



Fysal®

Controls *Salmonella* in vegetable and animal protein meals

Why Fysal®?



Salmonella contamination

Protein meals have high susceptibility for *Salmonella* (re-)contamination, even after heat treatment



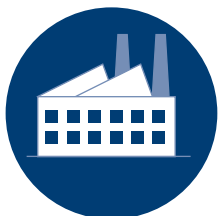
Business reputation and negative economic impact

Protein meals are often monitored for pathogens and a recall of *Salmonella* contamination may compromise the producer's and trader's reputation production systems



Fysal

Reduces *Salmonella* (re-)contamination risk in vegetable and animal protein meals



Vegetable and animal protein meals, risky raw materials for *Salmonella* contamination

- **The presence of *Salmonella* has been well-documented** in vegetal and animal protein meals such as oilseed meals/expellers and processed animal proteins
- **Processing conditions during toasting and rendering are of critical importance for removal of *Salmonella***
- **Recontamination may occur post-processing, in the crushing and rendering plant, during storage, transport and handling.** Decreases in temperature during cooling may lead to condensation, providing favorable conditions for *Salmonella* to proliferate

Business challenge

Do not let *Salmonella* recontamination damage your profitability

Salmonella recontaminated feed materials involve extra costs associated with decontamination and delayed delivery.

Moreover, producers and traders with *Salmonella* prevalence history could lose market share. Feed millers normally prefer suppliers with good records of low *Salmonella* prevalence, committed to deliver *Salmonella*-safe feed materials and with a sampling monitoring plan in place.

Controlling *Salmonella* (re-)contamination in feed materials:

Trouw Nutrition's integrated strategy

The Fysal® product range is part of the Feed Safety Programme and the *Salmonella* Control Programme, which provide full solutions to feed producer challenges.

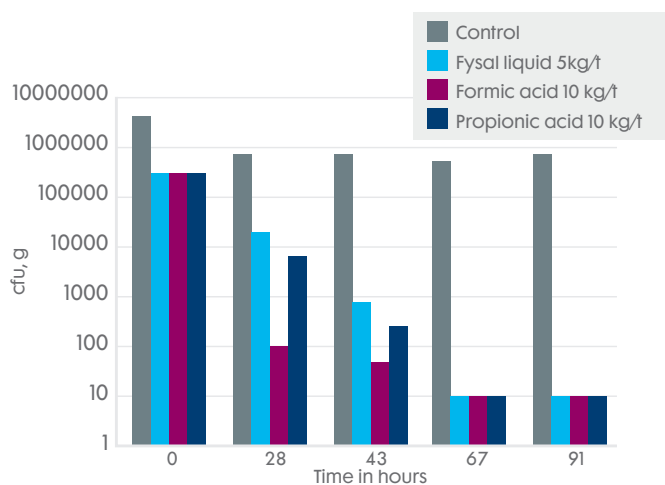
Contributing to feed safety throughout the feed to food chain

Key benefits

Reduction of *Salmonella* (re-)contamination risk in vegetable and animal protein meals

Proven results

In *vitro* trial: Fysal liquid effectively reduces *Salmonella* counts in maize gluten meal at lower inclusion rate than pure corrosive organic acids



How it works

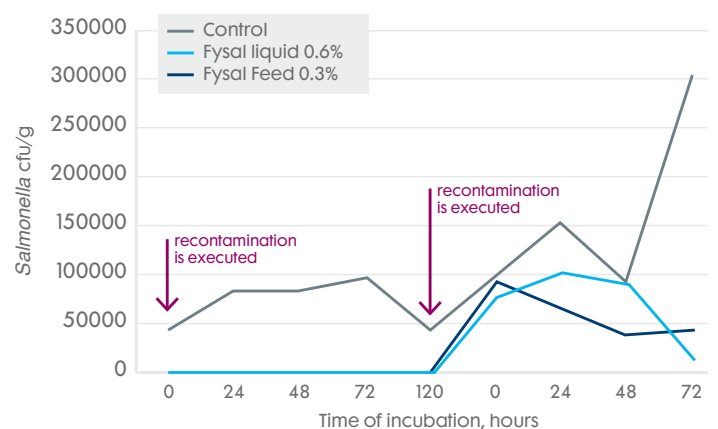
Fysal consists of a synergistic blend of organic acids, which effectively reduces the proliferation of *Enterobacteriaceae*, such as *Salmonella* in feed and feed materials.

