



**FINNSIL®**

*-FOR THE NEXT GENERATION-*  
**PRESERVATION SOLUTIONS FOR SILAGE**



**FINLACTIC**



## **-INTRODUCING- Finlactic Ltd**

Finlactic Ltd is a Finnish industrial company operating in Kokemäki and was founded in 2010. The company's most well-known brands are the Lakta® series (lactic acid-based liquid feed preservatives), Homesieppari® (bentonite-based mycotoxin binders), and Finnsil® (chemical silage preservatives).

All of Finlactic Ltd's products are manufactured in Finland (Kokemäki) and delivered directly to the farm using the manufacturer's own transportation fleet. Customers can also pick up the products themselves from Kokemäki.

The company's decade-long success story is based on its own innovative development work, broad-based expertise, and a good collaborative network. When used properly, Finlactic Ltd's products improve the productivity and profitability of its customers. Finlactic Ltd - Proven to increase productivity.

**Established: 2010**  
**Industry: Chemical industry**

**CEO: Jaakko Laine**  
**Headquarters: Kokemäki (Finland)**

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*Introducing Homesieppari®: Feed additives designed for binding mold toxins.*



## *FINNSIL® PRODUCTS AND* **CHEMICAL PRESERVATION**

The Finnsil product family is a series of preservative liquids manufactured by Finlactic Ltd. The products are suitable for all forage crops (including grass, legumes, whole crop silage, and chopped grain) and can be used in all forms of silage systems.

The Finnsil preservatives are made from non-volatile raw materials (sodium nitrite, sodium benzoate, sodium propionate, sodium citrate and potassium sorbate), so they are pleasant to handle and non-corrosive.

The preservatives direct the fermentation in the fodder towards the so-called good fermentation, strengthening the naturally occurring lactic acid bacteria population and preventing the growth of yeasts and harmful bacteria in the fodder.

The Finnsil products are superior in preventing post-heating. Sodium benzoate and potassium sorbate together with sodium citrate are effective against yeasts and therefore Finnsil-products improve the aerobic stability of the silage.

Finnsil products are the most cost-effective on the market. They combine the benefits of both biological preservation and traditional acid preservation without the weaknesses of either preservation method. With these products you can preserve the fodder without post-heating and without worries of corroding the machinery.

From the user's perspective, Finnsil products are safe to handle and they do not smell.

Finnsil products belong to the class of the chemical preservatives, which are the most popular preservatives in Europe. In Finland, the traditional acid preservation has been and still is the most popular preservation method, due to its reliability and emotional reasons; after all, the pioneer of acid preservation was the well-known Finnish Nobel price winner A.I. Virtanen. The fact is, however, that acid preservation is the most expensive of all ensiling methods.

With Finnsil, you can achieve the reliability of acid preservation and the convenience and cost-effectiveness of biological preservation. So why use any other preservative?



*Finland is a country with strong farming traditions.*  
*However, it's sometimes worthwhile to critically*  
*examine established practices.*

# INTRODUCING **FINNSIL® PRODUCTS**

The Finnsil product family consists of four different "basic preservation solutions", two targeted solutions for the top third of the silo/pile supplementary treatment, a heating inhibitor for silage preservation, and Organic Finnsil for farms with organic silage.

The efficiency of all the basic preservation solutions (Finnsil, Finnsil Plus, Finnsil Elite, and Finnsil Super) is based on the highly effective yeast and mold control properties of sodium nitrite, sodium benzoate, sodium propionate, sodium citrate and potassium sorbate, without negative influence on the lactic acid bacteria coming from the field.

**FINNSIL®** Finnsil is the first member of a product family introduced to the market in 2018. From the very beginning, the product has achieved excellent preservation results and has been praised especially for its ease of use, preservation quality, and because it remains active if stored for the next season. The product is suitable for all forage crops in the dry matter classes of 15-50% and is used in the same way as formic acid/biological preservatives, but without the adverse effects of these substances.

