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Landesanstalt für
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Impact of length of straw by the use of a straw mill on the selective feeding of young cattle and their effects for the cattle

67th Meeting of the European Federation of Animal Science (EAAP 2016)
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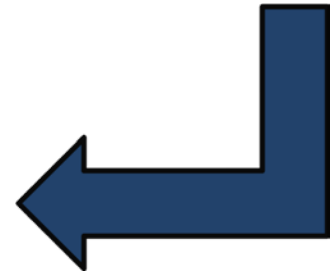
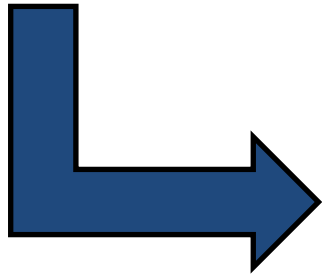
- feeding high quality silage to heifers from the age of two, there is a risk of energy oversupply and problems with Body Condition Score (BCS)
- depending on the feeding value or scarce availability of silage or corn silage diets with high proportions of straw is often incorporated
- for an energetically standardized young cattle supply of straw proportion can be much more than 20 % of dry matter in Total Mixed Rations

- 78 cattle (heifers) were kept and fed under similar conditions in two groups
 - Experimental group (EG): heifers from 12-15 months old (n=46) in a separate housing group
 - Control group (CG): heifers from 15-20 months old (n=32) in a separate housing group

Table 1: experimental design

	CG	EG
Period 1 (2 weeks)	Rotor-cut-straw	
Period 2 (1 week)	Rotor-cut	Mill straw

Material and Methods



Material and Methods



Ø 8.1 cm

Ø 1.5 cm

Material and Methods

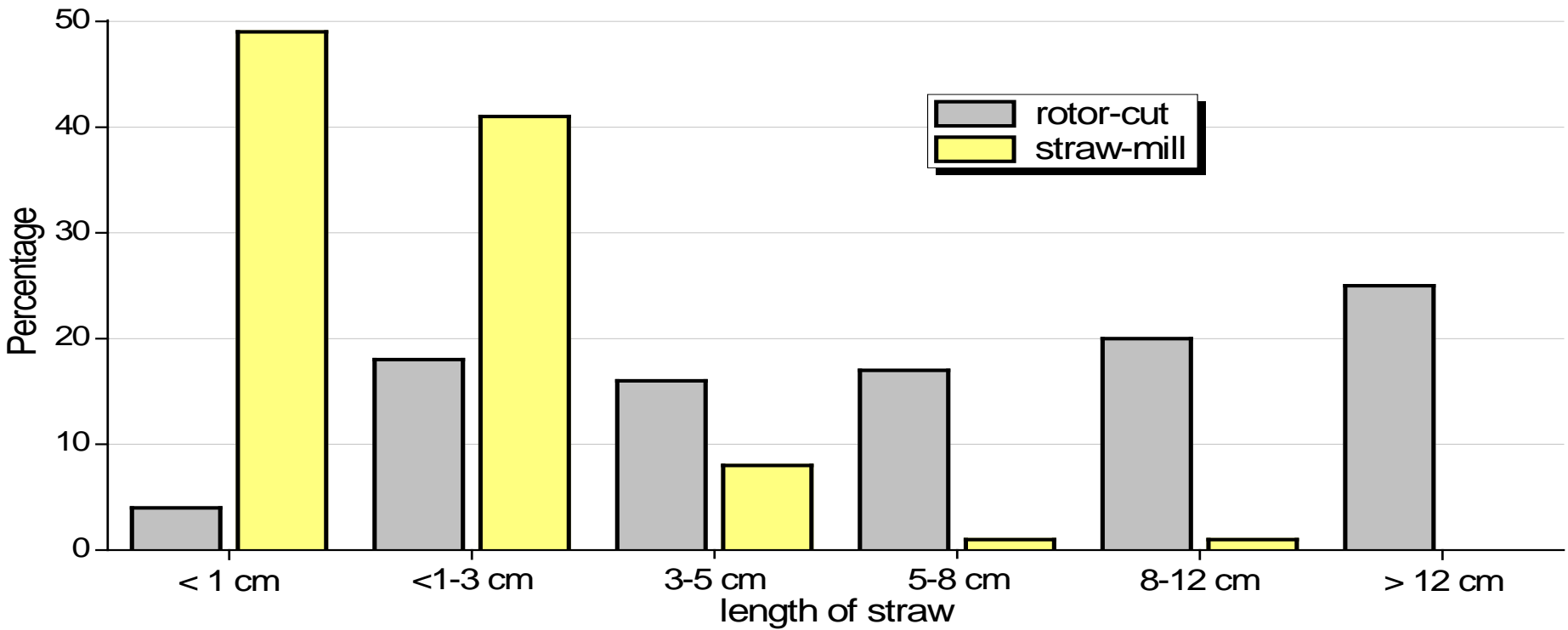
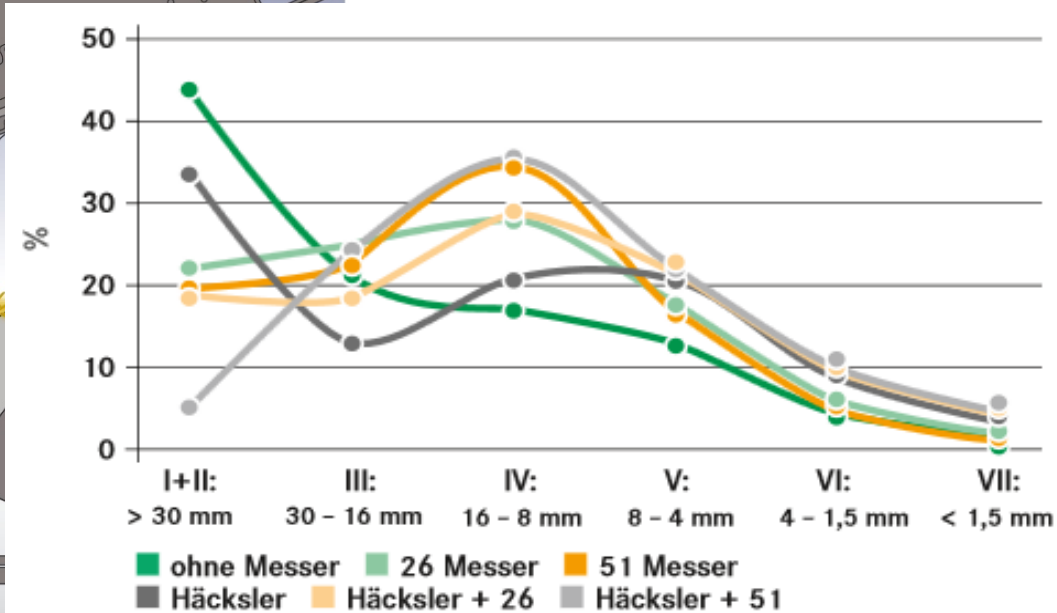


