

# NISINA® NISINZ®

## IN HEAT-TREATED MEAT



### KEY BENEFITS

- Growth Control of Gram + Bacteria
- *Clostridium botulinum* inhibitor
- No Organoleptic Impact
- Renewable and Non-GMO Source
- Approved in Heat-Treated Meat
- Natural, Consumer Label-Friendly

	NisinA®	NisinZ®
Code	0301	0302
Registration Number	E234 / CAS:1414-45-5	E234/CAS:137061-46-2
Organoleptic impact	No Impact	No Impact
Source	Non-GMO, renewable	Non-GMO, renewable
Thermal Stability	Up to 121°C	Up to 121°C
Applicable pH	2.5 - 6.5	2.5 - 6.5
Recommended dosage	50-500 (mg/kg)	50-500 (mg/kg)
Packing Size	0.5KG, 5KG, 20KG	0.5KG, 5KG, 20KG
Appearance	Grey White Powder	Grey White Powder
Concentration (w/w)	≥ 2.5% NisinA	≥ 2.5% NisinZ
Sodium Chloride (w/w)	≥ 75%	≥ 75%

### VEGETAL GRAM+ BACTERIA INHIBITOR

Heat-treated meat products such as cooked hams, cooked vacuum packaged sausages and pate may be susceptible to spoilage by pathogens (like *Listeria monocytogenes*) and thermostatic spores (like *Bacillus* and *Clostridium*) that can survive pasteurization temperatures. Apart from these, lactic acid bacteria can also play a role in spoilage of such products due to insufficient heat treatment or manipulated post-contamination after pasteurizing (cooling, portioning, packaging).

Nisin offered by Handary SA has been accepted as a natural food antimicrobial across the globe. Both NisinA® and NisinZ® are used as highly-effective gram-positive inhibitor in various food applications.

Nisin can effectively increase food safety by efficiently inhibiting the growth of most common microorganisms that may lead to the spoilage of heat-treated meat products, including the influence of lactic acid bacteria (LAB), *Clostridium botulinum* and *Listeria monocytogenes*. Nisin has also displayed proficiency in reducing the content of sodium nitrite and nitric acid in meat products (canned ham, smoked pork, salted pork, sausages, vacuum-packaged fresh beef) as well as decreasing the intensity of pasteurization treatments.

### OUR BRANDS

**NISINA**  
Vegetal Nisin A



**NISINZ**  
Vegetal Nisin Z



CASE STUDIES

Gram-positive bacteria including spore-formers *Bacillus* and *Clostridium*, *Lactobacillus*, *Brochothrix thermosphacta* as well as the pathogen *Listeria monocytogenes* are associated with spoilage and safety issues of processed meat products due to their relatively high tolerance to reduced water activity, refrigeration temperatures, low pH and the presence of nitrate and phosphate emulsifying salts in such products. Nisin has been widely used as a natural food preservative against such bacteria to maintain or even extend the shelf-life of heat-treated meat products.

Nisin: A Possible Alternative To Reduce The Use Of Nitrite In Cooked Meat

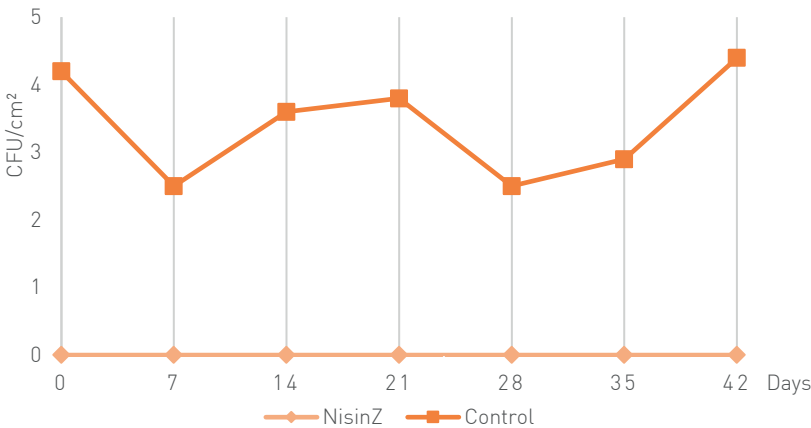
The efficiency of Nisin at 75 ppm has been observed to be superior for inhibiting the growth of *Clostridium sporogenes* compared with 150 ppm of nitrite in meat slurries, used to simulate the processes in cooked ham. Meats constitute high levels of iron, either occurring naturally or with added iron salts that can drastically decrease nitrite activity whereas nisin remains unaffected.

Nisin (75 – 100 ppm) as an antimicrobial may also synergistically work in combination with lower concentrations (40 ppm) of nitrite that can be sufficient to preserve meat colour and function as an overall solution similar to cured meats with 150 ppm nitrites.

