

Effects of shredlage and long cut maize silage on dry matter intake and performance of dairy cows

J.-H. Speit, J. Denissen, T. Etle, M. Pries

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Introduction

- Feeding and feeding intensity of dairy cows
 - Optimum rumen function
 - Whole-crop maize silage → energy and physical structure
- Discussion about optimal preparation and efficient nutrient utilization of maize silage
 - Recommendations in DE → 5-8 mm chop length
- New system: Shredlage®
 - Cross-grooved crop-processing rolls
 - Longer theoretical length of cut → 26-30 mm



(Claas 2016, Spiekers et al. 2009, Steingass and Zebeli 2008, Südekum 2009)

Introduction

- Overview of feeding trials with short and long cut maize silage in the years 2005 - 2007 (DE) (Spiekers et al. 2009)

Location	Futterkamp		Grub		Hohenheim		Haus Riswick	
	KONV	LCM	KONV	LCM	KONV	LCM	KONV	LCM
tHL, mm	7	22	5	19	5.5	14	5	21
MS/ MR (% DM)	42		48		40		52	
Animals (n)	36	36	22	22	12**	12**	30	29
Time (d)	210		100		23		140	
DM Intake (kg/d)	21.6 ^a	20.6 ^b	18.5	17.7	21.4	20.6	20.3	20.2
Milk (kg/d)	36.4 ^a	34.8 ^b	28.9	29.2	33.0*	32.0*	35.9	35.9

KONV: conventional maize silage, LCM: Long cut maize silage, tHL: theoretical length of cut, MS: maize silage, MR: mix ration, * energy corrected milk, ** periodic alternating test, ^{a,b} indicate P < 0.05

Introduction

- Overview of feeding trials with shredlage (USA)

Authors	Ferraretto and Shaver (2012)		Vanderwerff et al. (2015)		Flis (2015, 2016)		Chase (2015)	
	KONV	SHRD	KONV	SHRD	KONV	SHRD	KONV	SHRD
tHL, mm	19	30	19	26	n.d.	n.d.	n.d.	n.d.
MS/ MR (% DM)	50		45		38		50	
Animals (n)	56	56	40	40	76	76	64	64
Time (d)	56		28		84		56	
DM Intake (kg/d)	24.7	25.4	26.7	26.9	25.5	25.6	25.5	25.4
Milk (kg/d)	42.8	43.6	50.1	51.3	40.3	41.4	41.2	41.0
ECM* (kg/d)	40.8	41.7	45.3	46.1	38.2	39.0	38.8	38.6

KONV: conventional maize silage, SHRD: Shredlage, tHL: theoretical length of cut, MS: maize silage, MR: mix ration, n.d.: not determined, * energy corrected milk (kg) = $((0,38 \times \text{fat} (\%) + 0,21 \times \text{protein} (\%) + 1,05) \times \text{milk yield (kg)}) / 3,28$