**FINNSIL® PLUS** Finnsil Plus is the same in terms of its components as Finnsil, but its active ingredient concentrations are higher.

**FINNSIL® ELITE** Finnsil Elite has an increased ensiling power through addition of sodium formate.

**FINNSIL® SUPER** The most effective ensiling product is Finnsil Super. In addition to sodium formate it includes ammonium propionate.

**FINNSIL® TOP**

**FINNSIL® TOP PLUS**

The Finnsil Top and Finnsil Top Plus were developed for the precise treatment of the top one-third of the silo/pile, to ensure the aerobic preservation of the silage and very effectively prevent the growth of molds and yeasts in the sensitive surface layer. The Finnsil Top products also prevent secondary heating and minimize damage if there were any deficiencies in covering or compacting the pile during the silage making process.

**FINNSIL® TMR**

The newest addition to the Finnsil product family is Finnsil TMR. It is formulated for the use in the preparation of total mixed ration (TMR) of feed. During summer temperatures the problem with TMR is easy spoilage after heating with yeast growth. Finnsil TMR is a convenient solution instead of formic acid also in terms of maintaining good palatability.

**FINNSIL®**  
ORGANIC **G**

Organic-compliant version of Finnsil preservative for organic-grain storage.

**FINNSIL®**  
ORGANIC **S**

Organic version of the Finnsil preservative for organic-silage preservation.

| Finnsil: BASIC PRESERVATION SOLUTIONS |                 | FINNSIL® | FINNSIL® PLUS | FINNSIL® ELITE | FINNSIL® SUPER |
|---------------------------------------|-----------------|----------|---------------|----------------|----------------|
| COMPOSITION                           |                 |          |               |                |                |
| Sodium Nitrite                        | <%              | 18       | 20            | 20             | 20             |
| Sodium Benzoate                       | <%              | 7        | 10            | 10             | 10             |
| Sodium Propionate                     | <%              | 2        | 5             | 5              | 10             |
| Potassium Sorbate                     | <%              | 4        | 4             | 4              | 4              |
| Sodium Formate                        | <%              | -        | -             | 5              | 5              |
| Ammonium Propionate                   | <%              | -        | -             | -              | 5              |
| Moisture                              | %               | 70       | 63            | 58             | 57             |
| DOSAGE (Dry Matter %)                 |                 |          |               |                |                |
| Grasses (15-25%)                      | l / ton of feed | 3,5-5    | 3,5-5         | 3,5-5          | 4              |
| Grasses (25-30%)                      | l / ton of feed | 3,5-5    | 3,5-5         | 3,5-5          | 4              |
| Grasses (30-60%)                      | l / ton of feed | 3,5-5    | 3,5-5         | 3,5-5          | 4              |
| Clovers / Legumes (15-30%)            | l / ton of feed | 3,5-5    | 3,5-5         | 3,5-5          | 4              |
| Whole and Crushed Grains (15-80%)     | l / ton of feed | 3,5-5    | 3,5-5         | 3,5-5          | 4              |
| APPLICATION AREAS                     |                 |          |               |                |                |
| Whole Silage                          |                 | x        | x             | x              | x              |

| Finnsil: TARGETED SOLUTIONS               |                 | FINNSIL® TOP | FINNSIL® TOP PLUS | FINNSIL® TMR |
|-------------------------------------------|-----------------|--------------|-------------------|--------------|
| COMPOSITION                               |                 |              |                   |              |
| Sodium Nitrite                            | <%              | -            | -                 | -            |
| Sodium Benzoate                           | <%              | 15           | 15                | -            |
| Sodium Propionate                         | <%              | -            | 5                 | -            |
| Potassium Sorbate                         | <%              | 15           | 15                | 15           |
| Sodium Formate                            | <%              | -            | -                 | -            |
| Ammonium Propionate                       | <%              |              |                   |              |
| Sodium Citrate                            | <%              | -            | -                 | 10           |
| Moisture                                  | %               | 75           | 70                | 80           |
| DOSAGE (Dry Matter %)                     |                 |              |                   |              |
| Grasses (15-25%)                          | l / ton of feed | 3-5          | 3-5               | 2-5          |
| Grasses (25-30%)                          | l / ton of feed | 3-5          | 3-5               | 2-5          |
| Grasses (30-60%)                          | l / ton of feed | 3-5          | 3-5               | 2-5          |
| Clovers / Legumes (15-30%)                | l / ton of feed | 3-5          | 3-5               | 2-5          |
| Whole and Crushed Grains (15-80%)         | l / ton of feed | 3-5          | 3-5               | 2-5          |
| APPLICATION AREAS                         |                 |              |                   |              |
| For additional treatment of the top third |                 | x            | x                 |              |
| To prevent the heating of feed            |                 |              |                   | x            |

