The Science of Hay Preservatives

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Moisture management is critical to putting up high-quality hay. If baling is done when the hay is too wet, producers risk the possibility of mold, fungi and yeast growth – leading to excessive heating, as well as the development of harmful mycotoxins. Conversely, as hay dries out, leaf loss increases, which reduces tonnage, nutrient levels and profits.

A tight window for quality forage production presents its own challenges – amount of daylight, unpredictable weather, higher levels of precipitation and heavy overnight dew can make it difficult for producers to get the timing right. Moisture management is critical to hay production, and hay preservative is a valuable tool to help ensure a long lasting, nutritious product for livestock.

Spoilage

At moisture levels between 17 and 30 percent, mold, fungi and yeasts start to develop and multiply. This produces harmful mycotoxins, and gives hay a white and dusty appearance.

The chemical reactions involved in the growth of mold also produce a significant amount of heat. Hay baled at moisture levels between 17- to 22-percent will heat to over 115-degrees Fahrenheit, which causes discoloration and loss of the hay's fresh smell. Between moisture levels of 23- to 26-percent, hay can reach temps of over 125-degrees Fahrenheit in storage, causing brown to black hay with thick mold spores. Moisture levels of 27 percent or higher can result in heating to over 140-degrees Fahrenheit – hot enough to cause combustion if not managed properly.

The Science Behind Common Hay Preservatives

Buffered propionic acid is the most popular type of preservative used on hay between 16- and 30-percent moisture. While other acids can be used to preserve hay, propionic is the most effective in controlling the molds most commonly found in stored hay. Un-buffered propionic acid has a pH of less than 1 and is therefore very corrosive. The buffering process raises the pH level to 6 – the same as rainwater – making it safe to use around livestock, equipment and operators. However, in raising the pH, careful manufacturing procedures must be followed to prevent

The Science of Hay Preservatives, continued

neutralizing the propionic acid, which could make it much less effective.

New Holland's CropSaver™ is an example of propionic acid hay preservative that also features citric acid and surfactant. This combination allows for baling at up to 30 percent moisture while increasing the relative feed value (RFV) of hay baled. The ability to bale at higher moistures opens up the baling window and allows producers to beat the weather, work earlier in the morning and later in the evening, and produce greener hay with higher feed value without the risk of spoilage. It also does not clog application equipment and provides consistent coverage.

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Inoculants are another type of hay preservative. Inoculants are live bacteria introduced during baling to stimulate fermentation of the bale but are generally not recommended as a reliable way to preserve hay baled above 16-percent moisture due to variations in the fermentation process.

Other compounds found in some hay preservatives include:

Potassium sorbate – It is an excellent preservative for hay but is more expensive than propionic acid. Some manufacturers have cut the level of active ingredient back to be price competitive, leading to weaker products that may not keep hay from spoiling.

Silicone – A known wood preservative, it coats and seals the surface of wood to keep molding down. The complication in hay is that much of the moisture is on the inside of the plant and coating the surface with silicone has proven ineffective.

Sulphur – This is a low-cost preservative with significantly lower strength in controlling mold. Compared to buffered propionic acid, application rates should be five times higher to be effective.

For additional information on New Holland CropSaver Hay Preservative, visit the New Holland Parts Store.

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