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## Czech Journal of Animal Science

Effects of lucerne particle size and source of dietary carbohydrates on *in situ* degradation and ruminal variables in sheep

Asadi Alamouti A., Ghorbani G.R., Alikhani M., Rahmani H.R., Teimouri Yansari A., Südekum K.H.:

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The effects of altering forage particle size and source of rapidly degradable carbohydrates on *in situ* degradation and ruminal variables were studied in four Iranian male sheep. The study was

designed as a Latin square with a  $2 \times 2$  factorial arrangement of treatments including two carbohydrate sources (pelleted beet pulp vs. maize- and barley-based concentrate) and two lucerne particle sizes (2.38 vs. 0.94 mm). Kinetics of disappearance of lucerne, concentrates and mixed samples was studied *in situ*. Among feed samples, the degradation rate constant of lucerne dry matter was higher ( $P < 0.02$ ) and disappearance of lucerne neutral detergent fibre (NDF) in 4 h of incubation was lower ( $P = 0.06$ ) in diets with reduced particle size. The rapidly degradable fraction of lucerne samples was also affected by treatments. Other degradability components were not affected. The mean ruminal pH was lower in diets containing short hay than in those containing long hay (5.76 vs. 5.86,  $P < 0.006$ ) and pH values were consistently lower immediately after feeding diets with short lucerne hay. The form of carbohydrates did not affect ruminal pH, however, altering the source of carbohydrates changed the pattern of pH over time. Total volatile fatty acid (VFA) concentration and proportions of individual VFA were similar but numerical

ammonia indicated a lower acetate to propionate ratio in diets with short hay. Most of the affected variables were influenced by the particle size of forage to a larger extent than by the source of rapidly degradable carbohydrates or the interaction between them. So, when sheep diets contain no more than 250 g/kg starch, the source of dietary carbohydrates may not interact with forage particle size to affect DM degradability and ruminal fermentation.

**Keywords:**

forage particle size; carbohydrates; rumen; degradation; sheep

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