PROVITA SUPPLEMENTS

TRIAL REPORT

PEARL MILLET SILAGE FROM TEXAS TREATED WITH BONSILAGE FORTE WS

PERFECT COMPONENTS. MAXIMUM RESULTS.

PEARL MILLET SILAGE FROM TEXAS TREATED WITH BONSILAGE FORTE WS

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Pearl millet silage is a valuable forage source because of its ability to efficiently use water, to grow relatively quickly, and it has high nutritive value. The effects on the fermentation of pearl millet silage treated with our silage inoculant BONSILAGE FORTE WS are shown.

INTRODUCTION

Like many other small grain forages, millet silage should be wilted to reach a certain dry matter (DM) level before ensiling and to help decrease the risk of mis-fermentations. Reaching a higher DM can be difficult due to weather conditions and other delays in harvest. In some cases, like the situation in this study, the material cannot be wilted due to the increased levels of ash that are brought in during harvesting. Having a low DM and/or high ash content can create an environment where there is a slow drop in pH and unwanted microorganisms can flourish. This growth of unwanted microorganisms and excess protein degradation by protein degrading enzymes can be avoided by applying an inoculant containing homolactic lactic acid bacteria (LAB) that will rapidly drop the pH. The objective of this study was to evaluate the overall fermentation of pearl millet silage and the effects of BONSILAGE FORTE on fermentation.

STUDY PARAMETERS

In Texas, pearl millet silage in the soft dough stage of maturity was harvested at around ~22% DM. The material was not wilted as wilting increases ash content. It was packed by duplicates into 5-gallon plastic buckets and sealed. Treatments were untreated (Control) or treated with BONSILAGE FORTE.

The silage inoculant BONSILAGE FORTE is formulated with *Lactobacillus plantarum*, *Pediococcus acidilactici*, and *Lactococcus lactis* with an application rate of 300,000 CFU of LAB per gram of fresh forage. Silos were ensiled for 2, 6, 13, 45, and 100 days.

RESULTS

Results in Table 1 show that even with high ash levels, BONSILAGE FORTE was able to rapidly drop the pH in the front end of fermentation. This is critical to inhibiting unwanted microorganisms like clostridia and proteolytic enzymes.

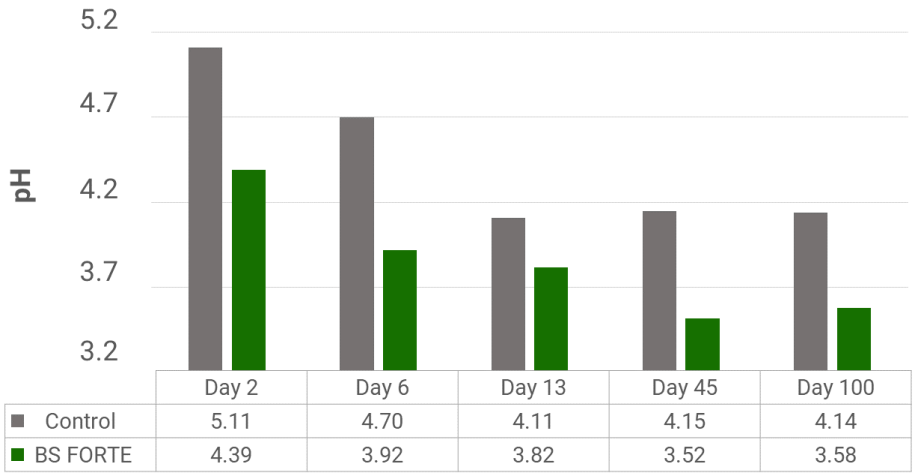
Table 1. The average DM content (%), pH, and ash (% DM) content of millet silage ensiled for 2, 6, and 13 days. Untreated silage (Control) or treated with BONSILAGE FORTE.

		DM (%)	pH	Ash (%)
Day 2	Control	22.23	5.11	10.18
	BS FORTE	22.42	4.39	10.79
Day 6	Control	21.84	4.70	11.19
	BS FORTE	21.87	3.92	11.43
Day 13	Control	20.80	4.11	13.07
	BS FORTE	21.92	3.82	12.33

Lower ammonia-N levels (Table 2) in BONSILAGE FORTE treated silage are a result of the rapid pH drop in the front end of fermentation.

Table 2. The average DM content (%), pH, ash (% DM), ammonia-N (% of CP), and lactic acid (% of DM) of millet silage ensiled for 45 and 100 days, either untreated (Control) or treated with BONSILAGE FORTE.

		DM (%)	pH	Ash (%)	Ammonia-N (%)	Lactic acid (%)
Day 45	Control	22.57	4.15	12.71	6.82	5.75
	BS FORTE	22.85	3.52	12.69	2.54	8.47
Day 100	Control	22.08	4.14	11.36	6.34	5.51
	BS FORTE	22.55	3.58	12.18	1.89	8.75



	Day 2	Day 6	Day 13	Day 45	Day 100
Control	5.11	4.70	4.11	4.15	4.14
BS FORTE	4.39	3.92	3.82	3.52	3.58

Figure 1. The pH of untreated (Control) and treated (BONSILAGE FORTE) millet silage ensiled for 2, 6, 13, 45 and 100 days.

The rapid and extensive pH drop during the early part of ensiling followed through for 45 and 100 days of ensiling (see Table 2 and Figure 1). Pearl millet silage treated with BONSILAGE FORTE had an average pH of ~3.55 while untreated silage remained high at pH ~4.14 on average.

Another parameter that directly correlates with pH levels is the lactic acid level. Treated silages with a low pH had higher levels of lactic acid versus untreated with lower levels of lactic acid having a higher pH, as shown in Table 2.

Table 3 shows nutritional data for pearl millet silage after 100 days of ensiling for untreated and BONSILAGE FORTE treated pearl millet silage.

Table 3. The average DM content (%), crude protein (% DM), aNDF (% DM), ADF (% DM), NDFd30 (%NDFom), NDFd240 (%NDFom), $uNDF_{240}$ (% DM), lignin (%NDFom) and starch (% DM) of millet silage ensiled for 100 days and untreated (Control) or treated with BONSILAGE FORTE.

		DM	Crude Protein	aNDF	ADF	NDFd30	NDFd240	$uNDF_{240}$	Lignin	Starch
Day 100	Control	22.08	15.25	53.79	30.75	66.38	77.55	11.72	4.49	0.10
	BS FORTE	22.55	17.04	57.27	32.29	67.74	77.43	12.60	5.66	0.10

SUMMARY

In the front end of fermentation BONSILAGE FORTE was able to rapidly drop the pH in millet silage, thereby protecting the silage from inefficient fermentations. On each early opening day, there is at least half a point difference in values. After 45 and 100 days of ensiling, the pH of FORTE treated material was still over half a point lower. Despite relatively high ash values which can make it difficult for the pH to drop, FORTE was able to rapidly acidify the silage compared to control. High lactic acid levels at 45 and 100 days of ensiling support this rapid and greater extent of acidification for treated silage over untreated. The rapid acidification leads to an inactivation of unwanted microorganisms (ex. clostridia and enterobacteria) and protein degrading enzymes. Higher ammonia-N levels are an indication of excess protein degradation either from unwanted microorganisms or proteolytic enzymes. In this study, FORTE treated silages after 45 and 100 days of ensiling had over 4 points less ammonia-N compared to untreated silage. BONSILAGE FORTE was able to rapidly drop the pH and improve the overall fermentation of pearl millet silage even when harvested and ensiled with relatively high ash levels.

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