Figure 1: division of straw particles with different treatment



Material and Methods



Material and Methods

- Total Mixed Ration (TMR) corresponds with nutrient requirement of DLG (1999) for heifers in the phase of Live weight between 350-450 kg LW → 750 g/d LW-gain
- DM-content of Total Mixed Ration (TMR) 45 %

Table 2: Intake of Dry Matter, Energy and CP per day

	DLG (1999)	TMR CG/EG
DM-Intake (kg/d)	8.0	8.4
Energy intake (MJ ME)	75	77
Crude protein (g/d)	825	950

Material and Methods

- largest amount in the TMR was alfalfa silage
- straw had an average share of more than 25 % and was varied in the length of particles

Table 3: Components of the TMR for the heifers in EG and CG

	kg OM/day	% of DM
Alfalfa silage (4 cm)	12.00	55.9
Maize silage (1 cm)	4.00	15.9
Straw (Barley)	2.80	27.4
Mineral supplement	0.07	0.8

- EG: feed intake was increased by 0.9 kg DM per animal and day (5 days used for analysis)
- Dry matter feed intake of cattle in control group was on an adequate level in both periods with the rotor-cut straw

Table 4: Dry matter intake of cattle in both periods

	CG	EG
Period 1 (kg DM/d)	8.7	7.4
Period 2 (kg DM/d)		
changes		

- EG: feed intake was increased by 0.9 kg DM per animal and day (5 days used for analysis)
- Dry matter feed intake of cattle in control group was on an adequate level in both periods with the rotor-cut straw

Table 4: Dry matter intake of cattle in both periods

	CG	EG
Period 1 (kg DM/d)	8.7	7.4
Period 2 (kg DM/d)	8.8	8.3
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Table 4: Dry matter intake of cattle in both periods

	CG	EG
Period 1 (kg DM/d)	8.7	7.4
Period 2 (kg DM/d)	8.8	8.3
changes	+ 1 %	+ 12 %

Particle Separator Box

Pore Size > 19 mm

Pore Size > 8 mm

Bottom Pan



- Experimental group: particle length of the residual feed to a large extent with the Total Mix Ratio (TMR) → indifferent variations

–

Table 5: results of particle separator box

	Control group		Experimental group	
	TMR	Residual	TMR	Residual
> 19 mm			10 %	11 %
8 – 19 mm			49 %	56 %
< 8 mm			41 %	33 %

- Experimental group: particle length of the residual feed to a large extent with the Total Mix Ratio (TMR) → indifferent variations
- CG: > 19 mm increased and short particle decreased

