

Film&Film Wrapping: Tested in the field

The science and production techniques used in baled silage production have advanced considerably in recent years with the launch of several next generation balewraps all of which work to improve silage quality whilst minimising forage losses. This trend looks set to continue with the advent of Film&Film wrapping, a bale wrapping system rapidly gaining popularity across Europe that has recently been proven in a commercial farm trial in the UK.

The Film&Film (F&F) wrapping system involves the use of a wide width polythene film, known as Baletite, to hold silage bale contents together before the bale is wrapped with balewrap. Thus, rather than applying netwrap to bind the bale, a polythene film is applied. Those testing the F&F wrapping system in the field over the last 3 years realised that this technique has several advantages over traditional netwrap, but minster films (manufacturers of Baletite) understood that, like all new developments, Baletite had to be tested by an independent expert in order to evidence its benefits.

In 2013 minster films commissioned Dr Dave Davies from Silage Solutions Limited to formally assess this new wrapping system. Dr Davies, an expert in Rumen/Silage Microbiology and an Honorary Professor at Szent Istvan University, Hungary, was the principle research scientist at the UK's Institute of Grassland and Environmental Research prior to his work providing silage consultancy services.

In July 2013, Dr Davies commenced a trial to examine the F&F wrapping system on a commercial sheep and beef farm in the United Kingdom where he oversaw the production of 44 silage bales from one field of a grass ley that had been cut the previous day and wilted for approximately 24 hours. The baler used was a McHale Fusion combi-wrapper fitted to apply either netwrap or Baletite. To ensure similar grass was

ensiled in each treatment the fixing method was alternated between netwrap and Baletite circa every 8 bales. Once wrapped, bales were immediately transferred to the farm yard on trailers where they were stacked and netted to prevent bird damage.

Treatment	Number of layers of binding material	Number of layers of Balewrap
Control Group: 22 bales	2.25 layers of netwrap	6 layers of 25µm balewrap
F&F Group:	3.5 layers of Baletite	6 layers of 25µm balewrap

In early February 2014, 206 days after ensiling, 12 bales from each treatment were opened and assessed for silage quality as follows:-

- Pressure test – the object of this test was to see how quickly, once a vacuum had been made in a bale, the pressure returned to normal atmospheric levels.
- Mould assessment – an examination of mouldiness by removing all mould present in a bale and weighing it to assess the percentage of the bale affected.
- Silage analysis – the removal of a cored sample from each bale that was subsequently sent to an independent laboratory for standard silage analysis.

The results of the on-farm assessment provided some very interesting findings:

- The pressure test indicated that the Baletite bales took 160 seconds longer than the netwrap treated bales for the

vacuum to be removed thus showing a much better seal for the Baletite bales than for the netwrap bales.

- The Baletite bales had a much lower mean mould weight per bale at 5.45kg FM (Fresh Matter) compared to 23.92kg FM for the netwrap bales.

- It is also worthy of note that, where a bale had been damaged, the Baletite bales had a maximum mould loss of 25.6kg, compared to the equivalent loss on the netwrap bales of 72.6kg – a result that highlights the importance of good bale management

to avoid damage post wrapping.

- The total silage losses, where storage losses plus mould losses were added together for each bale showed that the netwrap bales lost on average over twice as much DM as the Baletite treatment.

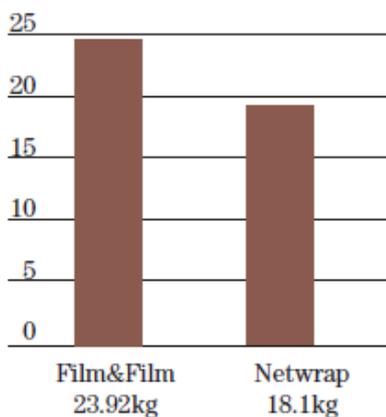
Following on from the on-farm assessment, the chemical analyses of the silages received from the laboratory indicated that the Baletite treated bales had better quality silage:

- The netwrap bales had a lower DM than the Baletite bales indicating the netwrap bales had higher DM losses.
- Baletite silages had higher sugar levels: 89g per kg DM compared to 70g per kg DM for netwrap silages.
- Baletite silages also had a lower pH: 4.46 compared to 4.52 for netwrap silages.

	Control	F&F	% Change
Average FM per bale (kg)	863kg	871kg	
Average DM per bale	277kg	297kg	
DM losses (moulds) ¹	8.64kg	1.69kg	-80%
TFA ² (g/kg DM)	115	100	-13%
Sugar (g/kg DM)	70	89	+27%
pH	4.52	4.46	
DM losses (storage)	5.33kg	4.93kg	-7.5%
Total DM losses (storage + mould)	13.97kg	6.62kg	-52%
Total % DM Losses	4.51%	2.23%	-50%

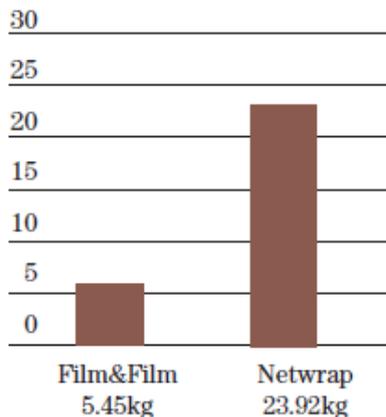
1. Kg of DM fodder physically removed from bale to take out the mould spot.
2. TFA (total fermentation acids).

