

Effect of forage quality and particle size on voluntary feed intake and chewing activities of oxen

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Chewing activity is an essential factor in digestion of ruminants. The extent of physical breakdown during eating and ruminating influences the passage of feed particles from the rumen and consequently rumen fill and feed intake (Teller *et al*, 1993, *Livest Prod Sci*, 33, 215-227).

Four mature Hinterwälder oxen weighing on average 541 kg were fed *ad libitum* successively four different forages supplemented with a constant amount of 400 g soybean meal per day: long hay of good "hay_g" and medium "hay_m" quality, straw in long "straw_l" and chopped "straw_c" form. After 3 weeks of adaptation nutrient digestibility was measured by total faces collection (8 days) and chewing behaviour was monitored by an self-developed automatic recording system (3-9 days).

As expected dry matter intake significantly declines with increasing NDF content and

decreasing digestibility of organic matter. However total chewing activity per day is similar for all diets. Although there is a trend towards higher values when straw is fed, data do not differ significantly. Therefore forage quality significantly influences chewing behaviour if the values are expressed per kg DM intake. Time for total chewing per kg DM of rations with straw is about twice as high as with hay rations. Chopping reduces the time spent for eating whereas time spent for ruminating is not influenced. The high standard deviations for some parameters indicate a considerable variation among animals in chewing behaviour.

It can be concluded that the animals have a maximum daily capacity of time for total chewing of about 13-15 hours. With decreasing forage quality more time has to be spent for chewing per kg DM and hence forage intake is lower. Apart from type of forage this limitation can be partly compensated by reduction of particle size.

	hay _g	hay _m	straw _l	straw _c
NDF (% i. DM)	48.9	60.4	81.1	81.1
Digestibility of OM (%)	76.0 ± 1.3	68.7 ± 0.5	53.2 ± 0.7	58.1 ± 3.4
DM intake (kg/d)	10.1 ^a ± 0.2	8.6 ^b ± 0.4	4.7 ^c ± 0.6	5.4 ^c ± 0.7
<i>time spent per day (min)</i>				
eating	413 ± 75	418 ± 52	511 ± 110	417 ± 100
ruminating	398 ± 43	416 ± 24	392 ± 26	442 ± 40
total chewing	811 ± 79	834 ± 60	903 ± 133	859 ± 128
<i>time spent per kg DM (min)</i>				
eating	41.0 ^a ± 8.1	48.6 ^a ± 5.6	109.0 ^b ± 9.4	77.3 ^c ± 13.5
ruminating	39.5 ^a ± 4.2	48.6 ^a ± 4.6	84.8 ^b ± 5.7	83.4 ^b ± 10.3
total chewing	80.5 ^a ± 9.3	97.2 ^a ± 8.9	193.8 ^b ± 4.6	160.7 ^c ± 18.5

a,b,c Means in same row with unlike letters differ (P < 0.05).