

# Impact of grain processing and undegradable fiber on chewing behavior and feed sorting of finishing beef cattle

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## Introduction

Fiber is required by feedlot cattle fed high-grain diets to reduce the risk of rumen acidosis and optimize growth rate and feed efficiency. It was hypothesized that altering ruminally fermentable carbohydrate and undegradable fiber (uNDF) concentrations in finishing cattle diets would affect chewing activity and the risk of rumen acidosis.

## Objective

The objective was to investigate the effects of processing index (PI) of barley grain and dietary uNDF concentration on chewing behavior and feed sorting of finishing beef cattle.

## Materials and methods

- **Design:** a 6x6 Latin square with 3 PI (65, 75 and 85%) x 2 uNDF concentrations (low and high; 4.6 vs. 5.6% of DM) factorial arrangement.
- **Animals:** Six ruminally cannulated beef heifers (BW=715 kg)
- **Diets:** 10% barley silage (low uNDF) or 5% silage and 5% chopped straw (high uNDF), 90% barley concentrate.
- **Chewing:** Chewing activity of each heifer was continuously recorded for 3 d using color CCTV cameras (model WV-CP484, Panasonic Corp., Japan) that placed on a wall shelf in the barn.



## Results and discussion

**Table 1.** Effects of barley grain processing and dietary undegradable NDF (uNDF) on chewing and feed sorting of beef cattle fed high grain diet

Items	Processing index (PI; %)						SEM	P-value		
	65		75		85			PI	iNDF	PI x iNDF
	Low <sup>1</sup>	High <sup>1</sup>	Low	High	Low	High				
Eating										
min/d	95.2	101.5	94.5	110.5	94.8	107.4	7.57	0.67	0.03	0.77
min/kg DM	8.3	8.8	7.8	10.2	8.1	9.0	1.23	0.81	0.02	0.32
min/kg NDF	49.1	47.9	45.5	55.2	48.2	50.5	4.24	0.73	0.41	0.37
Ruminating										
min/d	258.2	305.0	284.9	296.8	316.5	277.8	23.49	0.20	0.40	0.04
min/kg DM	22.5	26.4	23.1	26.9	27.1	22.8	2.24	0.21	0.24	0.02
min/kg NDF	133.7	141.2	133.6	144.2	163.8	127.0	13.44	0.11	0.83	0.02
Total chewing										
min/d	356.7	405.9	380.0	406.2	409.2	384.9	28.87	0.18	0.19	0.05
min/kg DM	31.2 <sup>b</sup>	35.1 <sup>ab</sup>	30.9 <sup>b</sup>	37.1 <sup>a</sup>	34.8 <sup>ab</sup>	31.9 <sup>b</sup>	3.11	0.23	0.10	0.02
min/kg NDF	184.4	188.6	178.5	199.1	210.0	176.9	12.87	0.12	0.98	0.03
Sorting index <sup>4</sup> , %										
19 mm	100.7	84.2	100.2	81.6	102.4	54.1	11.24	0.40	0.01	0.16
8 mm	100.9	98.8	101.0	101.0	102.2	95.3	3.43	0.69	0.17	0.41
1.18 mm	102.8	102.3	100.7	102.8	100.3	102.3	1.26	0.53	0.22	0.44
pan	96.9	99.4	98.9	100.1	98.0	99.8	1.86	0.68	0.16	0.93

### Chewing and sorting (Table 1)

- An interaction of PI with uNDF occurred (P<0.01) for DM intake, ruminating and total chewing time.
- Eating time (min/d) was not affected by PI but eating time (P=0.03) were greater with high than low uNDF diets.
- Ruminating and total chewing times were greater (P<0.05) with high than low uNDF at 65% PI, with no effect of uNDF at 75 and 85% PI.
- No effect of PI on sorting index was observed, but heifers fed high vs. low uNDF diets sorted (P<0.01) against long particles (>19 mm).

## Conclusions

These results suggest that when cattle are fed finely processed barley, increasing uNDF concentration of the diet may promote chewing and benefit rumen health.

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