Enterobacteriaceae counts are commonly used as an indicator of *Salmonella* presence. Reducing the levels of *Enterobacteriaceae* in feed and feed materials is associated with a reduced risk of *Salmonella* contamination.

Fysal liquid: Its organic acid molecules are able to cross Gram-negative bacteria cell membranes, disrupting *Enterobacteriaceae* metabolism and its further multiplication. These organic acids are partially buffered, making them less susceptible to evaporation. This results in a long lasting effect, which may reduce the chances of re-contamination of feed and feed materials.

Fysal Feed: The blend of potent non-buffered organic acids and medium chain fatty acids effectively reduces *Enterobacteriaceae*, such as *Salmonella*. Its fat detergent properties make *Enterobacteriaceae* more accessible to organic acids effect, boosted by cell membrane disrupting agents.

In *vitro* trial: Fysal liquid and Fysal Feed effectively reduce *Salmonella* after re-contamination in meat and bone meal



Recommended use

Fysal products should be applied in feed, feed materials or its residues in order to reduce the risk of *Salmonella* (re-)contamination. It can be used as a corrective action or a preventive measure.

Recommended inclusion rate

Contact Trouw Nutrition to discuss inclusion rate and your dosing equipment requirements.

| Inclusion rate Fysal Feed | Prevention, warm* application | Prevention, cold* application | Contamination, warm* application | Contamination, cold* application | **Application: warm: 40 – 55°C or cold: < 40 °C The inclusion rate depends on the level of contamination, physical and chemical characteristic of the feed material. |
|------------------------------------|-------------------------------|-------------------------------|----------------------------------|----------------------------------|---|
| Animal and vegetable protein meals | 1-2 kg/t | 2-3 kg/t | 2-3 kg/t | 3-5 kg/t | |
| Inclusion rate Fysal liquid | Prevention, warm* application | Prevention, cold* application | Contamination, warm* application | Contamination, cold* application | **Application: warm: 40 – 55°C or cold: < 40 °C For specific advice ask your Trouw Nutrition representative |
| Animal and vegetable protein meals | 1-3 kg/t | 2-4 kg/t | 3-5 kg/t | 4-6 kg/t | |

Summary

Product name: Fysal liquid & Fysal Feed

Benefit: Reduce *Enterobacteriaceae* proliferation, such as *Salmonella*, and may protect feed materials from (re-)contamination after processing

Use for: Vegetable and animal protein meals

Programmes: Raw Material Quality / *Salmonella* Control



 **Ask your Trouw Nutrition representative how Fysal and dosing equipment may reduce the risk of *Salmonella* (re-)contamination in the feed chain.**

Disclaimer: This document is an illustration of how the product may be effective. The composition, specifications and inclusion rates of the solutions in this document may differ. Due to similarities between compositions and based on MIC and/or bridging trials, Trouw Nutrition R&D endorses the relevance of the data reported in this document. The information in this document is believed to be correct as of the date issued. Given the variety of factors that can affect the use of a Selko product, the user is responsible for determining whether the Selko product and dosage is fit for a particular purpose and suitable for user's method of use. Selko B.V. or any of its affiliates makes no warranties, including but not limited to warranty of merchantability or fitness for a particular purpose. Product labelling and associated claims may differ based on government requirements. All quotations, orders, confirmations and transactions are subject to our General Conditions of Sale (www.nutreco.com). The applicability of any other terms and conditions is explicitly rejected. © Trouw Nutrition. The trademarks shown in this document are registered in The Netherlands, The USA and other countries. These trademarks are owned by Selko B.V. or Micronutrients USA LLC or Trouw International B.V. IntelliBond products are registered as Selko IntelliBond in The Netherlands, and other countries.