Table 5: results of particle separator box

	Control group		Experimental group	
	TMR	Residual	TMR	Residual
> 19 mm	23 %	74 %	10 %	11 %
8 – 19 mm	39 %	21 %	49 %	56 %
< 8 mm	38 %	5 %	41 %	33 %

Results

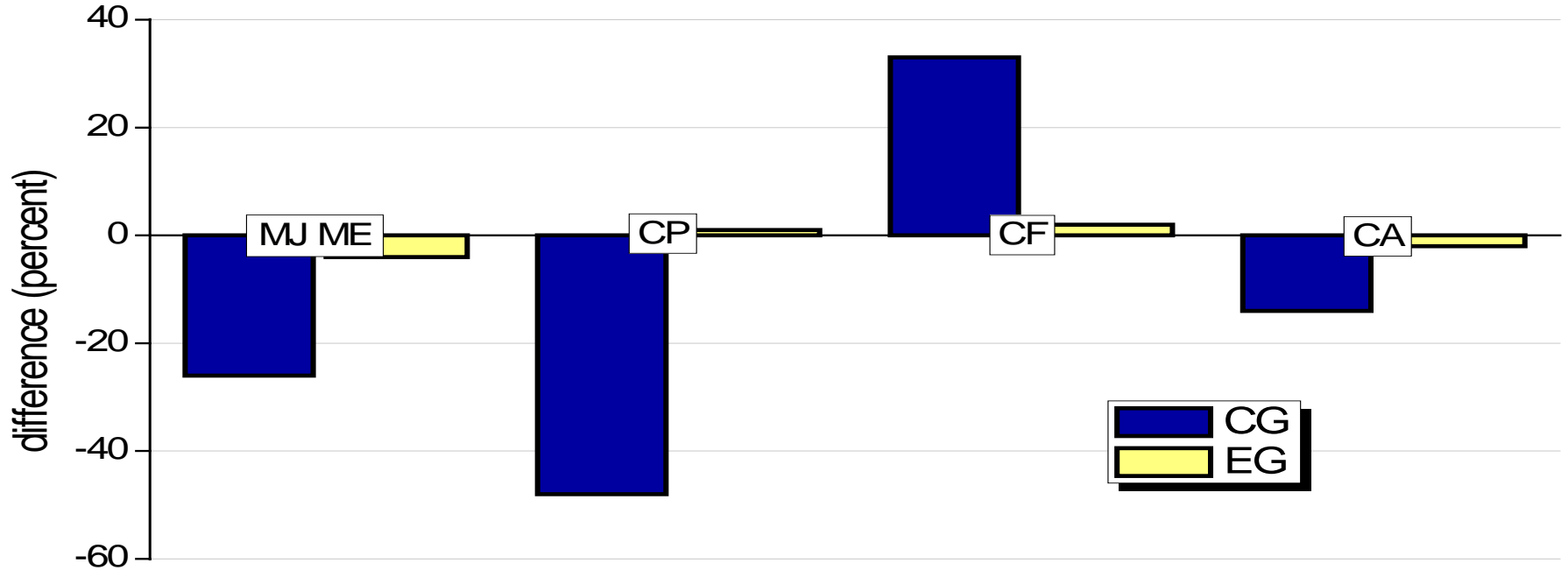


Figure 2: content of energy and nutrient by residual feed in comparison to Total Mixed Ration (TMR)

Results

- Acid-base-balance (NSBA) values of heifers in EG are within normal limits
-

Table 6: Urine parameters of cattle (NSBA, Acid and Base)

	Reference	CG	EG
NSBA (mmol/l)	60 – 200	220	174

- Acid-base-balance (NSBA) values of heifers in EG are within normal limits
- CG: regulation effort is increased for maintaining the acid-base-balance → selection of feed shifts the DCAB in the basic direction

Table 6: Urine parameters of cattle (NSBA, Acid and Base)

	Reference	CG	EG
NSBA (mmol/l)	60 – 200	220	174
Acid (mmol/l)	50 – 100	67	62
Base (mmol/l)	150 - 250	293	241

Conclusion

1. If straw shares of 25 % and more are fed in rations to young cattle (heifers), the particle length of straw has a significant impact on the selective feeding behavior.
2. A particle length of 1.5 cm compared to 7.5 cm long prevented straw certainly a discarding of the straw on the feeding barn.
3. The feed intake of heifers increases when grinding straw was mixed into the TMR.

A photograph of a cow in a stall. The floor is covered with a thick layer of yellow straw or hay. The cow's head and part of its black and white body are visible on the left side. In the background, there are dark metal bars of the stall. The text "... at the end ..." is overlaid in white with a black outline at the top center.

... at the end ...

**Thank you for
the attention**



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