Silage molds affect rumen health

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The occurrence of molds and their toxins in feed is an increasing global challenge, and multiple environmental pre-harvest and post-harvest practices may contribute to their increase. Moldy feed and mycotoxins have been associated with lower feed intake, reduced digestibility and health disorders in ruminants. An array of moldy silages present in moldy silage, some of which are not normally found in concentrates.

The mycotoxins of greatest concern are those produced by Penicillium spp., such as PR toxin, mycophenolic acid, roquefortine C and patulin.

Penicillium roqueforti is commonly found because they are acid tolerant and have a low oxygen requirement. Molds such as this high-growing mold, depending on environmental conditions. The distribution and extent of the spread of the molds and toxin formation in silage are highly variable. Molds have uneven growth in the silage, and the growth rate, production and stability of various mycotoxins varies.

Penicillium roqueforti is able to invade and degrade the corn and alfalfa components that have been identified in corn and grass silage. Silage is invaded by molds that have adapted to the growth of acid-tolerant yeast and molds. Penicillium roqueforti is commonly found because they are acid tolerant and have a low oxygen requirement. Molds such as this high-growing mold, depending on environmental conditions. The distribution and extent of the spread of the molds and toxin formation in silage are highly variable. Molds have uneven growth in the silage, and the growth rate, production and stability of various mycotoxins varies.

Penicillium roqueforti comes later in the silage period than some other mold toxins. This uneven temporal and spatial distribution of toxins creates challenges that are taken to detect a mycotoxin challenge.

**Mycoxins**

PR toxin has an antimicrobial effect and is considered a marker for problem silages (Sumarah et al., 2000). In cattle, PR toxin has been associated with reduced feed intake, rumen, urinary cigarette, antibiotic administration, abortion and reduced fertility.

Penicillae acid has antimicrobial effects can destabilize the rumen microbial flora. Roquefortine C is a neurotoxin. It has anticonvulsive and neuroprotective effects.

According to the International Agency for Research on Cancer, PR toxin is classified as a group 1, which means it is carcinogenic to humans.

**Diagnostic methods**

As mentioned, detecting mold toxins in feed is difficult and not very informative. A lot of research has been carried out to find diagnostic markers for a mycotoxic challenge in the animal such as Coelho et al. (2006). Various markers of metabolic distress are not unique to mycotoxins but can be used in making a diagnosis. Research is ongoing to find biomarkers, and researchers are currently developing a bovine signature that will be used to assist in the diagnosis of mycotoxicosis.

Gene expression analysis may also be a good approach to present biomarkers of effect when animals are exposed to multiple mycotoxins. When a mycotoxic challenge is suspected, a practical method is to feed a disease diagnosis drug with a broad-spectrum mycotoxin binder. If the clinical symptoms decrease or are assumed to naturally destroy the mycotoxin binder, then it is very probable that the mold is a mycotoxic challenge through the feed.

This approach avoids issues that arise with uneven sampling of materials and the difficulties of interpreting the risks associated with mycotoxin levels when they are found in combination.

**Silage management**

Silage is preserved feed where microbial processes have depleted the oxygen supply and lowered the pH through the production of organic acids. Silage management recommendations are designed to achieve an anaerobic and acidic environment to prevent further microbial growth. Under these perfect conditions, undesirable microorganisms will not grow.

Good silage management is very important for preventing moldy and mycotoxins. Plant stress needs to be minimized through optimized planting and harvesting times and proper moisture levels; packing and sealing are essential to ensure the exclusion of air. Inclusion of a silage inoculant optimizes the fermentation process and up to 15-30 cm should be removed daily to reduce fermentation.