German research centers



VBZL Haus Riswick

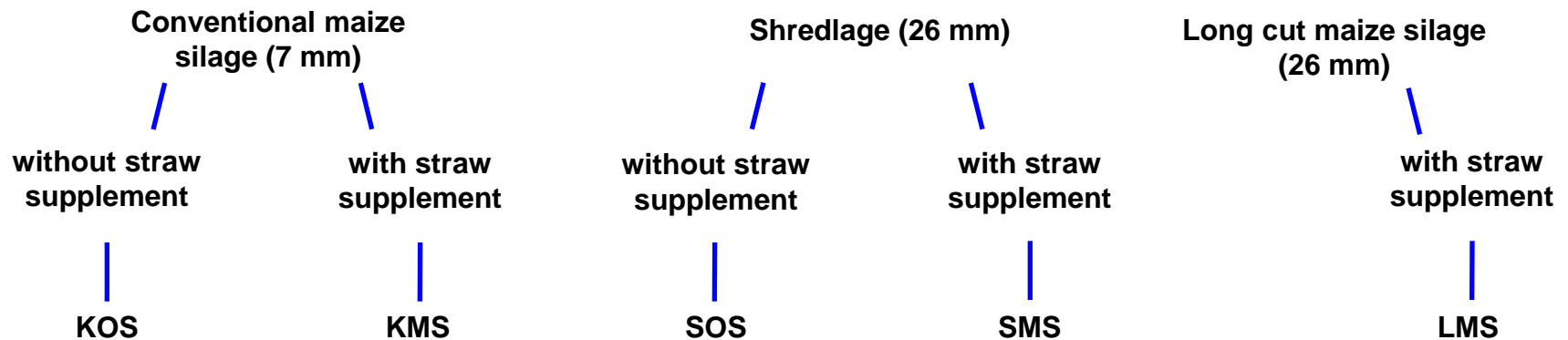


LVFZ Achselschwang



LVZ Futterkamp

- Similar experimental design → 5 feeding trials in the years 2016-2017



Experimental design

- Harvest of shredlage and long cut maize silage in German trials
 - Feeding Rations are planned with 40-47 % maize silage (% DM)
 - Harvesting in a parallel system (Shredlage or long cut maize silage with 26 mm tHL vs. conventional maize silage with 7 mm tHL)
- Contrary to the conventional theoretical length of cut 19 mm in USA, the chosen theoretical length of cut based on the current recommendation in Germany (Spiekers et al. 2009)



Experimental design

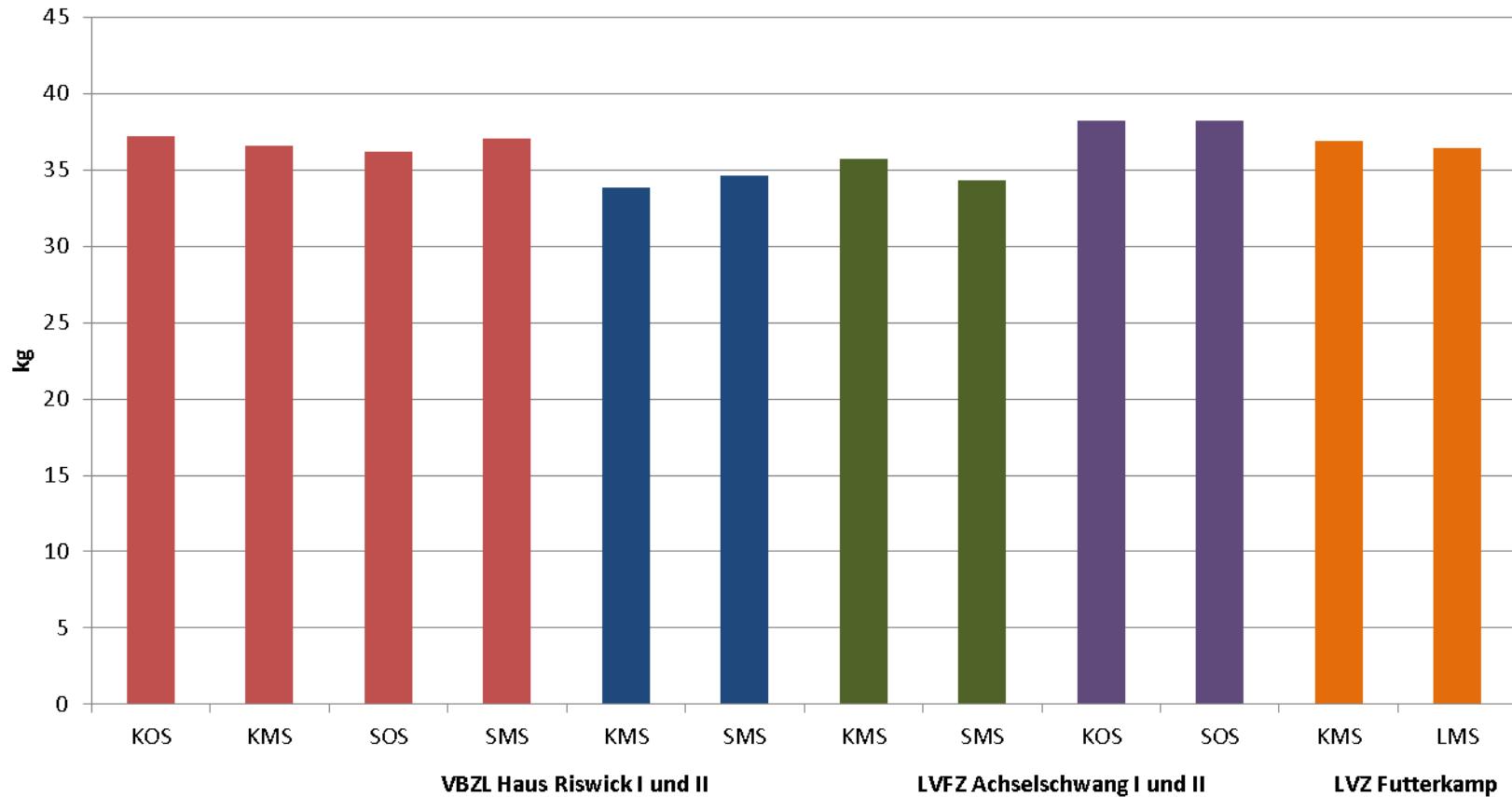
- Experimental setup of the feeding trials in Germany

