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Nitrogen utilization in lactating dairy goats

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Dairy goats of the Swedish Landrace breed with an average live weight of 50 kg were used in nitrogen balance experiments. The experiments reported here were conducted during the years 1980-1982 (Expt 1), 1983 (Expt 2) and 1984 (Expt 3).

The diets fed were in Expt 1 and 2 hay : concentrate (40 : 60) with urea, fish meal, soya-bean meal, dried brewer's grain and peas as protein supplements. In Expt 3 the goats were fed pea-silage : grass-hay concentrate (60 : 10 : 30) or clover-hay : concentrate (50 : 50).

All diets were fed *ad libitum* with an adaptation period of at least 2 weeks to each new diet. The collection periods lasted 2 weeks.

Milk yield was on an average 2.1 kg in Expts 1, 2 and 3. In Expt 1 the utilization of consumed N for total N retention (N intake-faecal N-urinary N) was lower when increasing the proportion of urea and fish meal in the diet. On the fish meal diets, however, the level of utilization was higher than on the urea diets and remained at a higher level despite an increased supplementation of diet. In Expt 2 and 3 differences in utilization of consumed N could be related to the degradability of feed nitrogen, measured in sacco (nylon-bags).

Increasing the proportion of fish meal in the diet significantly ($P < 0.01$) reduced feed intake relative to a standard diet. The standard diet was composed of 34.4 p. 100 of a hay and straw mixture (3 batches of hay, 2 batches of straw) and 65.6 p. 100 of a concentrate mixture (2 batches of each : barley, oats, molasses-beet pulp, wheat bran and soya-bean meal).

Digestibilities of organic matter and fibre (Expt 1 crude fibre, Expt 2 and 3 neutral detergent fibre) were on an average fairly similar with all diets.

As expected in these experiments a large part of the variation in total N retention could be explained by the intake of digestible organic matter or digestible N (DN). If, however, estimate of dietary N escaping rumen degradation (measured in sacco) was considered together with estimate of microbial protein production (AAT) a marked improvement in the precision of predicting total N retention was obtained especially in Expt 1. The amino acid flow to the duodenum (AAT) was calculated as : $[g \text{ N(1-Degradability)} \times 0.80 \times 0.85] + (g \text{ digestible carbohydrates} \times 0.020 \times 0.85)$. In Expt 2 and 3 there appeared to be of less benefit to use AAT in place of DN.

These results show that a 13 to 15 p. 100 crude protein ($N \times 6.25$) content in the diet (in DM) was necessary to allow a high and stable feed intake.

Key words : Nitrogen utilization, dairy goat, nitrogen retention, urea, fishmeal, pea, dried brewer's grain.