

Keep These In Mind When Ensiling

Comments Of The Ensiling Process

In looking at the normal ensiling process, there are a number of related points that should be kept in mind.

12. Temperature. The development of warm silage during the ensiling process is not necessary for the production of quality silage, although so-called "cold storage" with high moisture hay crops may suggest clostridia-type activity. The best temperature for lactobacilli is in the 25-30 degrees C range (75-90 degrees F).

13. Heat Buildup. Air is normally required for any appreciable heating to occur. Heat is the result of plant respiration and the by-product of microbial activity. If the temperature in an ensiling mass continues to build, a point

will be reached (approximately 45 degrees C or 115 degrees F) where serious changes will begin to occur in the protein component of silage. Heating causes a darkening of color or "browning" effect, in which parts of the silage protein (amino acids) are bonded chemically to the soluble sugars, forming a brown, lignin-like material which is indigestible to animals. Thus, heating causes a protein tie-up, thereby lowering the digestibility of the silage. This problem is the greatest in low moisture silages which are less dense and more open to continued air infiltration. The degree of tie-up is dependent on the temperature reached and the length of the heating period. Of course, in addition to this type of loss, the fact that heating occurs means energy (dry

matter) is also lost, thereby reducing both the quality and the quantity of the feed.

14. Silo Fires. If the aerobic conditions for a sufficient length of time, the temperature of the ensiling mass will continue to rise to the point where, under certain conditions, spontaneous combustion will occur. This type of problem is most apt to occur with whole-plant silages in the 24-45% moisture content range stored in a non oxygen-limiting environment. Silo fires, although most prevalent in conventional, top-unloading silos, also occur in controlled atmosphere silos which are not maintained properly (i.e. develop air leaks).

15. Silage Additives. Under normal ensiling conditions, there are sufficient numbers of lactoba-

cillus bacteria on the plant material going into the silo to ensure the rapid production of lactic acid environment. However, under some conditions, there may be an advantage in the addition of either selected strains of lactobacillus or enzymes that aid the growth of existing acid producers.

16. Acid Production. The moisture content of ensiling matter plays a large part in the fermentation process. In addition to its direct effect on air exclusion (influences silage density), it also affects acid production. Bacterial activity is lower in low moisture material, resulting in incomplete fermentation (higher pH). This reduces the protection of the silage from spoilage organisms. On the other hand, with high moisture content material, a greater amount of acid is required, since the acid is diluted by the contained water. This may add to the fermentation problem with some plant material such as alfalfa, which already has a low sugar content, so necessary for acid production.

17. Seepage. In the extreme, where silage seepage occurs, this material, although relatively low in nutritional value, still contains the most soluble portion of the plant material. The WSC lost results in a reduced level of readily available sugars for fermentation. Seepage is caused: a) by the pressure of overlay material and b) as a by-product of the initial (aerobic) phase as a result of the

collapse of the plant cells once respiration has stopped. The optimum moisture content range for efficient fermentation is 55-65%. Within silo losses (open silos) are the least at the same moisture content range.

18. Proteolysis. One of the actions which occurs during the ensiling of forage is a degradation process called proteolysis. This is a process which results in the conversion of protein present in fresh herbage to various non-protein nitrogen (NPN) constituents. Many NPN compounds are highly water soluble and are poorly utilized in the rumen of cattle. There is extensive absorption of these compounds through the rumen wall and subsequent excretion by the animal. It is highly desirable, from a nutritional standpoint, that protein not be degraded and made water-soluble in the rumen, but pass through to be utilized in the lower intestine. Proteolysis in silage is the result of the activity of plant enzymes called proteases and various micro-organisms. This process becomes quite rapid once the crop is cut. The rate of proteolysis is affected by forage species (higher in legumes), silage moisture content, pH, and temperature (all less at lower values).

Reduction in silage quality because of proteolysis can, to a large degree, be prevented by following good ensiling and silo management principles.

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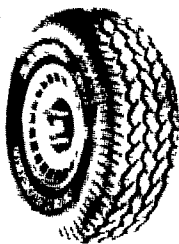


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