

ALFALFA QUALITY DETERIORATION FROM BALING AT HIGH MOISTURE LEVELS

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An alfalfa baling experiment was designed to test an experimental biological hay preservative. With use of a microwave oven to rapidly determine the moisture content of samples of alfalfa taken from the swath, baling was planned for 30, 25, 20 and 15 percent moisture contents. The hay preservative was applied during baling using 0, 2, and 4 pounds per ton of hay.

Baling began on November 25th and continued nightly through November 29th. After baling, internal bale temperatures were recorded to observe any effect of treatments on temperature (mold activity).

On January 7th, 36 bales representing the four moisture contents (30, 25, 20 and 15 percent), the three treatments (0, 2, and 4 pounds), and the three replications were opened to observe the color and presence or absence of mold. Samples were also taken for analysis.

Data show no effect of chemical treatment on overall forage quality, while increased moisture at baling had a detrimental effect on quality.

Total N was similar across all treatments in the experiment. Considerable denaturing of protein and heat damage occurred between baling and day 20. In both cases Neutral Detergent Fiber Nitrogen (NDFN) and Acid Detergent Fiber Nitrogen (ADFN) increased with moisture at baling. No effect of the chemical treatment (antifungal agent) was apparent (treatments 0, 2, and 4 pounds per ton). The increase in N for the lowest moisture level with the treatment of the chemical can not be explained. The pattern is not apparent in other measures done on these samples and the closeness of the replicates suggests good analyses' values. Digestion of the N fractions in vitro reveal that baling at higher moisture levels provided substantially more N that was resistant to microbial digestion but not heat damaged. These results should be viewed cautiously because although this method of determining N digestibility has been used previously (Goering et al., J. Dairy Science, 55(9):1275), it has never been validated with in vivo work. In general, N showed a predictable increase in the NDF and ADF fractions with moisture at baling but no response to the chemical treatment.

In vitro digestion of dry matter decreased with time after baling and with moisture. The lowest baling moisture level had no effect on DM digestibility by day 20. The chemical treatment had no effect on DM digestibility. The ADF residue (% DM) after in vitro was slightly higher in day 20 than day 1 but showed only a slight increase (decrease in digestibility of ADF) with increased baling moisture, further suggesting that heat damage was not extensive in the experiment.

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