Filling Feed Gaps – Hay vs silage production for the Eyre Peninsula

This document provides detailed comparisons between the Eyre Peninsula hay samples collected in December 2023 and collated by Tim Prance in March 2024. These results complement the *Filling Feed Gaps - Hay vs silage production* fact sheet which can be downloaded from the AIR EP website.

NDF (NEUTRAL DETERGENT FIBRE) AND ADF (ACID DETERGENT FIBRE)

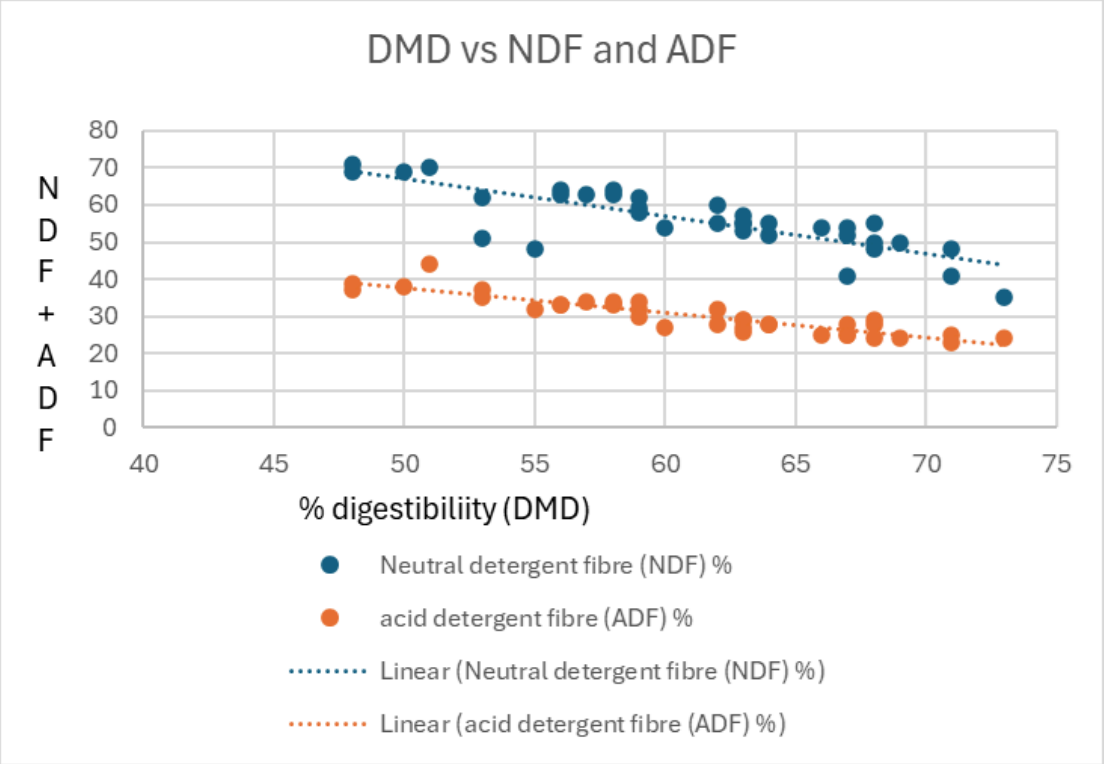

Figure 1. Demonstrates the relationshop between ADF, NDF and ME/digestibility for 35 hay and silage samples collected from the Eyre Peninsula in December 2023.

The ADF line is more closely related to digestibility than the NDF line, but both are similar.

In the NDF line, the two medic Samples 17 and 24 (from 2022 season) are clearly outliers (see blue dots above). They had a low NDF of 48% and 51% respectively which is high for medic (usually NDF 35-40%), yet still resulted in very low digestibility of 53% and 55% respectively. I suspect this is due a lot of rain between cutting and baling, and subsequent long curing time during which they also lost sugar + pectins (digestible fibre) and suffered leaf loss, leaving just stalks.

Feed Test Lab reported very high yeast levels from hay samples tested in 2022, suggesting high levels of bacterial activity on cut hay lying on the ground, which would have resulted in significant leaf loss, especially medic, clover, lucerne or vetch hay.

As in most areas of SA, the 2022 hay would have been rain affected in addition to being cut late = less leaf and more stalk = higher NDF/higher ADF and lower DMD and lower ME (samples 26& 27)

If % of sugar is lost, then % of fibre must increase!

