

The effect of temperature during processing of rape seed meal on nitrogen and total amino acid nitrogen degradation in the rumen and digestion in the intestine

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Rapeseed meal quality is a function of rapeseed variety used and conditions during the manufacturing process, which are mainly related to temperature, moisture level and time of treatment. Heating is one of the factors which may affect the rumen degradability of protein, but heating above the optimal temperature may overprotect the protein to a degree where it is neither degraded in the rumen nor digested in the intestine.

Commercially processed rapeseed meals either untreated or treated with temperatures of 130°C, 140°C and 150°C and moisture levels of 15 and 20 %, respectively, were used to measure nitrogen and total amino acid nitrogen (TAAN) degradation in the rumen and digestibility in the intestine. Effects of these treatments were measured with nylon bag and mobile bag technique using rumen and duodenal fistulated cows.

For untreated rapeseed meals the effective rumen N degradabilities were similar (approx. 73 %), but for heat treated meals degradabilities decreased to 57 % for moderate heat treatment, to 15-23 % for 140°C and 150°C treatments. After 16 h rumen incubation N degradabilities for untreated samples were

slightly higher than TAAN degradabilities. However, for heated samples, N degradabilities (as mean over moisture levels) were higher than that of TAAN : 48.5 and 40 %, 22.5 and 8 %, and 20 and 4.5 %, for samples heated to 130°C, 140°C and 150°C, respectively. Higher degradabilities of N and TAAN were found for 20 % moisture compared to 15 % moisture. Intestinal digestibility of rapeseed meal N residue after 16h incubation in the rumen was on average 73 % for unheated samples, 81 % for samples heated to 130°C and 67 % for samples heated to 140°C or 150°C. Similar differences between treatments were found for intestinal digestibility of TAAN. Digestibility of intact nitrogen in the intestine was similar for untreated and heat treated at 130°C (89 %), but for samples heated at 140°C and 150°C, the digestibility was only 65-70 %.

The proportion of feed N digested in the intestine was higher for rapeseed treated at 130°C (38 %) compared to untreated (21 %), and the whole tract *in situ* digestibility was unchanged for rapeseed treated at 130°C compared to untreated indicating that heat treatment at 130°C may shift protein metabolism from degradation in the rumen to digestion in the small intestine.