



# BINDING AND BALE DENSITY STUDY IN GRASS SILAGE

## STUDY CONTACT:

Nils Zehner - Agronomy and Farm Solutions  
nils.zehner@agcocorp.com

## OBJECTIVE:

The objective of this study was to evaluate fermentation and feed quality in round bale grass silage baled with different bale density and binding material (net and film) using the Fendt Rotana 130 F Combi round baler.

## STUDY DESIGN:

The study was carried out on the Swiss Future Farm during the 2022 season. This was focused during the 3rd cut in the first week of July 2022. A Fendt Rotana 130 F Combi round baler equipped with net and film binding system was used (Figure 1). The following settings for baling were tested:

No. of bales	Bale Density	Binding	Wrapping
3	Medium (6)	Net (3 layers)	8 layers
3	Maximum (10)	Net (3 layers)	8 layers
3	Medium (6)	Film (4.5 layers)	8 layers
3	Maximum (10)	Film (4.5 layers)	8 layers

*Table 1. Baler settings applied for the SFF 2022 Bale Density and Binding Study in Grass Silage.*

The trial plot was located in a legume-rich, temporary grassland field with homogeneous grass stand conditions. Grass for all treatments was mowed and tilled on 5th July, and raked and baled the following day.

A baseline sample of the fresh mass grass stand was taken on the day of baling (5 samples across the trial field) and submitted for laboratory analysis (UFAG Laboratories, Sursee, Switzerland) to characterize the nutritional value and for later assessment of feed and forage quality of silage bales after the examined storage period.

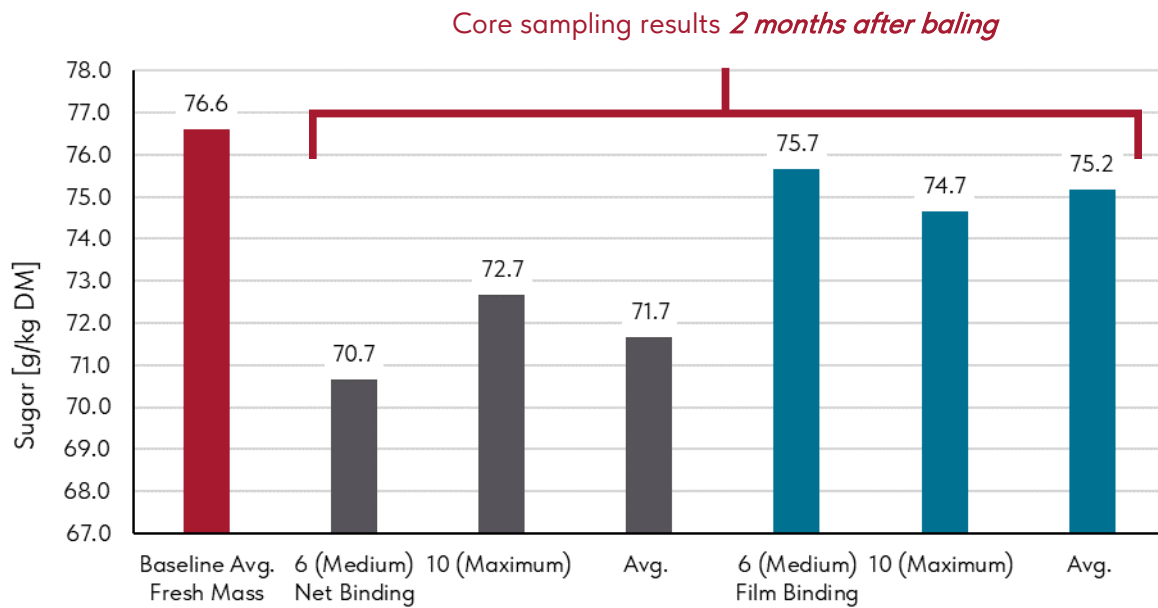


**Figure 1.** Fendt Rotana 130 F Combi round baler with film binding option (left) and legume-rich temporary grassland on the trial field (right).