## ALSO AVAILABLE

### Finnsil **ORGANIC** series

#### Finnsil Organic G (for grain):

Lactic Acid 25%  
Citric Acid <6%  
Sorbic Acid <5%  
Moisture: 70%

Dosage: 5-7 liters per ton of feed

#### Finnsil Organic S (for silage):

Sodium Propionate <13%  
Sodium Formate <13%  
Moisture: 75%

Dosage: 4-6 liters per ton of feed

## FINNSIL® PRODUCTS AND **AMMONIA NITROGEN**

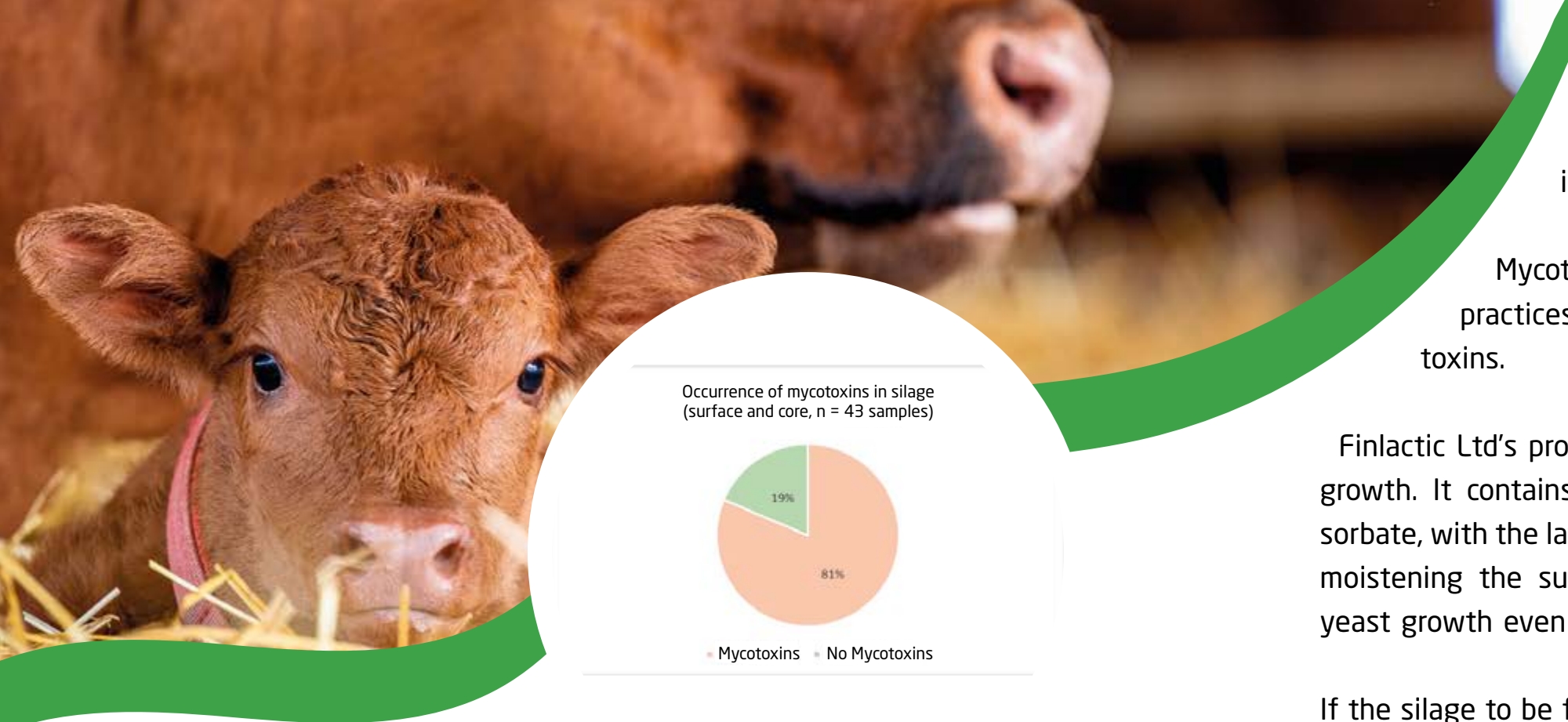
In some cases, the ammonia nitrogen in silage analyses conducted on Finnsil products has exceeded the upper reference value. This has understandably raised concerns about the quality of the feed, even though the other measured quality values of the feed have been within the reference values.

