

Effect of Sorghum Berry Size, KP Roll Gap, and Ensiling Storage Duration on Berry Processing Score and Starch Digestibility



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INTRODUCTION

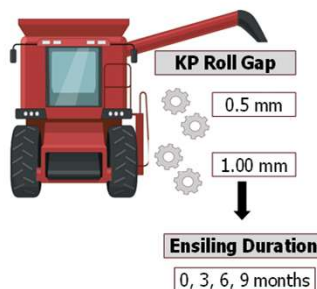
Water scarcity is major challenge in the Southern High Plains (Scanlon et al., 2012), affecting the production of forages used to feed the dairy cows. Sorghum silage is a drought-tolerant forage alternative to corn silage in regions with limited irrigation capacity (McCary et al., 2020).

The objective was to evaluate the effects of forage sorghum hybrids varying in berry size (F10 vs. F24; regular vs. large berry), roll gap (0.5 vs. 1.0 mm), ensiling duration (ED; 0, 3, 6, and 9 months) and their interactions, on berry processing score (BPS) and 7 h *in-situ* rumen starch digestibility (isSD7).

MATERIAL AND METHODS

Sorghum Hybrids

F10 F24



Harvested at the **early hard-dough stage** (35% DM; 31% starch).

Experimental Design: Split-plot

Blocks: n = 3 (1, 2, 3)

Main plot: Hybrid (F10, F24; Richardson Seeds, Vega, TX)

Subplot: Roll gap (0.5, 1 mm, DurraCut™ kernel processor [KP], Scherer Inc., Sioux Falls, SD)

Ensiling duration: 0, 3, 6, and 9 months

Measurements: DM, starch, BPS 2.36 mm, and isSD7.

Statistical analyses: Mixed model regression analyses; fixed effects = hybrid, roll gap, ensiling duration.

RESULTS

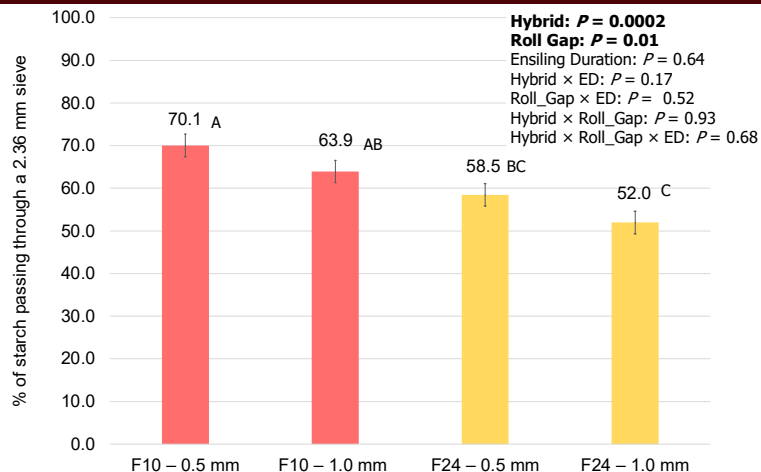


Figure 1. Berry processing score of hybrids F10 and F24 processed at 0.5 and 1.0 mm roll gaps with a DurraCut™ KP. Means without a common superscript letter differ.

Table 1. Table 1. Berry processing score (BPS 2.6 mm) and 7 h *in-situ* starch digestibility (isSD7) for hybrids harvested at 0.5 or 1 mm roll gap and ensiled for 0, 3, 6 and 9 months.

		Treatments		BPS2.36, % starch	isSD7, % starch	
Hybrid	Roll gap	Ensiling duration				
F24	0.5	0	55.1	bcde	81.4	ab
		3	58.4	abcde	85.7	ab
		6	59.3	abcde	90.2	a
	1	0	61.0	abcde	91.9	a
		3	52.4	cde	78.9	b
		6	51.5	de	86.9	ab
F10	0.5	0	53.0	cde	90.4	a
		3	50.9	e	89.7	ab
		6	71.3	a	80.2	ab
	1	0	70.7	a	84.7	ab
		3	70.6	a	84.7	ab
		6	67.6	ab	85.4	ab
0	65.4	abc	77.1	b		
3	64.6	abcd	83.3	ab		
6	64.6	abcd	83.2	ab		
9	61.0	abcde	83.9	ab		
SEM			2.50		2.43	

^{a-e} Within a column, means without a common superscript letter differ.

Hybrid: $P = 0.0002$
Roll Gap: $P = 0.01$
Ensiling Duration: $P = 0.64$
Hybrid × ED: $P = 0.17$
Roll_Gap × ED: $P = 0.52$
Hybrid × Roll_Gap: $P = 0.93$
Hybrid × Roll_Gap × ED: $P = 0.68$

F10 had higher BPS2.36 than F24

0.5 mm roll gap improved processing

Digestibility increased with ensiling duration

CONCLUSIONS

Sorghum hybrid F24, harvested with DurraCut™ kernel processing and ensiled for 6 months, significantly improved starch digestibility compared hybrids F10 and F24 not ensiled.

ACKNOWLEDGMENTS



REFERENCES

- McCary, C. L., et al. 2020. Current perspectives on whole-plant sorghum silage production and utilization by lactating dairy cows. *J. Dairy Sci.* 103:5783–5790.
- Scanlon, B. R., et al. 2012. Groundwater depletion and sustainability of irrigation in the U.S. High Plains and Central Valley. *Proc. Natl. Acad. Sci. U.S.A.* 109:9320–9325.