Using the DewPoint Steamer to Minimize Leaf Loss During Hay Baling

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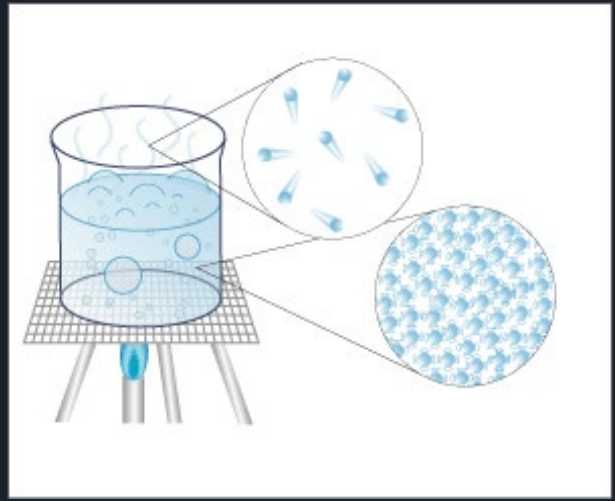
The Importance of Leaves

Leaf loss is one of the major factors negatively impacting harvested alfalfa forage quality. University of Wisconsin research has shown that leaf percentage accounts for 71% of the variation in forage quality. Leaves have a relative forage quality (RFQ) of approximately 550, while stems have an RFQ of only 70 to 80.


THE BIGGEST GAME CHANGER
IN HAY PRODUCTION

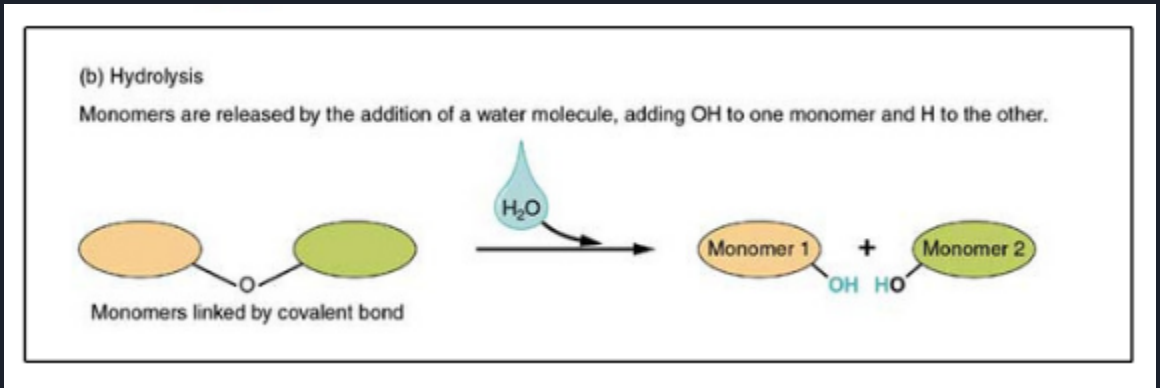
Why Use Steam?

- Steam is the hot gas that forms from water when it boils.
- 1 Gallon of Water Produces Around 1,700 Gallons of Steam.
- Unlike particles in the solid or liquid state, gas (steam) particles are widely separated and are free to move randomly.



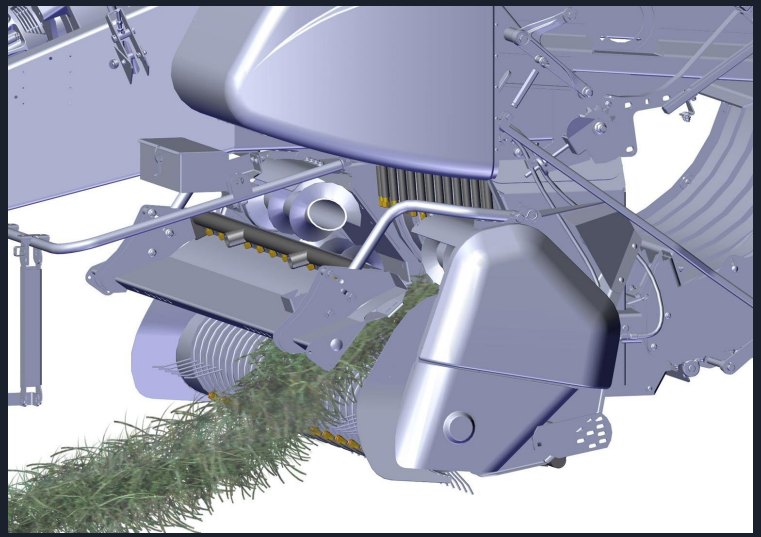
Steam Softens Cured Hay Through Hydrolysis

- Hydrolysis ("hydro" = water and "lysis" = break) involves adding water to one large molecule to break it into multiple smaller molecules.



Baler Hardware Design

- The treatment of the hay is accomplished by injecting steam through a series of distribution manifolds mounted in the baler.
- These manifolds are designed to reduce leaf loss.




Shelby Chesnut - Kersey, Colorado

Baling with Steam - University of Wisconsin Study

Steam vs Natural Dew Experiment

In 1998, Researchers at the University of Wisconsin conducted field experiments on the effects of steam on hay during the baling process. Two experimental conditions were evaluated in all tests. Baling at night when dew re-hydration was apparent (natural dew) and baling in the day with steam rehydration when the hay was less than 12% moisture.

Shinners, K.J. and W. M. Schlesser. Reducing baler losses in arid climates by steam re-hydration. Applied Engineering in Agriculture. 30(1):11-16.

Baling with Steam - University of Wisconsin Study of Wisconsin Study Continued...