Ammonia nitrogen reflects the breakdown of the protein in the feed. If the figure is high, the protein value of the feed is poor. When using Finnsil products, the ammonia nitrogen may exceed the limit value, but at the same time the crude protein, OIV value (protein digested in the small intestine) and volatile fatty acids are in order. Thus, the results suggest that the breakdown of protein has not occurred to the extent that has been concluded from the amounts of ammonia nitrogen.

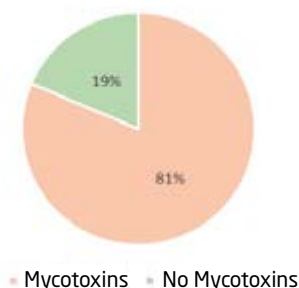
Why is this so? When using Finnsil products, they contain sodium nitrite ( $\text{NaNO}_2$ ) which includes nitrogen (atomic symbol N). This nitrogen comes into the feed analysis as ammonia nitrogen and does not reflect the breakdown of protein. It is possible to calculate how much ammonia nitrogen can be formed depending on the amount of Finnsil product added. The calculation formula is as follows: Grams of ammonia/ton of feed is equal to the Finnsil product added in liters  $\times 1000 \times 1.2 \times 17/6900 \times$  the percentage of sodium nitrite mentioned on the Finnsil label.

In the formula formation, Finnsil ELITE has been taken as an example calculation. If 4 liters/ton of ELITE has been added, the weight converted is  $4 \times 1.2$  kg/ton. The label of ELITE states that the sodium nitrite concentration is 20 percent by weight, so the amount of sodium nitrite that has come into the feed with ELITE is  $4 \times 1.2 \times 20/100$  kilos or  $4000 \times 1.2 \times 20/100$  grams. The molar mass of sodium nitrite is 69, so the number of moles of the added sodium nitrite used in chemistry is  $4000 \times 1.2 \times 20/100$  divided by 69. The same mole amount of nitrogen as nitrite is in the sodium nitrite. The atomic weight of nitrogen is 14, so the added nitrogen that comes with the sodium nitrite can now be calculated by multiplying the sodium nitrite moles by 14. This gives  $(4000 \times 1.2 \times 20/100) \times 14/69$  grams of nitrogen. From this amount of nitrogen, the same mole amount of ammonia is formed as there is nitrogen. The mole amounts of nitrogen and thus also of ammonia are obtained by dividing the

grams of nitrogen by the atomic weight of nitrogen (14), i.e. the aforementioned  $(4000 \times 1.2 \times 20/100) \times 14/69$ . The result is the same mole amount of nitrogen and ammonia, i.e.  $(4000 \times 1.2 \times 20/100)/69$ . Now that the mole amount of ammonia is known, the weight amount of ammonia can be calculated by multiplying it by the molecular weight of ammonia (17). This gives  $(4000 \times 1.2 \times 20 \times 17/6900)$  grams of ammonia, i.e. 236.5 grams of ammonia/ton of silage when 4 liters/ton of ELITE has been used.



