95 vs. 6.2 ($P < 0.001$), with the SFL diet than with WL. Ruminal NH_3 concentration was higher with the SFL diet, 500 vs 210 mg/l two h after feeding ($P < 0.001$) and 430 vs 310 at 8h ($P < 0.03$).

We conclude that steam-flaking of lupins does not increase the digestibility of a diet containing 50% SFL, but increases the rate of production of ammonia to very high levels and produces low ruminal pH.

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