Sugar by kg FM per bale type



Average sugar levels by Kg FM
Average bale tested = 850kg

Mould losses by Kg FM



Average mould losses by Kg FM
Average bale tested = 850kg

- The results showed a lower level of ammonia-N in the Baletite bales compared to the netwrap bales. The Ammonia-N concentration in a silage sample provides a gauge of protein breakdown and the lower the level is, the less protein has been degraded.

The table on the previous page contains the key findings from the laboratory analysis. In summary, this trial, undertaken in working farm conditions demonstrated that the Film&Film wrapped bales had:

- 7.5 % less DM losses on F&F bales compared to netwrap bales due to an enhanced fermentation process.
- 80 % less DM losses on F&F bales compared to netwrap bales due to mould formation on the bale.
- an overall 52% reduction on F&F bales compared to netwrap bales in DM losses.

The reduced losses that resulted through the use of the F&F wrapping meant that the farmer on this farm gained more forage to feed to his herd.

It is important to note that, for a dairy farmer, preserving forage more successfully would provide a significant financial benefit as follows:

- This farmer gained an average of .35kg DM (Dry Matter) per bale using the F&F wrapping system.
- As 1kg of Dry Matter = 11.8 MJ ME (Metabolisable Energy), this means that the farmer gained 86.73 MJ ME per F&F bale (7.35 kg DM x 11.8 MJ ME).
- In order to produce 1 litre of milk you need: ± 5.8MJ/litre MJ ME.
- Therefore the 86.73MJ ME averagely gained for each of the F&F bales could give an additional 15 litres of milk production (86.73 / 5.8 = 15 litres).

To put it another way: 15 litres of milk would be lost for each of the net-wrapped bales.

Speaking of the trial findings Dr Davies commented: "The Baletite treated bales in this farm trial evaluation showed better silage fermentation quality and lower losses than the netwrap treated bales. This can be explained by the fact that the Baletite product excludes more oxygen from the bale which promotes a faster fermentation in the early stages whilst maintaining a more oxygen free environment during the entire time the bales are in storage."

The benefits demonstrated in the above farm trial have also been seen by farmers and contractors already using the F&F wrapping system. Two such farming enterprises who investigated Baletite as a netwrap alternative over two years ago are Fenwick Jackson, a sheep and beef farmer located in Scotland along with a neighbouring sheep farm business run by farther-and-son team Jim and Dave Sutherland.

Both farms utilise silage to feed sizeable sheep and beef herds. As progressive farm businesses they researched the emerging F&F wrapping system back in 2012 to see what benefits the system offered before approaching Krone UK to enquire about buying a balewrapper capable of applying film instead of netwrap. In the intervening two years each farm has experienced similar outcomes with their F&F wrapped bales namely; a better bale shape, a visibly better bale and enhanced silage quality. Speaking of the silage produced via the F&F wrapping system, Dave Sutherland commented: "The bale shape is fantastic with F&F bales and you can visibly see the difference when you open an F&F

Netwrap bales took just 20 seconds for the vacuum to be removed

20

Film&Film took 180 seconds for the vacuum to be removed

180

bale in terms of silage quality." He continues: "We opened the F&F bales along with a few netwrap bales for comparison and you can see that the F&F bales are much better. Having made both types of bales over the last two years, we have found F&F bales to be better protected."

Fenwick Jackson concurs adding that in addition to an enhanced silage quality he has found F&F bales easier to open, more robust in handling and to be more resistant to forage spoilage. Fenwick cites the case of a farmer who handled an F&F bale roughly resulting in a significantly large hole that was not subsequently repaired. Several months later when the bale was discovered and opened the spoilage caused by oxygen ingress via a circa 10cm hole was limited to the area immediately surrounding the film puncture with the remaining silage still being usable.

Aside from the type of silage quality enhancements available through F&F wrapping, the system also enables automation of the feeding process and easier recycling after use. If using a bale handler and mixing wagon it is possible to feed out the bale contents with minimum human intervention. A further benefit of the system is that Baletite is easy to remove from the bale as no fodder can become enmeshed in it as with netwrap. Users also benefit from a quicker recycling process as, unlike netwrap, Baletite does not have to be separated and segregated from balewrap after removal in order to be recycled as both films are manufactured from the same base material.

With the recent launch of the McHale Fusion 3 Plus combi-wrapper adding to the growing number of machines capable of applying netwrap replacement film, the quality and convenience benefits of the F&F wrapping system will soon be available to even more farmers and agricultural contractors. ■