Compared to baling with dew rehydration, steam re-hydration significantly reduced baler losses by an average of 58% (1.2% to 0.5%, respectively) for large square balers and 43% (0.7% to 0.4%, respectively) for 3-tie balers. Although not quantified, visual observation of steam re-hydrated alfalfa bales indicated that leaf retention on the stems was superior to that of bales formed with dew rehydration. Compared to bales formed with dew re-hydration, steam re-hydration increased bale density by an average of 20% and 30% for large and 3-tie bales, respectively.

Instituto Nacional de Tecnologia Agropecuaria

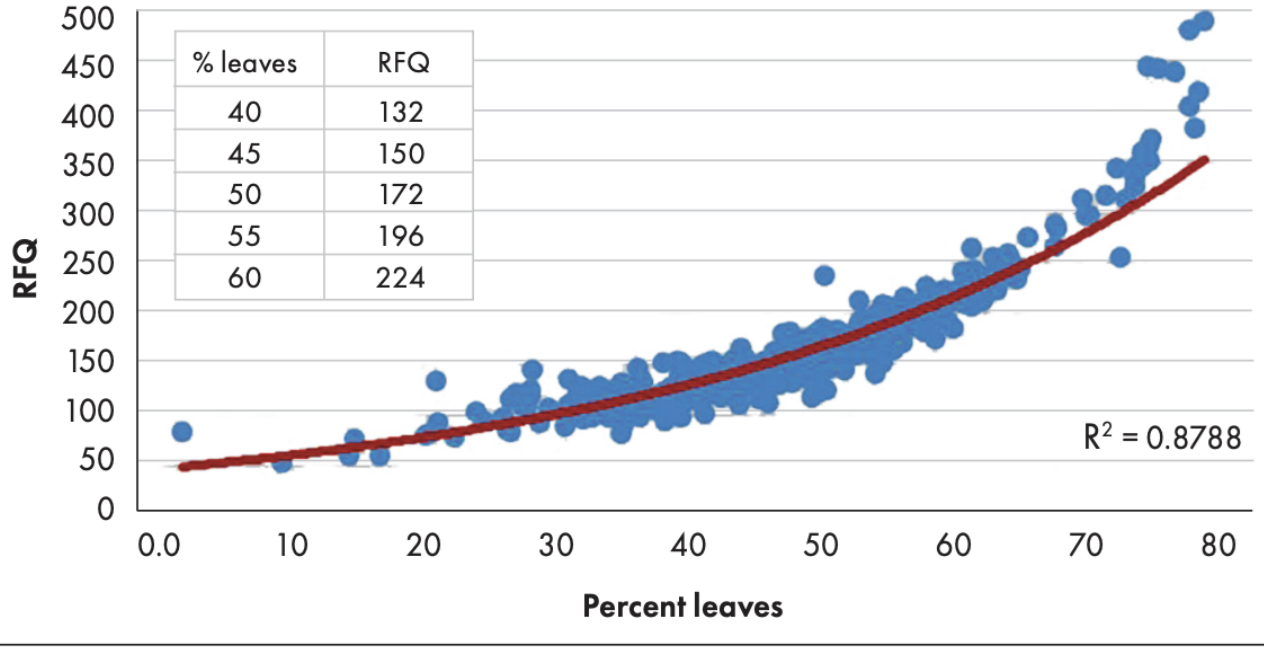
ALFABAN Field Test (Bernardo Noya) January 8 2021 -Tránsito Córdoba

- Adds 5% in windrow moisture, bringing it from 8% to 13%.
- The moisture values measured after 15 days are equal to the initial windrow moisture without steam.
- 41% reduction in dry matter loss during baling process.
- 15% increase in the weight and density of big bales.
- Increased working capacity of the equipment, tractor, and operator.
- Less break-up and leaf loss, 1.1% more crude protein.
- Benefits in appearance by better preserving its original structure.
- By increasing the hours of work, it increases the quality of life of all those involved.
- It provides predictability by being able to control moisture.

INTA

LEAF (Leaves Enhance Alfalfa Forage)

Figure 3. Influence of percent leaves on RFQ



David Weakley and Charlie Rodgers

The Significance - LEAF (Leaves Enhance Alfalfa Forage) Continued...

Takeaways:

- For every 1 unit change in leaf percentage, there was a corresponding rise or drop in RFQ of 4.6 units.
- According to Dan Undersander, professor emeritus extension forage specialist with the University of Wisconsin, a 1%-unit loss of leaves drops the value of the hay or haylage by $7 per ton. The declining value encompasses both yield and quality loss, with the latter making up the highest percentage ($4.60 per ton).

The Significance - LEAF (Leaves Enhance Alfalfa Forage) Continued...

Takeaways:

- According to LEAF the average leaf percentage of standing alfalfa is around 50%.
- According to LEAF 45% leaf percentage is ideal, 40-45% leaf percentage leaves room for improvement, and if leaf percentage falls below 40%, significant leaf loss has occurred

2 Areas Where Major Leaf Loss Can Occur During the Harvest

Raking

Baling

Reducing Leaf Loss While Raking and Baling

Rake Before the Hay Gets Too Dry

Bracken Farms - Utah

Bale with Steam

Bales Hay Sales - Arizona

What can the DewPoint 6210 Steamer DEW For You in Regards to Leaf Percentage

What can the DewPoint 6210 Steamer DEW For You in Regards to Leaf Percentage Continued...

Example:

- A 3-5% loss of leaf percentage during conventional dew baling would result in a $21-$35/ton loss (Undersander).
- By baling with steam we can reduce our leaf loss by 58% (University of Wisconsin) and make an extra $12-$20/ton due to increased bale density and quality (Undersander).
- With good raking practices and baling with steam, hay producers can make ideal hay (45% or higher leaf percentage).

*Results of baling with steam would be even more dramatic if compared to baling conventionally without proper dew conditions.

Thank you

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