## RESULTS:

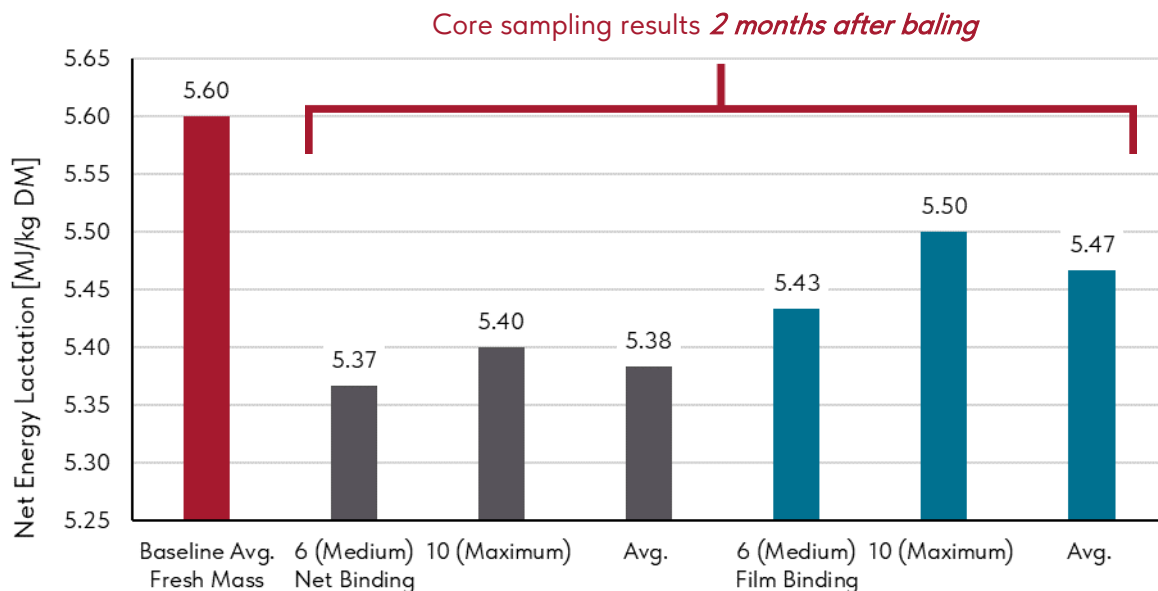
Bale core samples were taken in intervals of 2 months and 7 months after baling to determine fermentation and feed quality parameters via laboratory analysis at UFAG Laboratories, Sursee, Switzerland.

Core sampling results for 2 months after baling show that higher sugar content could be retained in silage bales with film binding, which differs marginally from sugar content of the fresh mass sample with -1.4 g/kg DM, whereas silage in round bales with net binding showed higher reduction of sugar content with -4.9 g/kg DM (Figure 2).



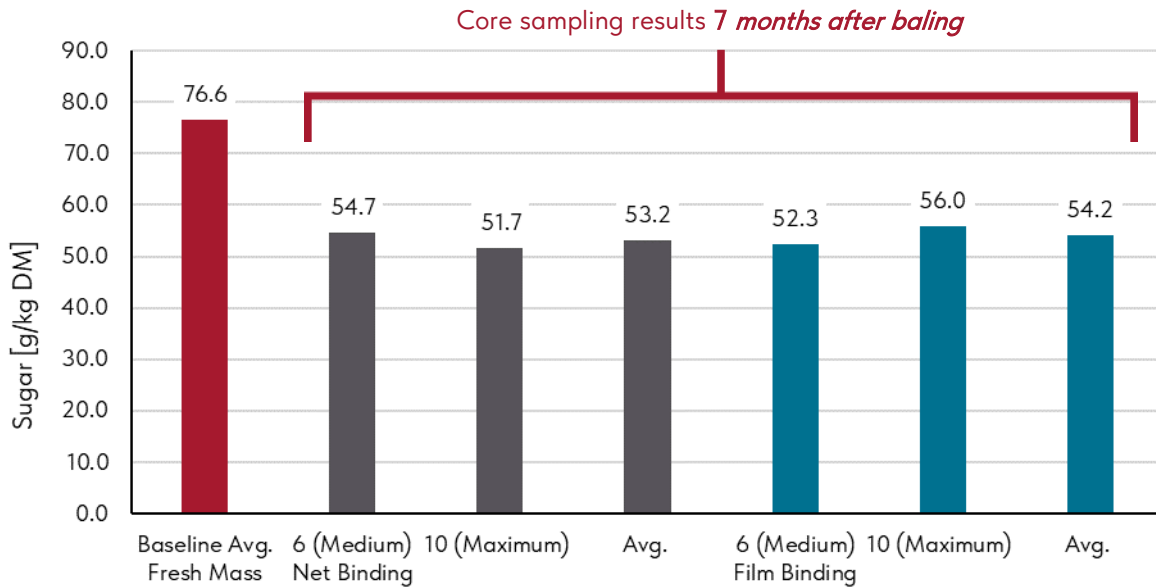
**Figure 2.** Sugar content results of the SFF 2022 Bale Density and Binding Study in Grass Silage after 2 months storage period.

