Trial Summary: Biotal Plus; Corn Silage; USDA

BIOTAL

Site	USDA Dairy Research Center, Madison, Wisconsin
Lead Researchers	Dr. Richard Muck
Objective	To determine the efficacy of Biotal inoculant (Biotal Plus) on corn silage and high moisture corn.
Protocol	Chopped whole-plant corn silage from Prairie du Sac and high moisture shelled corn from Arlington were ensiled in 60 cm tall x 15.5 cm diameter PVC silos sealed with polyethylene. There were 4 replicates per treatment per crop. For each trial three samples of the initial material were analyzed for DM content, pH, crude protein and microbiology. After 3 months storage at room temperature (~ 22°C) the silos were opened, weighed and samples were taken from the top and bottom half for analysis.

Results

1. Corn Silage:

Value					
Parameter	**Initial**	**Control**		**Treated**	
		Top	**Bottom**	**Top**	**Bottom**
Dry Matter (%)	32.86	33.52	33.35	33.99	33.78
pH	5.71	3.91	3.87	4.02	3.87
Lactic Bacteria (Log CFU/g)	6.93	7.75	7.26	8.34	7.21
Lactic Acid (%DM)	0.00	5.76	6.90	4.40	7.04
Acetic Acid (%DM)	0.00	2.47	1.81	2.82	1.92
DM Losses (%)	–	4.8[a]		0.5[b]	
Spoilage Losses (%)	–	7.5		5.1	

[a,b]: Values in different columns with different superscripts are significantly different (P<0.05)

2. High Moisture Corn

Value					
Parameter	**Initial**	**Control**		**Treated**	
		Top	**Bottom**	**Top**	**Bottom**
Dry Matter (%)	77.27	71.61	72.88	71.10	71.25
pH	6.57	5.15[a]	5.43[a]	4.54[b]	4.59[b]
Lactic Bacteria (Log CFU/g)	2.24	7.26	7.40	7.94	7.89
Lactic Acid (%DM)	0.00	0.43[b]	0.47[b]	1.08[a]	1.17[a]
Acetic Acid (%DM)	0.00	0.24	0.05	0.23	0.06
Time to heat (h)	–	36[b]	57[b]	56[b]	161[a]

[a,b]: Values in different columns with different superscripts are significantly different (P<0.01)





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Conclusions

The corn silage trial presented the challenge of a very high natural population of LAB on the crop at harvest. As a result, there was little difference in the fermentation profiles in the finished silages. However, there was significantly less DM loss in the silage treated with Biotal Plus, and a trend to lower spoilage losses.

The low level of natural LAB on the HMC resulted in the Biotal Plus treatment achieving a more controlled fermentation (significantly lower pH and higher lactic acid levels). The Biotal Plus treated HMC from the lower half of the silos was significantly more stable in aerobic stability tests, while the upper half samples trended to improved stability compared to the corresponding untreated samples.