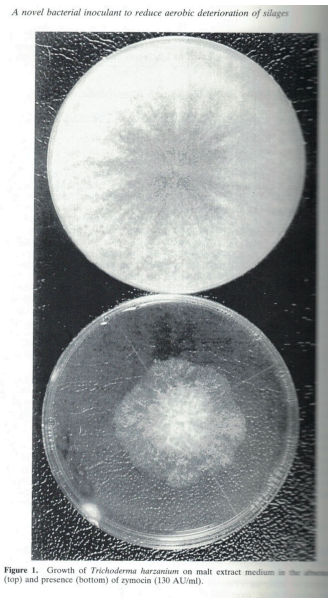


SAFEGUARD 5 USP

1. Manufactured to Forage Technology specification by the worlds oldest and largest Food Biotechnology company, Christian Hansen A/S, the company that provides 50% of the cultures used in the worlds cheese manufacture, 1 in 3 breakfasts, and natural ingredients in 1.5 Billion human beings daily intake.
2. SAFEGUARD 5 is the only non-Chr Hansen A/S silage inoculant to include their PATENTED, new-technology micro-organisms, that directly create healthier and more productive silage, proven by independent trial, registration, and international approval bodies.
3. Developed over 32 years, through 5 generations, used on millions of tonnes of UK silage, SAFEGUARD 5 was the first biological silage treatment to identify and combat yeasts and moulds in silage. (Published peer-reviewed) Work at Cranfield Institute of Biotechnology demonstrated effective yeast control in UK silages as early as 1989.

(Here evidence showing control of lactate assimilating yeast, one of the major causes of losses and aerobic stability - heating - in silage.)



4. Four distinct components, with both independent and combination benefits. First, specific xylanase enzymes, NOT to create “more sugar” in the silage (doesn’t happen at typical silage rates of application), but to convert some of the plants normally indigestible xylem core into SPECIFIC sugars, i.e. Arabinose and Xylose, which trigger the production of yeast and mould inhibitory substances (Zymocin) in certain micro-organisms.
5. Second, the Super-fast starter.... (Bacteria numbers are NOT important in a silage inoculant, what’s known as the “Lag Phase” is. That’s the time from application, to the point that rapid multiplication (hence production) commences.) With *Enterococcus faecium* DSM22502 there is virtually no lag phase:

Enterococcus faecium



— *E. faecium* — *L. plantarum* — *L. lactis*

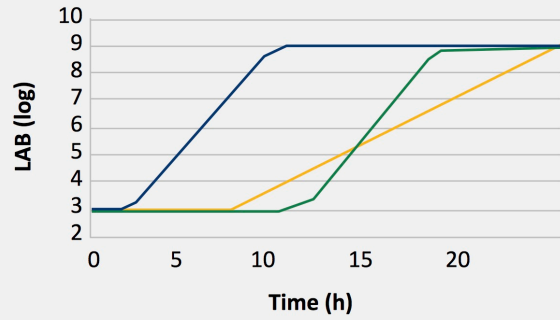
Grows at neutral pH

A fast and extensive production of lactic acid is essential to get well preserved silage. *E. faecium* has optimum growth at pH 6, which is the pH value in many freshly packed silages. *E. faecium* is especially quick in initiating the production of lactic acid

