

Session 38

Theatre 4

Coarseness of grain or level of rumen by-pass starch had marginal effects on rumen environment and rumen wall conditions in concentrate-fed veal calves

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The effect of coarseness of grain and source of starch in concentrate on the rumen environment was studied in 9 rumen-fistulated bull calves. Three blocks of 3 bull calves were weaned at 2 months of age and fed one of 3 pelleted concentrate rations (N, R or S) and long barley straw *ad libitum* until slaughter at 11.5 months of age. Starch sources in N and R were identical and consisted of barley and wheat. Ingredients of N were finely ground whereas those of R were coarsely ground. In the S concentrate, half the barley and wheat was substituted with finely ground corn and sorghum to increase theoretical rumen escape starch from 30 in N and R to 100 g/kg dry matter (DM) in S. Crude protein (15%) and energy content was similar in all 3 concentrates. Calves were ruminally cannulated at 9 months of age. Two weeks post surgery 3 sampling periods were initiated (9 rumen samples per 24 h in the medial (M) and ventral (V) rumen sac) with a 3-week interval. Average daily concentrate intake (7.6 kg DM), straw intake (0.7 kg DM) and daily gain (1.35 kg) were not affected by treatments. Rumen pH in V was lower in S- compared with N- and R-fed calves ($P < 0.05$). A similar tendency was observed in M. pH was 0.30 units lower in M compared with V. pH in V was below 5.8 for more hours in S- compared with N- and R-fed calves (16.9 vs. 12.0 h/d). Total concentration of volatile fatty acids in M was greater in S- compared with N- and R-fed calves ($P < 0.01$) and S also had the lowest acetate ($P < 0.10$) and highest propionate ($P < 0.10$) proportion. Evaluated macroscopically at slaughter, the shape of rumen papilla was in favour of S ($P < 0.10$) and papillae were longer in S and R compared with N ($P < 0.05$). The results show that more slowly fermentable starch or more coarsely ground grain had only marginal effects on rumen environment and rumen wall conditions of concentrate-fed calves.

Session 38

Theatre 5

The use of visible and near infrared reflectance spectroscopy for prediction and improvement of meat quality characteristics in beef

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A slaughter trial was carried out to identify improved measurement techniques for meat eating and carcass quality in beef. Data on 194 steer and heifer beef cattle from rotational crosses of Aberdeen Angus and Limousin were available. Meat eating quality characteristics measured were sensory traits (tenderness, flavour, juiciness and abnormal flavour, 14 days post mortem (pm)), instrumental tenderness (slice shear force, 3 days pm; Volodkevitch 10 days pm), fatty acid profiles (saturated and unsaturated fatty acids, 48 h pm), colour (48 h pm) and cooking loss (14 days pm). Visible and near infrared reflectance spectroscopy (Vis-NIR) measurements were taken in the abattoir on the M. longissimus thoracis between 12th/13th ribs at 48 h pm over the spectral range from 350 to 1,800 nm. Partial least square regression was used for prediction of meat eating quality traits from Vis-NIR spectra. Measurements of Vis-NIR showed correlations with sensory traits of 0.45 (juiciness) to 0.77 (flavour), physical measurements of 0.61 (Volodkevitch) and 0.74 (slice shear force), fatty acids in the range from 0.49 to 0.80, colour of 0.93 (red-green) to 0.95 (yellow-blue) and cooking loss of 0.60. The results indicate that based on the measurements of Vis-NIR spectra online in the abattoir, it was possible to successfully predict numerous (mostly lowly correlated) meat quality characteristics. This shows the high variation in absorption at different Vis-NIR wavelengths due to factors such as muscular fibre characteristics, chemical bonds and colour, which are associated with various meat quality characteristics. Generally, the results support the use of on-line Vis-NIR in the abattoir for early, fast and relatively inexpensive estimation of beef meat quality and its use in value based marketing systems and genetic improvement programmes.