



# SILAGE ODORS

## - WHAT THEY MAY TELL US AND WHAT THEY MAY NOT ...

Experts agree about many of the more common smells associated with silage. What surprises many producers is that lactic acid, the acid commonly cited as the most desirable for a fast, efficient fermentation has no discernable odor. The second most commonly observed silage fermentation by-product is acetic acid and it does have an odor. Most commonly that odor is likened to vinegar. The oddity of lactic acid being odorless and acetic acid having the typical vinegary, fermented smell often associated with good silage and silage that cows perform well on is quite ironic. The reason it is ironic is that often producers and nutritionists associate acetic acid with being an undesirable volatile fatty acid and associate it with decreased feed intake and reduced milk production. Unfortunately, acetic acid is typically more prominent in silages made too wet and the poor performance should be associated with the silage being too wet and other fermentation by-products which were the result of the silage being made too wet.

Corn silage occasionally has two other prominent odors, propionic acid and ethanol. Propionic acid has more of a tendency to sting the nose tissues as opposed to a distinct smell. Ethanol smells similar to rubbing or medicinal alcohol and can also be astringent. In haylages (alfalfa, grass, small grain etc.) there often are smells associated with butyric acid or clostridial fermentation. In reality, these smells reported as butyric can be a mix of the butyric acids plus many other compounds that result from protein degradation and result in the extremely strong, offensive odors all being lumped together as "butyric". It is not uncommon for these silages to also have a strong ammonia component.

Earthy odors can result in wet silage from *Bacillus* as can the classic burnt tobacco smell in dry haylages from *Bacillus* or molds. Unfortunately forage laboratories commonly test for only lactic, acetic, butyric and iso-butyric acids plus ethanol and ammonia nitrogen. We are left to try to describe how silages smell with these few familiar terms when in fact there are more than 100 compounds produced during fermentations and many result in odor such as acetone, mycophenolic acid, butanone, propanol, 2 butanol, esters, ethanol, propyl esters, ethyl acetate, ethyl formate, methyl sulfide, methyl acetate, various butyrates, acetic acid, propionic acid, butyric acid, propyl formate, methanol, aldehydes and other compounds

**Conclusions and solution** - Although having subjective evaluations done by a specialist on the farm is helpful it is still best to collect a good composite sample of the feed(s) in question, freeze them, send them into a laboratory for a wet chemistry fermentation analysis. These results combined with on the farm observations regarding silage quality and animal performance allow the best interpretation of exactly what substances are present and how to proceed to improve the quality of future silage crops.