BaleMax™ Improves Digestibility & Feed Quality of Alfalfa Hay

BACKGROUND

BaleMax™ is a dry granular hay inoculant designed to preserve forage quality when harvest conditions are suboptimal. Applied directly during baling, BaleMax performs best when treating forages at or below 25% moisture and allows producers greater flexibility in harvest timing while supporting improved storage outcomes, feed quality and digestibility when fed to ruminants.

Visible signs are easy to evaluate, but the true value of a forage inoculant is not always apparent at the bale surface. Instead, its impact is best understood by evaluating how forage preservation influences ruminal digestion, nutrient availability and overall feed utilization. Preserving forage quality reduces heat damage and nutrient loss that can otherwise limit animal performance during critical production periods.

Alfalfa forages play a key role in ruminant rations by supporting microbial protein production, which drives growth in grow-finish cattle, milk production in dairy cows and fetal development in gestating animals. By stabilizing the fermentation process, BaleMax helps reduce heat damage, resulting in improved availability of protein and energy and lower ash content which directly influence feed efficiency, intake and animal health.

In this study, alfalfa hay samples were collected from bales stored under Arizona conditions and shipped to Ralco's laboratory in Marshall, Minnesota for analysis. In addition to evaluating relative feed value (RFV) and bale temperature to assess forage preservation during storage, the trial also measured the effects of BaleMax on *in vitro* dry matter digestibility (IVDMD) using ruminal fluid collected from beef cattle consuming a forage-based diet.

Crop: Alfalfa
Storage Location: Arizona
Laboratory Analysis: Ralco Laboratory, Marshall, MN
Treatment: BaleMax dry hay inoculant
Digestibility Analysis: *In vitro* dry matter digestibility (IVDMD)
Samples per Run: 16 total (8 control, 8 BaleMax)
Ruminal Fluid Source: Beef cattle fed a forage-based diet

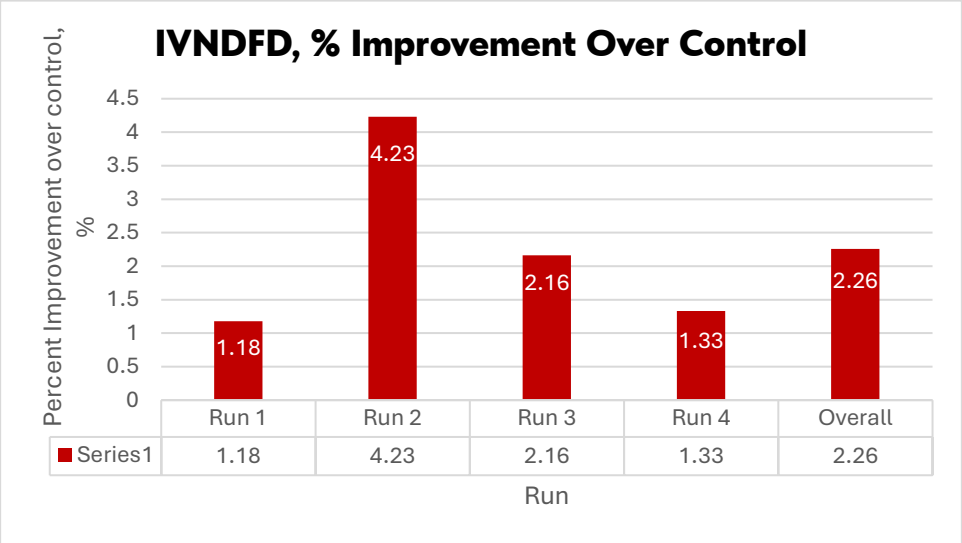
RESULTS

Improved Digestibility

Treating alfalfa hay with BaleMax resulted in a significant improvement in *in vitro* dry matter digestibility. Across all runs, BaleMax-treated samples showed an average 2.26% increase in IVDMD compared to untreated control samples ($P < 0.0001$).

All experimental runs also demonstrated significant improvements in *in vitro* neutral detergent fiber digestibility (IVNDFD) over control samples ($P < 0.05$).

Chart 1. Percent improvement of alfalfa bales treated with BaleMax over bales not treated. P < 0.05 for all runs.



