AV
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Is silage the bottleneck of **your farm productivity?**

Get a lot of value for your business with a little extra effort.

Silage production is a key process that affects the economics of a dairy farm. Silage production and quality of silage can be influenced at the farm level, sometimes even with small measures.

Why is **silage quality** such a key success factor?

The importance of silage is based on the biology of the ruminant. The rumen needs a lot of fiber to function optimally. In silage, fiber is in a palatable form. Palatable silage enables feeding concentrates without disturbing the balance of the rumen. The cows stay healthy, producing plenty of milk with high fat and protein content. Good silage provides energy and protein while also ensuring the health of the cow.

TARGET VALUES FOR HIGH-QUALITY GRASS SILAGE

D-VALUE
(digestible organic matter)

680–710 g/kg DM

DRY MATTER

300–400 g/kg

FERMENTATION QUALITY

- Ammonia N: <40 g/kg N
- Volatile fatty acids: <10 g/kg DM
- Lactic acid: 20–60 g/kg DM
- Sugars: 50–150 g/kg DM

CHECKLIST: Is silage the bottleneck of your farm productivity?

Think about the whole year, all silages, and in which combinations they are fed to the animals.

Is there enough **good-quality silage?**

- Do you end up feeding moderate or poor silage to dairy cows?
- Can you ensure unrestricted feed intake for dairy cows?
- Can you recognize any losses during harvesting/ensiling/feed-out processes that could be eliminated to gain more feed for animals?
- Are you prepared for a poor yield? Is there any excess silage in stock?

Is the silage for dairy cows **highly digestible and of high energy content**?

- It matters what is served at the feeding table.
- Good yield and good digestibility are needed from the first cut to ensure optimal feeding throughout the year.
- However, harvesting the first cut too early can reduce the energy content of the total harvest because the proportion of the best cut is too small. That is why it's important to look at the big picture.

Is the silage **palatable**?

- Silage intake can be increased by:
  - High silage digestibility
  - Minimizing changes during ensiling by using a formic acid-based additive and prewilting the silage to a maximum of 42% dry matter
- Avoid feeding heated or spoiled silage, even in small quantities.

Is there enough silage of **good quality**?

It is possible to have a lot of silage in stock, yet none of it is good. There is a shortage of good silage every year.

The first cut of grass is the best cut in terms of production response. Cows eat the first cut more than a similar second or third cut. Therefore, it is worthwhile to invest in the yield of the first cut. If there is a shortage of fertilizers, fertilization should be targeted at good fields with full-density grass crop.

When timing silage harvesting, factors that have to be balanced include increasing yield, the decrease in digestibility, and the weather. On a dairy farm, the aim is to get enough yield without compromising silage digestibility and energy content.

Extra silage stock helps to survive over poor years.

In the long run, it is also worth considering how well the farm is prepared for fluctuations in grass yields between years. Silage can be stored for more than one year by ensiling with extra care and applying enough formic acid-based additive. The value of such silage in cattle feeding should not be underestimated, assuming that the silo has been closed airtight during the whole ensiling period.

In the case of round bales, bales to be stored more than one year should be wrapped with extra layers and protected against birds, rodents, etc.

The importance of buffer stocks of silage seems to be underlined by climate change. It should be noted that the buffer storage actually reduces the required grass area when the preservation is done so that losses don't increase.

Benefits of a **silage buffer stock**

Alleviates problems caused by years with poor grass growth

Eliminates the need to open silos too early, reducing the problem of silage heating and losses caused by that

Makes it easier to plan and implement balanced dairy cow feeding because consumption of different types of silage can be planned well beforehand

Improves average milk yield with better combination of different types of silages (i.e., first-cut silage is not fed out immediately during summer and can be consumed during winter together with later cuts)

Is the silage **highly digestible and energy rich**?

Silage that is not highly digestible provides less energy per bite. In addition, the cow eats fewer bites as poor digestibility also impairs the palatability of the silage.

Often, the cause of poor digestibility is some failure in the harvesting process. It is worth learning from the mistakes and thinking how similar failures can be avoided in the future. Foresight is a valuable skill, and it is best to be prepared for the most probable risks. For example, worn-out parts may break down or an employee may become ill. It is worth leaving room for surprises in the schedule. Anticipation and preparation save days during busy forage harvesting times.

Optimal harvest days should be used for harvesting high-yielding fields located close to silos. For low-yielding fields, it may be wise to harvest separately and for different animals or even to crush the crop if harvesting becomes more expensive than the value of the crop.

Was the **ensiling process successful**? Did it yield **highly palatable silage**?

Only feed that is eaten can produce. The palatability of silage is at its highest when changes in nutrients during ensiling are minimized. This requires the right methods and effective silage additives.

Efficient and fast prewilting eliminates effluent losses, promotes successful ensiling, and increases silage intake. On the other hand, if dry matter content is too high, it increases the risk of losses during the feed-out stage. The optimum dry matter content for silage stored in a clamp silo or pit is about 30%–35%.

To increase the efficiency of the prewilting, it is important that the standing crop is dry at the time of mowing and that the swaths are as wide as possible during the prewilting to maximize surface area. During prewilting, the grass must dry. If this does not happen, the swath must be collected from the field as soon as possible to stop the spoiling process.

With a formic acid-based additive, the grass pH drops rapidly. This helps to stop the breakdown of protein and the action of harmful microbes. Lactic acid fermentation takes days to achieve a similar change, but the effect of formic acid is immediate. In addition, sugars are saved when not consumed in fermentation reactions. Saving sugars directly improves the palatability of the feed. Studies show that intake is the highest when the sugar content of the silage is 110 g/kg ka.

The large amount of fermentation products reduces silage intake by 2 kg of dry matter per day, i.e., 4–10 kg per day of fresh weight. The fewer changes due to microbial activity during ensiling, the better the silage intake. Keep this in mind, even during the feeding phase. The less yeast in the silage, the slower the feed starts to spoil and heat up after silo opening.

Quality changes resulting from fermentation reactions during ensiling **impair milk yield and milk fat and protein concentrations.**

Dairy cow feeding trials with silages of different quality are used to estimate the effects of silage fermentation quality on milk production parameters. The effects on milk volume and milk fat and protein content can be added together to calculate total effect on milk production.

SILAGE QUALITY AFFECTING MILK PRODUCTION PARAMETERS

Silage quality parameter	Change	Milk yield, kg/day	Milk fat content, %/units	Milk protein content, %/units
Ammonium N, g/kg N	40 → 100	–0.5	–0.18	–0.11
Sugars, g/kg DM	110 → 20	–0.5	–0.27	–0.16
Total acids (lactic and volatile fatty acids), g/kg DM	40 → 100	–0.9	–0.36	–0.18
Volatile fatty acids, g/kg DM	10 → 50	–0.2	–0.24	–0.14

References

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