MINERAL CONTENTS OF SWEET CORN STOVER SILAGE: EFFECT OF MECHANICAL PROCESSING AND ENSILING DURATION

Peter Dele[1], Joshua Peter[2], Bolanle Akinyemi[1], Julius. Tanloju[1], Ibrahim Balogun[1], Abdulqadir Majekodunmi[1], Kayode Adegbola[1], Ibrahim Olanloye[1], Kayode Aina[1], Iduwe Chika[1,3], Michael Wuaku[3] , Foluke Enwete[1]

[1]*Federal University of Agriculture, Abeokuta, Nigeria*
[2]Africa Steading Farms Ltd, Adewusi Village, Odeda, Ogun State, Nigeria
[3]*North Carolina Agricultural and Technical State University, Greensboro, USA*

INTRODUCTION

▪In the tropics, mineral imbalance in ruminant diets can lead to reduced productivity (Dele et al., 2021).

▪Sweet corn stover, a by-product of maize production, has potential as a mineral-rich forage (Heuzé et al., 2019).

▪This study evaluates how processing (chopping vs shredding) and ensiling durations (0, 4, 8, and 16 weeks) affect its mineral composition of sweet corn stover.

MATERIALS & METHODS

•**Crop**: Sweet corn (Sugar-75 F1)
•**Harvest**: 68 days after planting
•**Treatments**:
•*Processing*: Chopped vs. Shredded
•*Ensiling duration*: 0, 4, 8, 16 weeks
•**Experimental Design**:
2 × 4 factorial, 5 replicates
•**Analysis**:
•Macro minerals (Ca, P, K, Mg, Na)
•Micro minerals (Fe, Mn, Zn, Cu)
•Statistical analysis using GLM in SAS

Table 1: Effect of processing and ensiling duration on the mineral contents of sweet corn stover silage

Processing	Duration (WOE)	Ca	P	K	Mg	Na	Fe	Mn	Cu	Zn
		gkg^{-1} DM					mgkg^{-1} DM			
Chopped	0	2.14^{b}	3.09^{b}	6.09^{g}	3.95^{e}	1.59^{bcd}	121.12^{g}	52.78^{a}	0.72^{g}	22.36^{b}
	4	3.08^{b}	1.68^{g}	11.42^{a}	4.46^{b}	0.66^{e}	207.26^{f}	26.03^{f}	1.75^{d}	14.57^{f}
	8	3.12^{b}	2.24^{e}	9.23^{d}	3.57^{g}	2.03^{ab}	790.53^{a}	9.51^{g}	2.05^{b}	13.60^{g}
	16	2.57^{b}	3.08^{b}	9.29^{d}	3.97^{e}	1.43^{cd}	471.74^{b}	44.81^{b}	1.59^{e}	19.93^{c}
Shredded	0	6.59^{a}	3.40^{a}	7.74^{e}	4.32^{c}	1.09^{de}	383.12^{c}	53.30^{a}	1.49^{f}	24.50^{a}
	4	2.75^{b}	2.11^{f}	9.58^{c}	4.62^{a}	0.76^{e}	322.86^{d}	38.91^{c}	1.89^{c}	17.73^{e}
	8	2.97^{b}	2.74^{c}	7.01^{f}	4.21^{d}	2.40^{a}	260.50^{e}	31.48^{e}	0.66^{h}	18.26^{d}
	16	7.07^{a}	2.53^{d}	10.33^{b}	3.79^{f}	1.70^{bc}	785.19^{a}	37.37^{d}	2.36^{a}	19.86^{c}
SEM		0.32	0.06	0.19	0.04	0.09	26.54	1.54	0.06	0.39
P-Value										
Processing (P)		<0.0001	<0.0001	<0.0001	<0.0001	0.6447	<0.0001	<0.0001	<0.0001	<0.0001
Duration (D)		0.0201	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
P x D		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

$^{a, b, c, ..h}$: Means in same column with different letters were significantly (P<0.05) different. SEM= Standard error of means, WOE= weeks after ensiling

RESULTS

•Calcium: Highest for Shredded and ensiling at 16 weeks (7.07 g/kg DM).

•Phosphorus: Highest in unensiled shredded stover (3.40 g/kg DM).

•Potassium: Highest for stover chopped and ensiled for 4 weeks.

•Iron: Highest value was for chopped and ensiled for 8 weeks (790.53 mg/kg DM)

•The highest Zn and Mn contents were recorded for unensiled shredded stover.

CONCLUSION

▪Shredding and longer ensiling enhanced calcium content, while phosphorus and trace elements declined.

▪Optimization of these parameters is vital for improved silage quality in tropical ruminant nutrition

REFERENCES

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