Improved Feed Quality

Improved digestibility in BaleMax-treated alfalfa is attributed to reduced heat damage during storage, which helps preserve protein and energy that would otherwise be lost. By stabilizing the fermentation process, BaleMax supports improved forage preservation and lower ash accumulation, factors that directly influence nutrient availability and digestibility.

Bales treated with BaleMax had significantly improved quality compared to untreated control bales, including:

- 20°F cooler bale temperatures during storage (Chart 2)
- +28 RFV compared to control bales (Chart 3)

These improvements in forage quality support greater digestibility, improved ruminal function and enhanced feed efficiency, contributing to better livestock performance during critical production periods.

Chart 2: Reduction in bale temperature of alfalfa bales treated with BaleMax compared to bales not treated.

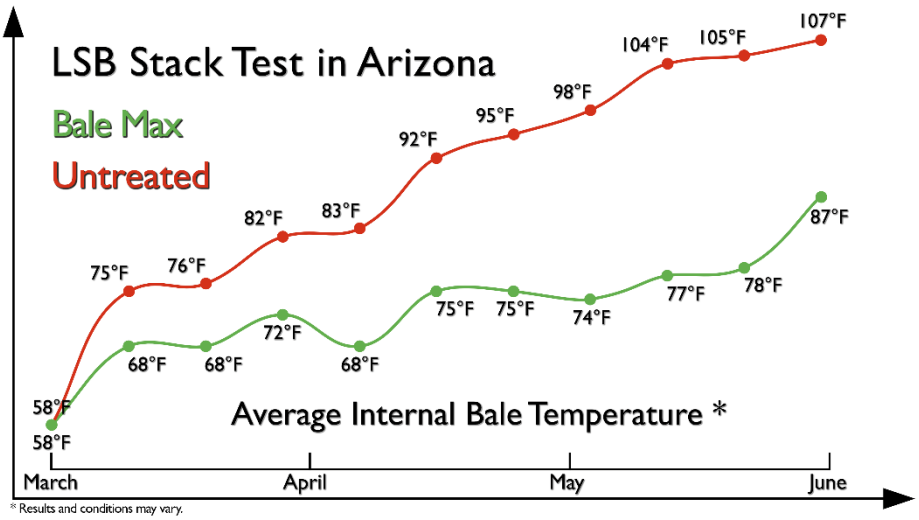
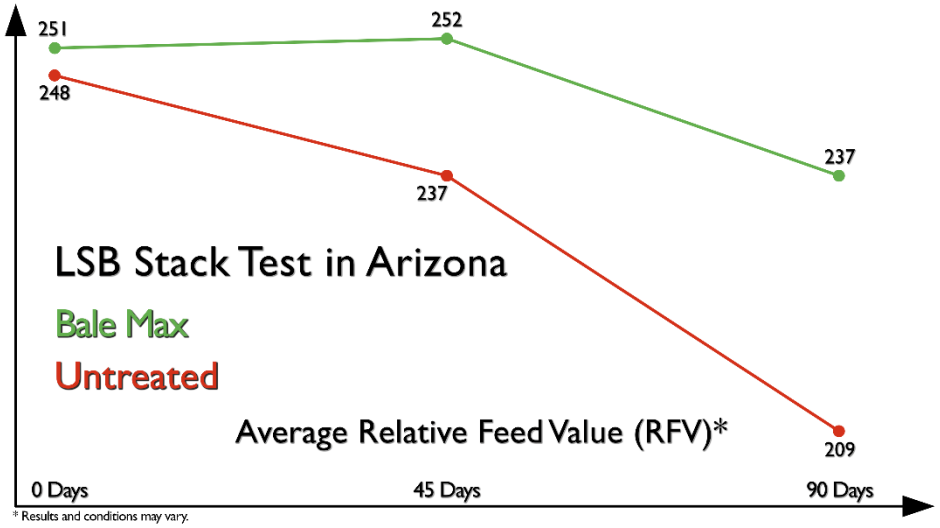


Chart 3: Relative feed value (RFV) improvement of alfalfa bales treated with BaleMax over bales not treated.



SUMMARY

Alfalfa hay treated with BaleMax demonstrated improved forage preservation, as evidenced by lower bale temperatures, higher RFV and significantly greater digestibility compared to untreated control hay. By reducing heat damage and preserving nutrient availability during storage, BaleMax enhances forage utilization and supports improved animal performance and economic returns for livestock producers.