Inhibition Effect Of Nisin On *Brochothrix Thermosphacta* In Lean Pork

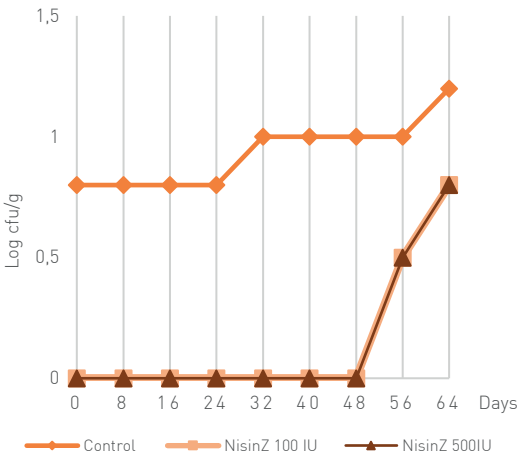
*Brochothrix thermosphacta* is one of the predominant spoilage microorganisms in cured and vacuum-packaged meats due to its tolerance to high-salt and low-pH conditions, ability to grow at refrigeration temperatures, and production of organoleptically unpleasant compounds.

The graph displays the effects of Nisin on lean pork compared with control. As shown, Nisin completely inhibits the growth of the bacteria *Brochothrix thermosphacta* for up to 42 days storage at 2°C, whereas control showed a considerable spoilage growth in lean pork.

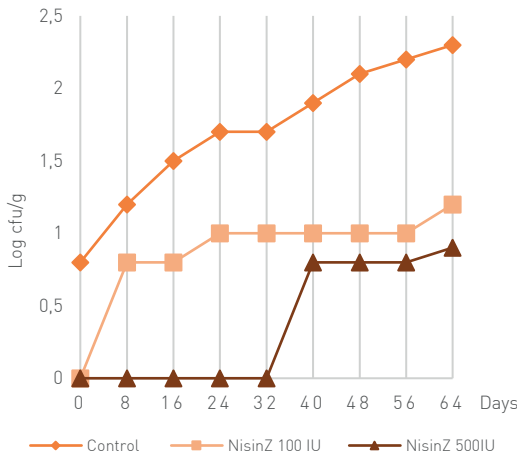


Growth of *B. Thermosphacta* inoculated onto sterile cores of pork lean.

Nisin Effect Against *Clostridium Perfringens* & *Bacillus Cereus* In Beef



A. Nisin effects in processed beef at 4°C storage.



B. Nisin effects in processed beef at 25°C storage.

The study evaluates the effect of Nisin on the microbial safety of sous vide processed seasoned beef during its shelf-life storage.

Sous vide processed beef with (100 IU or 500 IU) or without Nisin were stored at 4°C (A) or 25°C (B) for 60 days. The results show that Nisin at 500 IU could efficiently increase the shelf-life of such products by significant inhibition of *Bacillus cereus* and *Clostridium perfringens*.



# APPLICATION GUIDELINE

The following guideline steps will assist you to get the optimum solution by using Handary Nisin products to effectively extend the shelf-life and preserve the quality and safety of heat-treated meat products.

Before usage and application, Nisin powder needs to be dissolved into a brine solution during the mixing step of the heat-treated meat processing.

## 1. Direct Addition to Heat-Treated Meat

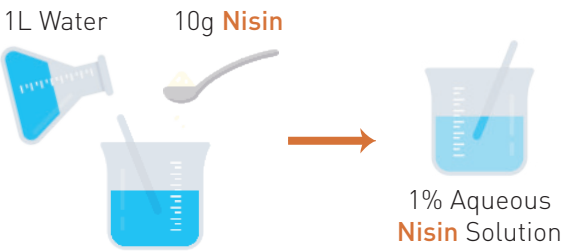
Follow the suggested dosage to apply NisinZ® or NisinA® directly into meat product formulation

NisinA®	Meat	Fermented sausages	Growth control of <i>Listeria monocytogenes</i>	50-100 (mg/kg)
NisinZ®		Vacuum bologna sausages	Growth control of lactic acid bacteria spoilage organisms	250-500 (mg/kg)
		RTE turkey bologna	Growth control of <i>Listeria monocytogenes</i>	125 (mg/kg)
		Meat slurriees, cooked ham	Growth control of <i>Clostridium sporogenes</i>	75-100 (mg/kg)

## 2. Nisin Brine Solution

To prepare a Nisin brine solution of 1% concentration, 10 grams of Nisin needs to be dissolved in 1L brine. The dosage guide in the following table displays the exact amount (g) of 1% Nisin brine solution to be added during the mixing step into the formulation to obtain the suggested final Nisin dosage (mg/kg) in heat-treated meat products.

Final Dosage in Meat (mg/kg)	Nisin Brine Solution 1% (g)
50	5
100	10
500	50



## 3. Heat-Treated Meat Manufacturing Process

Follow the representative production process flow chart of heat-treated meat and the recommended stage of application to get the best efficiency of NisinZ® or NisinA® application.