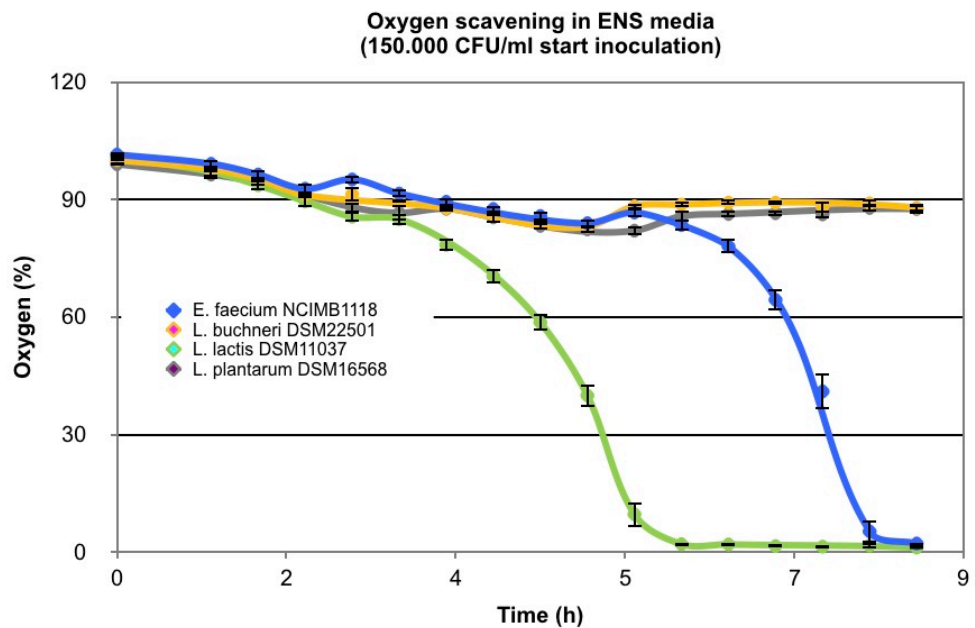
A fast acidifier

E. faecium provides a fundamental start for the control of the fermentation process

Growth of lactic acid bacteria



.... in addition, uniquely for this organism, *Enterococcus faecium* DSM22502 shows rapid oxygen scavenging ability, within 8 hours, creating low-loss, perfect silage fermentation environments:



..... whilst rapidly producing a burst of lactic acid, to lower pH, but most importantly to “feed”

6. Thirdly, *Lactobacillus buchneri* DSM22501.

Unlike any other heterofermenter strain (bacteria that make acetic acid to improve aerobic stability) from competitors, Chr Hansen A/S *L. buchneri* is creating Acetic acid within as short a time as 24 - 48 hours. Generally, competitor strains are taking 48 days or longer, by which time significant extra DM losses will have been incurred, and many of the silage pathogens will have had a chance to become established. Because of the ability of DSM22501 to rapidly create and convert lactic to acetic acid, it becomes possible to have cold, stable, silages, after a few days. That allows for EARLY OPENING, 7 days after ensiling. In addition DSM 22501 is the ONLY *L. buchneri* available for silage which is acknowledged to REDUCE DM LOSSES in silage production.

See EFSA report



European Food Safety Authority

EFSA Journal 2013;11(4):3168

SCIENTIFIC OPINION

Scientific Opinion on the safety and efficacy of *Lactobacillus brevis* (DSM 23231), *Lactobacillus buchneri* (DSM 22501), *Lactobacillus buchneri* (NCIMB 40788—CNCM I-4323), *Lactobacillus buchneri* (ATCC PTA-6138) and *Lactobacillus buchneri* (ATCC PTA-2494) as silage additives for all species¹

EFSA Panel on Additives and Products or Substances used in Animal Feed (FEEDAP)^{2,3}

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

One strain of *Lactobacillus brevis* and four strains of *Lactobacillus buchneri* are each intended to improve ensiling at proposed doses ranging from 5×10^7 to 1×10^8 CFU/kg fresh material. Both bacterial species are considered by EFSA to be suitable for the Qualified Presumption of Safety approach to safety assessment. As the identity of all strains was clearly established and as no antibiotic resistance of concern was detected, the use of these strains in silage production is presumed safe for livestock species, consumers of products from animals and the environment. Given the proteinaceous nature of the active agents and the high dusting potential of the products tested, the FEEDAP Panel considers it prudent to treat these additives as skin and respiratory sensitisers. They are also considered irritants. The efficacy of *L. brevis* to improve the preservation of nutritive value or increase the aerobic stability of silage was not demonstrated.. One strain of *L. buchneri* has the potential to improve the production of silage from easy, moderately difficult and difficult to ensile materials by reducing the pH and ammonia nitrogen and by increasing the preservation of dry matter. The remaining three strains of *L. buchneri* showed the potential to improve the aerobic stability, one in all forages and two in easy to ensile materials.

ABSTRACT

One strain of *Lactobacillus brevis* and four strains of *Lactobacillus buchneri* are each intended to improve ensiling at proposed doses ranging from 5×10^7 to 1×10^8 CFU/kg fresh material. Both bacterial species are considered by EFSA to be suitable for the Qualified Presumption of Safety approach to safety assessment. As the identity of all strains was clearly established and as no antibiotic resistance of concern was detected, the use of these strains in silage production is presumed safe for livestock species, consumers of products from animals and the environment. Given the proteinaceous nature of the active agents and the high dusting potential of the products tested, the FEEDAP Panel considers it prudent to treat these additives as skin and respiratory sensitizers. They are also considered irritants. The efficacy of *L. brevis* to improve the preservation of nutritive value or increase the aerobic stability of silage was not demonstrated.. **One strain of *L. buchneri* has the potential to improve the production of silage from easy, moderately difficult and difficult to ensile materials by reducing the pH and ammonia nitrogen and by increasing the preservation of dry matter.** The remaining three strains of *L. buchneri* showed the potential to improve the aerobic stability, one in all forages and two in easy to ensile materials.

... which translates into a massive volume of official, independent, and regulatory approval for the claims that this organism is UNIQUE IN IMPROVING AEROBIC STABILITY AND REDUCING DM LOSSES. Here's the figures from the Official German DLG organisation ratifying Chr Hansen's claims:



By: Kristian Witt, Global Product Manager, Silage

Since the EU authorization of *L. buchneri* DSM 22501 in November 2013 Chr. Hansen has submitted data to the German DLG organization.