Location/ Authors	VBZL Haus Riswick				VBZL Haus Riswick		LVFZ Achselchwang		LVFZ Achselchwang		LVZ Futterkamp D. Kampf (unpublished)	
	KOS	KMS	SOS	SMS	KMS	SMS	KMS	SMS	KOS	SOS	KMS	LMS
tHL (mm)	7	7	26	26	7	26	7	26	7	26	7	26
Rations	TMR	TMR	TMR	TMR	TMR	TMR	PMR	PMR	PMR*	PMR*	TMR	TMR
MS/ MR (% DM)	45	44	46	45	40	40	39	39	47	47	46	46
NEL (MJ/kg DM)	7.3	7.2	7.3	7.2	7.1	7.1	6.8**	6.9**	7.1**	7.1**	n.d.	n.d.
peNDF_{>8 mm} (%)	17.8	17.8	19.6	19.3	18.1	21.1	15.1**	17.5**	14.3**	15.8**	n.d.	n.d.
Animals (n)	39	44	41	40	24	24	24	24	24	24	36	36
Time (d)	140				188		84		84		100	

KOS: conventional maize silage without straw supplement in ration, KMS: conventional maize silage with straw supplement in ration, SOS: Shredlage maize silage without straw supplement in ration, SMS: Shredlage maize silage with straw supplement in ration, LMS: Long cut maize silage (Scherer special rollers) with straw supplement, tHL: theoretical length of cut, MS: maize silage, MR: mix ration, TMR: total mix ration, PMR: partially upgraded mix ration, n.d.: not determined *straw for ad libitum intake, **inclusive concentrates

Results

■ Energy corrected milk (kg) per day



Results

- Comparative overview of the results of the 5 feeding trials in Germany

Location/ Authors	VBZL Haus Riswick				VBZL Haus Riswick		LVFZ Achselchwang		LVFZ Achselchwang		LVZ Futterkamp Kampf (unpublished)	
	KOS	KMS	SOS	SMS	KMS	SMS	KMS	SMS	KOS	SOS	KMS	LMS
DM Intake (kg/d)	23.2 ^a	24.1 ^{ab}	23.2 ^a	25.0 ^b	21.9	22.3	24.4 ^a	22.7 ^b	24.9	24.7	22.2	21.8
Milk (kg/d)	38.5	38.2	38.4	39.1	35.2	36.1	35.9	34.6	38.9	39.0	38.9	38.0
Fat (%)	3.70	3.73	3.61	3.67	3.77	3.81	3.82	3.83	3.69	3.72	3.62	3.67
Protein (%)	3.26	3.26	3.24	3.25	3.07	3.01	3.66	3.61	3.68	3.64	3.21	3.26
ECM* (kg/d)	37.2	36.6	36.2	37.0	33.8	34.6	35.7	34.3	38.2	38.2	36.9	36.4
Rumination (min/d)	544 ^a	623 ^{ab}	653 ^b	678 ^b	606	602	485	502	591	557	n.d.	n.d.

KOS: conventional maize silage without straw supplement in ration, KMS: conventional maize silage with straw supplement in ration, SOS: Shredlage maize silage without straw supplement in ration, SMS: Shredlage maize silage with straw supplement in ration, LMS: Long cut maize silage (Scherer special rollers) with straw supplement, n.d.: not determined, * energy corrected milk (kg) = ((0,38 x fat (%) + 0,21 x protein (%) + 1,05) x milk yield (kg)) / 3,28, ^{a,b} indicate P < 0.05

Conclusions

- **No negative influence** on feed intake and milk production of dairy cattle
- **Leaving out the straw is possible** if using shredlage
- **Ensiling succesful** → pay attention to **chop length and packing densities**
- **Optimal chop length**
 - Conservation success of corn silage
 - Rumen function and utilization of nutrients
 - Dairy production development
 - Increase in costs
- **Future perspective**
 - Feeding trials with calves and beef cattle
 - Economic calculation



Thank you very much for your attention!



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