However Sample 19 (cut and baled in 2022) tested 9.8 ME (with a NDF of 53%) shows you can make good hay in a wet spring, although may have been baled a little on the wet side with 15% moisture.

Silage Sample 12 with an ME 8.1 is an expensive mistake. Cut too late (NDF 70%), especially for ryecorn and annual grasses, resulting in minimal or no vetch in the silage (crude protein only 9%).

CRUDE PROTEIN

Low protein cereals (less than7%) from 2023 (see example Samples 30, 35, 7, 10, 11 and 20) suggest these crops would have responded to more N fertilizer between sowing and end of tillering compared to cereal Samples 29, 25 and 34 with protein % over 13%.

METABOLISABLE ENERGY (ME)

Samples 1 and 2 are very good results with low NDF/ADF, high digestibility and ME, and very high crude protein. This shows the benefits of making good clover hay. Sample 2 (balansa clover) however may have been cut late in 2022 after the rain? This sample shows the benefits of planting late maturing clovers (and ryegrass) which means they can be cut later (therefore less chance of rain damage) without being too mature. Note: Although the NDF levels of Samples 1 and 2 are very low, the fibre content is still adequate for ruminant animals.

Samples 22 and 23 are also good results for cereal hay from 2022, with very high ME and low NDF/ADF. Both of these samples had very high water soluble carbohydrate levels (high sugar) suggesting they were cut early/on time and also baled soon after cutting.

Often frosted crops have high water soluble carbohydrate (sugar) levels (see Samples 35, 5 and 6) which makes them very palatable. Unfortunately, high sugar can also increase the incidence of heating in hay, especially if it is slightly wet, as both moisture and sugar increase the bacteria load - so take care with storage, especially square bales!

Sample 20 being oaten hay made in 2023, was much lower ME than Sample 21, oaten hay made in 2022. But the NDF/ADF provides the reason! Both are much higher in 2023, suggesting the 2023 oaten hay was cut too late.

The difference in ME and feed quality between silage Samples 31 and 32 is timing of cutting (NDF of 48 vs 67) plus the Sample 31 (higher ME) probably contained more vetch (because it had much higher protein). This could have been a timing of cutting (too late) or a timing of raking (too dry) - or both.

HAYLAGE VS SILAGE

Haylage is very dry silage, containing only 25-30% moisture compared to 50-60% moisture for baled silage. Haylage contains much less water and therefore cheaper per tonne dry matter. Haylage still has to be wrapped to exclude air, but also relies on very high density bales to ensure no air is trapped inside the bale. This usually means baling with a large square baler. There will be minimal fermentation, so is unlikely to be silage as the pH of the final product will be close to neutral. Weed and grass seeds won't be "pickled" as in low pH silage, and haylage won't last as long as low pH silage. A pH and volatile fatty acid analysis test is a very good way of evaluating silage – see *Filling Feed Gaps - Hay vs Silage production for the Eyre Peninsula* fact sheet for this information.

Sample 33 dry silage (haylage) has a very good ME, which shows you can make good haylage if the bales are well wrapped and dense so that there is minimal air trapped inside. Less water means haylage can be very cost effective (c/MJ ME)

HAY MIXTURES

I question the advantages of this practise unless the seeding rate of the vetch/clover is very high (e.g. 40-50 kg/ha and 10 kg/ha respectively), and the cereal/ryegrass seeding rate very low (e.g. 30-40 kg/ha and 5 kg/ha respectively).

As part of the SA Drought Hub Filling Feed gaps project, I monitored two oat/vetch crops from just before cutting to baling. One oat/vetch silage crop contained 30% vetch pre-cutting with none present in the silage, whilst another sown as an oat/vetch mix contained only 5% vetch pre-cutting, but no vetch was present in the silage. To evaluate a feed test, the % each component in the sample collected for a feed test should be specified.

Raking and baling cereal (or ryegrass) vetch/clover mixes in order to cure the cereal (or ryegrass) and maximise legume content, is quite difficult.

I suggest the most reliable way of improving protein content of hay or silage is to ensure adequate N nutrition of the crop.

Furthermore, reducing oat (or ryegrass) seeding rates to accommodate the vetch (or clover) reduces overall hay/silage yields and increases stem size therefore reducing the ME content of the silage.

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