

ADVERTISEMENT

## A Comparison of Higher-Moisture vs. Lower-Moisture Ensiling

by Dr. Donald A. Sapienza, Research Biochemist, Microbial Genetics Division, Pioneer Hi-Bred International, Inc.

**S**ilage makers are sometimes tempted to avoid problems such as excess seepage, spoilage or undesirable odor by ensiling crops at moisture levels of 60% or less. Although this may prevent some problems, it can cause others — resulting in less-than-optimum recovery of dry matter and nutrients from the silo at feeding.

There are several specific advantages to ensiling crops at higher moisture — within the range of 63-68%. (This range applies to conventional upright silos measuring approximately 14 ft. in diameter and 50 ft. in height. The moisture range for bunker or pit silos would be higher; the range for sealed structures would be lower.)

### 1. Lower Field Losses

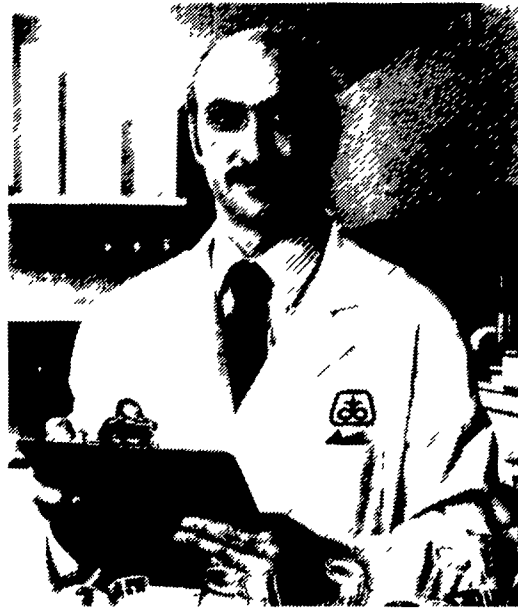
Field losses for corn harvested for silage at 65% moisture average only 4%. However, losses increase to 16% when the moisture level at harvest falls below 60%.<sup>a</sup> These increased losses are due mainly to leaf and ear drop and downed stalks.

Field losses for hay crops harvested for silage are only about 2% at 70% moisture, but increase to 8% at the 55% moisture level.<sup>b</sup> Dropped and shattered leaves account for most of the increased loss, meaning that a significant amount of valuable protein is left in the field.

### 2. Less Heat Damage

Ensiling dryer forage increases the difficulty of packing the silo well, and may result in less air being excluded. Increased air penetration can encourage mold growth and result in higher fermentation temperatures. Ensiling dryer forage can also cause higher temperatures when the silage is fed out. Aerobic stability or bunk-life studies measuring temperature rise and dry matter loss of silages during aerobic exposure at feeding show about a 3% loss in dry matter with each 10° rise in temperature.

Ensiling temperatures greater than 100°F can also reduce protein availability to animals. Although high fermentation temperatures can produce



a pleasingly sweet, tobacco-like aroma, the resulting 'caramelized' silage is usually lower in feed quality. Ensiling at 65% moisture allows for better packing, reduced overheating, recovery of more dry matter and increased protein availability.

### 3. More Digestible Dry Matter

The comparative chart below helps disprove the once popular belief that the only thing higher-moisture silage offers over lower-moisture silage is more water. Generally speaking, the percentage of digestible dry matter in corn silage ensiled at 65%-70% moisture is approximately ten percent greater than the same crop ensiled at 55% moisture.

Per Acre Comparisons	Silage Moisture	
	70%	57%
Green Wt., lbs.	40,000	30,000
Dry Matter Produced, lbs.	12,000	12,900
Total Loss (Estimated harvest & storage losses)	17%	22%
Feedable Dry Matter, lbs.	9,960	10,062
% Digestibility	63%	57%
Digestible Dry Matter, lbs.	6,275	5,735

The more efficient fermentation obtained by ensiling at higher moisture also reduces the chances of re-fermentation, overheating and yeast and mold growth when the silage is re-exposed to air.

### 4. Reduced Weather Risk

Weather can also play an important part in the ensiling process. Too much rain or sun can rob silage crops of valuable nutrients. By ensiling at higher moisture, the silage maker can reduce the chances of bad weather causing a reduction in feed value. This is particularly true with hay crops cut for silage.

Silage makers can take advantage of the benefits of higher-moisture ensiling — while avoiding the drawbacks — by using Pioneer® brand 1177 silage inoculant. 1177 contains specially selected strains of lactic acid-producing bacteria which bring about a rapid, efficient homolactic fermentation in the silo. This modified fermentation helps reduce the problems of seepage, spoilage and overheating which are often associated with higher-moisture silages. A homolactic fermentation also results in more efficient conversion of plant sugars to acids. These acids can be used directly by the ruminant animal for conversion to meat or milk.

By using 1177, the silage maker can also reduce weather risk. Corn can be harvested for silage earlier in the season, when plants are closer to their nutritional peak. And using 1177 on alfalfa harvested at higher moisture makes same-day harvesting practical (on a good drying day), and minimizes the risk of overnight rain damage to cut alfalfa.

<sup>a</sup>S.A. Dum, R.S. Adams, J.E. Baylor & A.R. Grout, "Silage & Silos," Penn State University special circular 223.

<sup>b</sup>Timothy Logan & Donald Hillman, 1975, "Preserve the energy and protein of forages," Michigan State University extension bulletin E-803.

One in a series of articles devoted to improved silage making and sponsored by Pioneer Hi-Bred International, Inc. 1177 silage inoculant is available from your Pioneer sales representative. Ask him for more information about it.