

# Oxygen In baled silage making

In this article, Dr. Dave Davies of Silage Solutions Ltd discusses the importance of excluding oxygen from the bale during silage production.

As with clamp silage making it is important to minimise air ingress during bale silage production. Key to this are:

- Producing high density bales
- Keeping oxygen out during storage

#### Oxygen results in:

- Lower sugar
- Higher acetic acid

#### Greater Dry Matter losses:

- Higher numbers of yeasts, moulds and enterobacteria - the undesirable microorganisms.
- Higher risks of aerobic spoilage during feed-out

#### Key baling points

Bales should have defined edges so the film wrap adheres more closely to the contours of the bale so that less oxygen is trapped inside. Defined edges mean there are less lumps. Such contusions can result in the film being under/overstretched which reduces the oxygen barrier making the bale more prone to damage.

Bales should be chopped to improve density. This reduces the amount of oxygen trapped in the bale and releases sugar to encourage a more rapid fermentation leading to increased silage quality and reduced growth of undesirable microorganisms.



#### Where to wrap

Bales should be wrapped as quickly as possible but ideally not in the field. Dropping a well wrapped bale on to the recently cut sward results in the very real risk of film punctures by stubble or stones. Further damage can occur when wrapped bales have to be picked up and moved to the stacking site. Any damage to the film allows oxygen to enter the bale. If unnoticed such damage will allow oxygen unfettered access for the entire storage period. Holes caused by stubble or stones are small, but oxygen is smaller!



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### Moving wrapped bales

If wrapping in the field, move bales from the field as quickly as possible, ideally within 2 hours but definitely within 12 hours. Moving bales after 12 hours significantly increases the risk of oxygen penetrating the bale. Similarly, moving bales once fermentation is underway risks damaging the wrap and opening up the seals between film layers thus introducing oxygen. Therefore, if bales have not been moved within 12 hours leave them in situ for two weeks. However even when moving them after this period there is a significant risk of introducing oxygen because the bale will have been handled with a grab. Grabs squeeze a bale to pick it up and in doing so often squeeze the CO<sub>2</sub> in the bale and so forces it out. Once the bale is placed on the ground, the grab releases the bale and thus causes a potential vacuum which pulls air in from outside the bale.



### At the stacking site

Bales should be stacked on a level surface free from sharp objects, but preferably on a hard core surface. When bales are stacked on pasture there is a risk of burrowing invertebrates, such as wireworms, puncturing bales. The surface must be at least 10m away from any water courses. It is important to protect the stack from rodents using suitable bait.

The stack should also be netted to protect it from bird and domestic pet damage.



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