

PERFORMANCE OF DAIRY HEIFERS FED WHOLE-PLANT CORN SILAGE TREATED WITH BENZOHYDRAZIDE

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Introduction

Corn silage digestibility is mainly determined by starch and fiber contents and their respective digestibility. Fiber digestibility is mainly affected by lignification during plant development. A potential strategy to reduce the negative impact of lignin on the digestibility of forage fiber is the application of enzyme inhibitors of the phenylpropanoid pathway. For instance, benzohydrazide can regulate the biosynthesis of lignin monomers and thus modify the structure of this polymer present in the cell wall of corn plants, which may facilitate the attack of microbial hydrolases in the rumen. Thus, the objective of this study was to evaluate the performance of dairy heifers fed diets containing whole-plant corn silage treated with benzohydrazide.

Material and methods

- Corn hybrid DKB255PRO3 was sown in four 1.0-ha plots placed in two field blocks (two plots per block);
- At 26 and 43 d after emergence, one plot per block received 180 L ha⁻¹ of 50 µM benzohydrazide (BZD) solution. The remaining plots served as untreated controls (CON);
- Whole-plant corn was mechanically harvested at approximately 35% dry matter (DM) and stored separately in two bunker silos (i.e., one bunker for BZD and one bunker for CON);
- After 60 d of storage, the silages were fed to 24 Holstein heifers (12 heifers per treatment). Heifers were blocked by body weight (12 blocks) and housed in individual pens;
- Experimental diets contained 15% concentrates and 85% corn silage (CON or BZD);
- Feeding period: 67 d (7 d of adaptation and 60 d of treatment comparison);
- Data were compared using the MIXED procedure of SAS with a model including a random effect of block and a fixed effect of treatment (CON or BZD). Significant differences were declared if $P \leq 0.05$, and trends if $P > 0.05$ and $P \leq 0.10$.



Results

Table 1. Performance, apparent digestibility, and blood parameters of dairy heifers fed corn silage

Item	Treatment ¹		SEM ²	P-value
	CON	BZD		
DM intake, kg d ⁻¹	11.0	10.2 -7.3%	0.23	0.039
Initial BW, kg	334	333	7.64	0.944
Final BW, kg	397	401	8.62	0.800
ADG, kg d ⁻¹	1.32	1.38	0.042	0.343
Feed efficiency	0.128	0.142 +10.9%	0.003	0.011
Total-tract DM digestibility, %	58.4	61.9 +6.0%	0.59	<0.001
Total-tract NDF digestibility, %	34.0	37.5 +10.3%	1.43	0.002
Plasma glucose, mg dL ⁻¹	67.3	69.7	3.61	0.283
Plasma urea, mg dL ⁻¹	25.1	22.7 -9.6%	1.29	0.009

¹CON: control; BZD: benzohydrazide.

²Standard error of the mean.

Corn silage composition		
Item	CON	BZD
DM, % as fed	32.0	31.9
Starch, % DM	32.5	34.4
aNDF, % DM	40.5	41.0
Lignin(sa), % DM	1.96	1.72
Lignin(sa), % aNDF	4.96	4.26
Lignin(ab), % DM	8.03	7.97
Lignin(ab), % aNDF	20.2	20.0

Conclusion

Application of benzohydrazide to corn crop increased fiber and dry matter digestibility *in vivo*, which resulted in greater corn silage feeding value for growing dairy heifers.