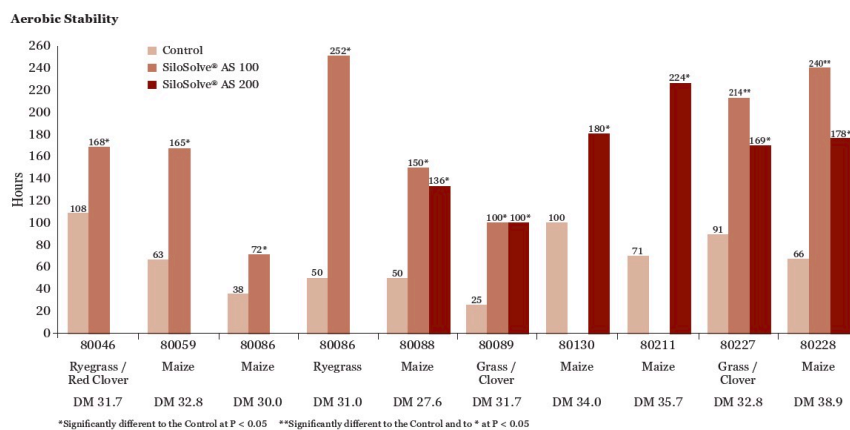
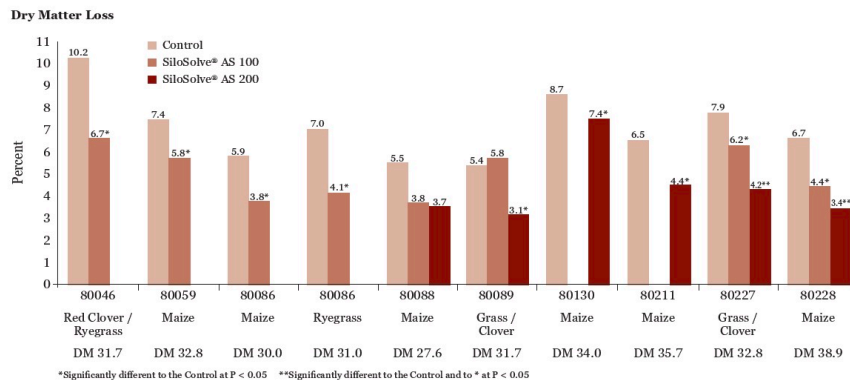
With the DLG category 2 approval "improvement of aerobic stability" we have confirmed the already provided evidence that *L. buchneri* DSM 22501 is able to extend the aerobic stability of silage. However, improving aerobic stability is only one effect of our unique strain of *L. buchneri*.

While literature data has shown that aerobic stability can be improved, our *L. buchneri* strain is able to deliver this feature in reduced dry matter loss! Seven out of 8 trials with SiloSolve® AS 100 have shown a significant reduction in dry matter compared to untreated control group.

Why is this important?

The reduction in dry matter loss means more feed for the cows! This reduction in dry matter loss is generally not observed with other *L. buchneri*.

L. buchneri DSM 22501 is used in SiloSolve® AS 100 (100% *L. buchneri*) and SiloSolve® AS 200 (5% *L. buchneri*).



... and then we come to the jewel in the crown.....

7. Like a vicious jungle predator, *Lactococcus lactis* SR3.54, the patented clostridia killer, is tearing through the silage exterminating thermophilic bacteria, including protein-breaking organisms, through the production of Nisin, a hugely effective bacteriocin which also may offer benefits in the subsequent TMR, as it behaves in a similar fashion to Monensin, by reducing methane producing bacteria, thus saving energy, and allowing better throughput and conversion of feed to production.

... that means:

Figure 1: The effect of *L. lactis* SR3.54 on Clostridia



Swedish patent nr. 511828.

.... organisms like *Clostridium perfringens*, implicated in several health problems in cows, *Clostridium tyrobutyricum*, implicated in creating butyric silage, and TRACED IN MILK AND CHEESE, even *Clostridium paraputrificum* which utilises the essential silage sugars, Bacillus species, etc., many of the inherent problems in the silage post as well as during ensilage and storage, are eliminated, or controlled by the *L. lactis* SR3.54
NO OTHER SILAGE ORGANISM OFFERS THIS.

8. Together..... SAFEGUARD 5 becomes a totally unique, patent protected, 2nd generation silage treatment that offers benefits that translate into improved animal performance, better conservation (more tonnes saved in fermentation/aerobic stability), vastly increased TMR life, control of fungal and microbial pathogens, enhanced palatability, and a major return on investment!