Occurrence of mycotoxins in silage  
(surface and core, n = 43 samples)



## INVISIBLE DANGER

### **MOLD TOXINS IN SILAGE**

Mycotoxins are invisible and tasteless compounds produced by molds, and they cannot be detected without analyzing the feeds. Mycotoxins can form in feeds at various stages of production, and toxins are much more common in silage than is generally believed.

This is evident from the accompanying graph, which showed that mycotoxins were identified in 81% of the 43 silage samples. These samples were taken as part of the "Productive Cattle Farm Grassland" project in Finland.

Rumen microbes can break down mycotoxins, but their capacity is limited. Situations where the intake of toxins is high and the exposure is prolonged, the feed intake is large, and the feed passes quickly through the rumen, it may exceed the ability of rumen microbes to handle the mycotoxins.

Mycotoxins include several chemical compounds, and their combined effect may increase the chances of individual mycotoxins passing through the rumen. Toxins that have passed through the rumen can create health issues and production losses.

Symptoms of mycotoxins can include reduced feed intake, impaired production results, reproductive problems, and weakened immune response.

Mycotoxins are a result of mold in the feed. Good cultivation practices and care in every stage of silage making can reduce the risk of mold toxins.

Finlactic Ltd's product Finnsil TOP is formulated with a focus on eliminating mold growth. It contains high concentrations of both sodium benzoate and potassium sorbate, with the latter being particularly effective against mold growth. For example, moistening the surface of silage in a stack or silo with Finnsil TOP eliminates yeast growth even when the surface comes into contact with atmospheric oxygen.

If the silage to be fed is suspected of containing mycotoxins, this can be verified by a toxin test conducted by Finlactic Ltd. The test analyzes a feed sample using a so-called rapid method that identifies up to six (6) different toxins. The results can be obtained within a week of sampling.

**//**  
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# INTRODUCING HOMESIEPPARI

Mold toxins are a result of mold growth in feed. In every stage of silage making, the goal should be to minimize mold formation as much as possible, ideally preventing it entirely. However, in practical harvesting conditions, this goal is difficult to achieve. Other means are needed to prevent or mitigate the toxic effects.

The harmful effects of mold toxins can be reduced with feed additives. These are categorized based on their mode of action into two groups: products that bind toxins or those that alter the structure of toxin molecules. Products under the HOMESIEPPARI® trademark, approved by the European Union Intellectual Property Office for Finlactic Ltd, belong to the former group.

They contain bentonite and diatomaceous earth, which are EU-approved minerals for feed additives. These materials attach to mold toxins that enter the digestive system with the feed and transport them to the manure, thus preventing toxic effects. In addition to bentonite and diatomaceous earth, the cell wall fragments of crushed yeast cells are also known to bind mold toxins, which similarly end up in the manure.

Finlactic Ltd produces two products. One, HOMESIEPPARI, contains bentonite as the active ingredient, while the other, HOMESIEPPARI PRO, is designed to be more broad-spectrum, containing bentonite, diatomaceous earth, and crushed yeast cell wall.

| HOMESIEPPARI® Product Family |               |   |     |
|------------------------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| COMPOSITION                  |               |                                                                                                                                                                            |     |
| Bentonite                    |               | x                                                                                                                                                                          | x   |
| Diatomaceous earth           |               | -                                                                                                                                                                          | x   |
| Crushed yeast cell wall      |               | -                                                                                                                                                                          | x   |
| DOSAGE                       |               |                                                                                                                                                                            |     |
| Silage and feed              | kg / feed ton | 1-4                                                                                                                                                                        | 1-4 |



**//**  
*In every stage of silage making, the goal should be to minimize mold formation as much as possible, ideally preventing it entirely. However, in practical harvesting conditions, this goal is difficult to achieve.*



*CONTACT*

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