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The effect of drier outflow temperature on rumen protein degradability and intestinal digestibility of rumen-undegraded protein of dehydrated grass and lucerne

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Dehydrated herbage may be a valuable source of protein in dairy cow diets (Peyraud *et al*, 1994). High temperature required during dehydratation may positively decrease protein degradability in the rumen (Kowalski and Kaminski, 1993) ; on the other hand it can also negatively decrease digestibility of rumen-undegraded protein in the intestine. The aim of this study was to determine the effect of drier outflow temperature (123, 133, 143 and 153°C) on dehydrated grass and lucerne protein degradability in the rumen as well as on rumen-undegraded protein digestibility in the intestine.

The experiment was conducted on three dry cows, equipped with ruminal and duodenal cannulae, and fed with standard diets. Rumen degradability (in sacco) was determined according to Michalet-Doreau *et al* (1987). Total tract protein disappearance (TTPD) was determined by incubation of nylon bags in the rumen for 16 h then in a pepsin bath (2.5 h, 38.5°C) and then in the duodenum (mobile nylon bags), according to Peyraud *et al* (1988). The intestinal digestibility of rumen-undegraded protein (IUPD) was estimated from crude protein (CP) content, its effective degradability in the rumen calculated at outflow rate k = 0.06 (DG) and TTPD, using the following equation : IUPD = 100 x (CP x (100 - DG) - CP x (100 - TTPD)) / (CP x (100 - DG)).

An increase in drier outlow temperature decreased crude protein content slightly and increased ADIN % N in dehydrated grass. These tendencies were not seen for dehydrated lucerne.

Temperature significantly reduced dehydrated grass protein degradability in the rumen. The decrease in effective protein degradability of dehydrated grass dried at 153°C resulted from the decrease of the degradation rate (c) of unsoluble but degradable protein fraction (b). For dehydrated lucerne these effects were not observed.

The increase of temperature significantly reduced TTPD. In case of dehydrated grass it was particularly seen at 153°C. Average estimated intestinal digestibilities of rumen-undegraded dietary protein were 79.3 and 76.5 %, for dehydrated grass and lucerne respectively. Temperature 153°C significantly reduced IUPD of dehydrated grass.

Temperature °C	123	133	143	153
Dehydrated grasses				
Crude protein (g/kg DM)	172.5	165.0	166.3	158.1
ADIN % N	13.0	15.9	17.7	21.7
DG	52.1	49.0	48.7	41.5
TTPD (%)	91.3^{A}	90.7^{AB}	90.2^{B}	84.0^{C}
IUPD (%)	81.8	81.5	80.9	73.0
Dehydrated lucerne				
Crude protein (g/kg DM)	185.6	186.3	184.4	185.6
ADIN % N	14.5	14.8	14.9	16.8
DG	63.4	64.2	63.6	64.0
TTPD (%)	92.0^{Aa}	91.5^{ABb}	91.2^{B}	91.4^{B}
IUPD (%)	78.0	76.6	75.7	75.7

DG - effective rumen protein degradability at k = 0.06 ; TTPD - total tract protein disappearance from mobile nylon bag ; IUPD - calculated intestinal rumen-undegraded protein digestibility