Best Management Practices for Reduced Lignin Alfalfa

- A 10% decrease in alfalfa lignin could result in a $350 million per year increase in milk production.
- Reduced lignin alfalfa has the ability to maintain quality when cuttings are delayed.
- Manure production could be reduced by about 3 million tons per year because of increased alfalfa digestibility.

Lignin and Its Affect on Alfalfa Quality

Lignin is an organic polymer that serves as a structural component in plants that is important for plant standability. Lignin fills the spaces in the cell wall between cellulose, hemicellulose, and pectin.1 It is the “woody” and the indigestible component of plant stalks and stems and aids in the transportation of water within the plant without leakage.2 Because of its indigestibility, it is the number one component of manure solids.3

The concentration of lignin within conventional alfalfa and other plants increases with plant age. Dairy operations generally prefer to have alfalfa harvested around the late bud stage of growth and beef operations prefer harvest around 10% bloom.4 Allowing conventional alfalfa plants to grow beyond the most desirable growth stages generally increases yield potential, but due to the increase in lignin, overall quality decreases. A reduction in the lignin content would increase the digestibility of alfalfa and allow for harvest to potentially occur up to 7 days after the plants are at their peak without a reduction in quality.3 According to the USDA Forage Research Center, a 10% decrease in lignin could result in a $350 million per year increase in milk production and a reduction in manure production of about 3 million tons per year.3

Reduced Lignin Research

Research conducted by Forage Genetics in 2015 demonstrated that HarvXtra™ Alfalfa with Roundup Ready® Technology provided a marked, and statistically significant improvement over the commercial check products used in the test for acid detergent lignin (ADL) and percent of neutral detergent fiber (NDFD) at every sampling date in the experiment (p < 0.05). The lignin content in HarvXtra Alfalfa with Roundup Ready Technology was greater than two LSD units lower than the commercial checks at every sampling date, and greater than 20% lower than any of the commercial check products at the last sampling date.1 The reduced lignin HarvXtra Alfalfa with Roundup Ready Technology product contains about 10 to 15% reduced lignin compared to related alfalfa lines without HarvXtra Alfalfa with Roundup Ready Technology.4

Best Management Practices

To realize the full potential of a HarvXtra Alfalfa with Roundup Ready Technology product, the first cutting should be harvested at the generally accepted time for conventional alfalfa products. The later cuttings can be delayed 7 to 8 days because the reduction in lignin allows for quality to be similar to the first cutting and yield potentially higher because of taller plants (Figure 1).3

For the 2017 growing season, this product is available across the U.S. and growers must direct any product produced from HarvXtra Alfalfa with Roundup Ready Technology seed or crops (including hay and hay products) only to U.S. domestic use. It is a violation of national and international law to move material containing biotech traits across boundaries into nations where import is not permitted. Growers should talk to their product purchaser to confirm their buying position for this product.

Sources

1Smith, R. Reduced or low lignin alfalfa: advantages for hay and grazing. University of Kentucky.
2Undersander, D., McCaslin, M., Sheaffer, C., Whalen, D., Miller, D., Putnam, D., and Orfolf, S. Low lignin alfalfa: redefining the yield/quality tradeoff.
4The development of HarvXtra™ alfalfa. 2014. Forage Genetics International, LLC.

For additional agronomic information, please contact your local seed representative.

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