BioEnergy News

Securing your substrate supply

Producing high-quality cereal WCS

There are various reasons for using cereal whole-crop silage (WCS) in AD plants: compliance with greening requirements, crop rotation considerations, securing of substrate supply, low prices for combine harvested wheat.

Provided that certain particularities of ensiling cereal WCS are taken into account, this substrate can generate high-quality, energy-rich silage with gas yields comparable to maize silage.

The optimal harvesting time is between late lactic and early dough ripeness; the grains should still release a milky liquid when squeezed between thumbnail and a finger. At this stage, the optimal DM content of whole plants is between 32 and 38 %. Depending on weather and location, the crops quickly reach full maturation (0.5–1 % DM per day).

These dry, very energy-rich crops are particularly at risk of heating and mycotoxin formation from mould. Green rye harvested at a DM content of below 25 % has an entirely different ensiling behaviour and risk of spoilage (see Fig. 1).

Mechanical preparation of plant material

Precision choppers used for harvesting cereal WCS should be equipped with friction floors or bars.

Modern choppers feature grain crushers to optimise the mechanical breakdown of WCP, as only crushed grains can be digested successfully in AD plants.

Chop length and compaction

Compaction within the silo is often inadequate with cereal WCS.

The stalks in particular, tending to be lignified, "give" in silage and thus prevent adequate compaction. That is why a maximum particle length of 6–10 mm is absolutely essential. As an added difficulty, hollow cereal stalks contain more air pockets than, for example, marrow-filled maize stems, additionally favouring air circulating at the clamp face.

Fig. 1: Energy content of cereals over the ripening process

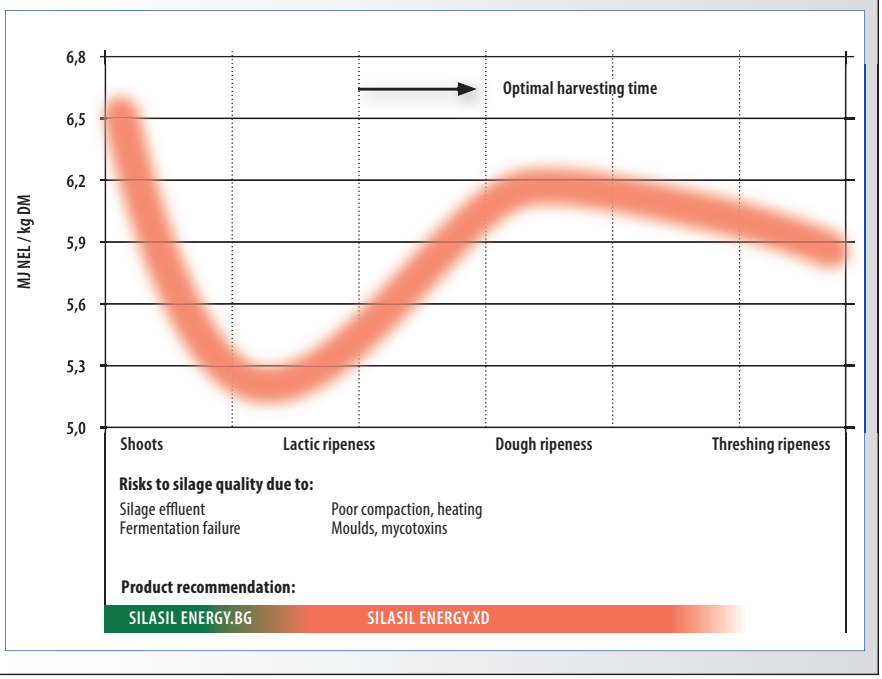


Fig. 2: Fermentation acid patterns with short, 4-week silo ripening

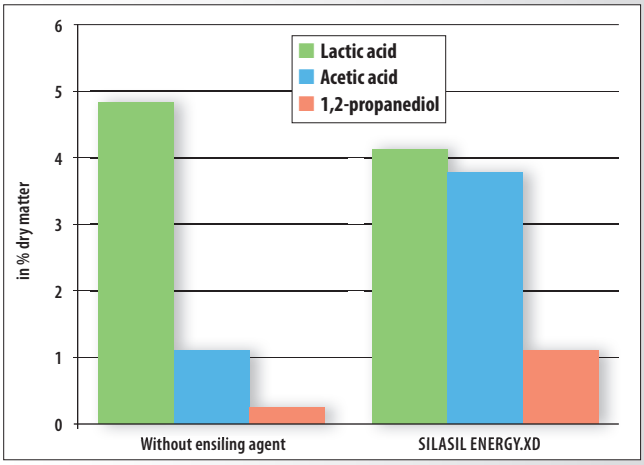
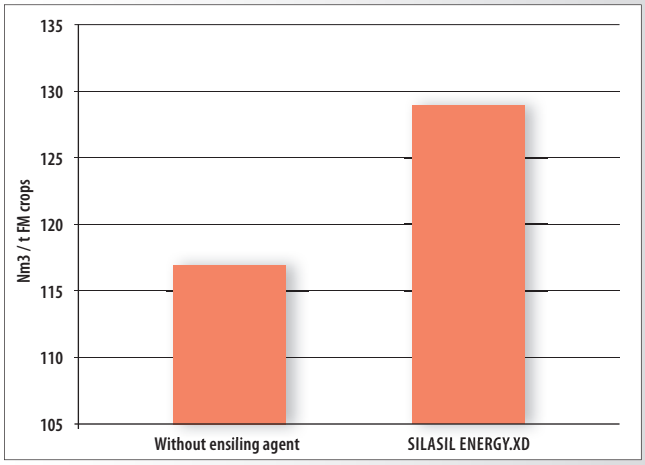


Fig. 3: Stable silage for more methane



Risk of spoilage

Even when harvested under optimal conditions and adhering to the above recommendations, whole-crop silages run a higher risk of spoilage than maize or grass. This is mainly due to a comparatively low nitrate content and the aforementioned high oxygen inclusion in the silo. Coupled to a naturally high density of harmful microorganisms in the harvest material these factors combined promote increased energy losses during storage and removal. Moulds require oxygen for their formation and may produce mycotoxins. This mainly affects silages with heating problems due to inadequate mechanical preparation or compaction.
The accumulation of mycotoxins can result in severe disruptions of the biological process in fermenters.

Recommendation

Silasil Energy.XD results in a rapid formation of acetic acid during the first weeks of the ensiling process, efficiently protecting the crop's high energy content against loss induced by fermentation pests and heating (see Fig. 2). On top of that, Silasil Energy.XD accelerates silage availability by reducing the maturation time with simultaneously very high silage stability. That is why Silasil Energy.XD is the additive of choice particularly for WCS.
Silasil Energy is the silage additive for higher energy yields (see Fig. 3). DLG-tested!

Dr. Dirk Banemann

SILASIL ENERGY XD

Range of applications

SILASIL ENERGY.XD is highly recommended wherever shortened silage ripening periods of 2–6 weeks are required!

category 6b, 2 Methane

Whole plant maize silage	28–40 % DM
Maize kernel products (e.g. CCM)	55–65 % DM
Cereal WCS (as energy crop silage)	28–40 % DM
Energy grass	30–45 % DM
Sorghum	> 25 % DM

Result

- Controls ensiling processes
- Improves silage stability both at the face andin intermediate storage
- Shortens silage ripening periods
- Reduces process-related energy losses

category 6b, 2 Methane

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