Energy content was higher in bales with film binding after 2 months storage period, whereas in silage bales with net binding it was around 0.1 MJ NEL/kg DM lower (Figure 3). These results are in line with the better conservation of sugar content found when comparing net and film binding bales versus the fresh mass baseline sample.



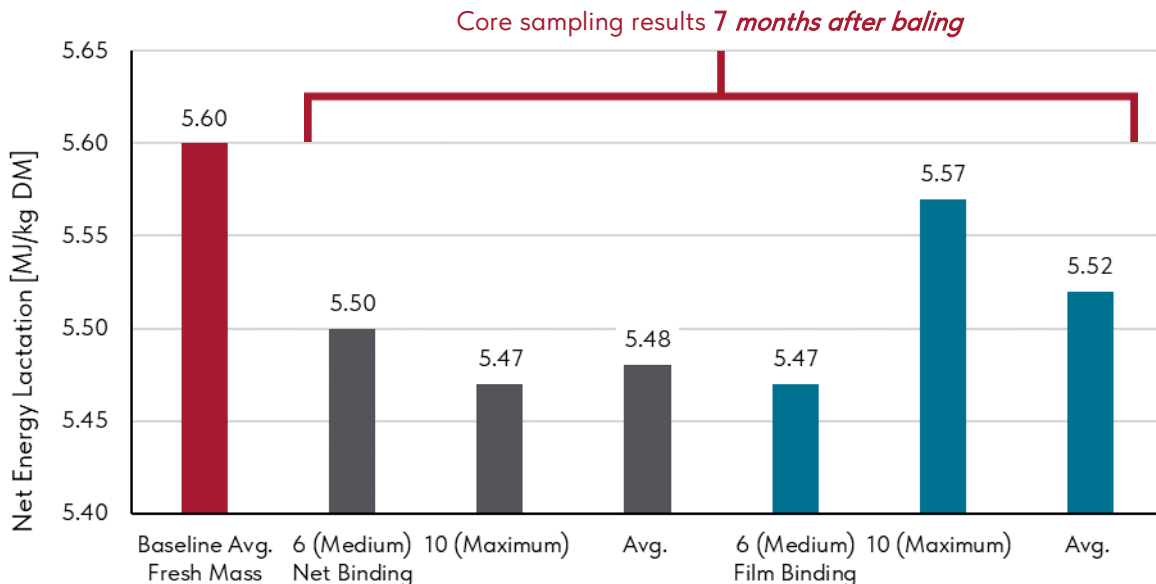
**Figure 3.** Energy content results of the SFF 2022 Bale Density and Binding Study in Grass Silage after 2 months storage period

Marginally higher sugar content retained in silage bales with film binding after long-term storage of 7 months (Figure 4). However, the value to be obtained for the sugar content of 50.0 g/kg DM for grass silage after this storage period was reached with all applied bale densities and binding types.



**Figure 4.** Sugar content results of the SFF 2022 Bale Density and Binding Study in Grass Silage after 7 months storage period.

For maximum bale density (10), the feed energy content was better preserved with film binding, whereas for net binding it was around 0.1 MJ NEL/kg DM lower after 7 months of storage period (Figure 5).



**Figure 5.** Energy content results of the SFF 2022 Bale Density and Binding Study in Grass Silage after 7 months storage period.

## FINANCIAL:

At an annual dry matter yield of 10.0 t/ha in grassland, increased energy content by 0.1 MJ NEL/kg DM from 5.4 to 5.5 MJ NEL/kg DM using the film bind option for production of round bale silage as found in this study, results in additional 305 kg milk per hectare. Given a milk price of 0.50 EUR/kg, this is an additional income from milk of 152.50 EUR/ha of grassland.

At a purchase price of 9085 EUR for the film binding option, the investment is amortized within 60 hectares.

### Assumptions for payback:

1 kg of milk (ECM: 4.0% fat, 3.4% protein) requires 3.28 MJ NEL.

Milk price 12/2022: 0.50 EUR/kg

List price film binding option: 9085 EUR

## CONCLUSIONS:

Fendt Rotana 130 F Combi round baler can be ordered with the direct film binding option.

With film binding, the bales are pressed and wrapped exclusively with film.

Forage losses are reduced due to higher fermentation stability.

The option for net binding is still available.

The positioning of the rollers allows fast switching between film and net binding.

This allows drivers to switch quickly from silage bales to straw bales in tight time windows.