NISIN, TECHNICAL DATA SHEET

DESCRIPTION
Nisin natural antimicrobial is used to control bacterial spoilage in both heat processed and low pH foods. Nisin is a natural polypeptide antibacterial produced by strains of *Lactococcus lactis* subsp *lactis*. Nisin is effective against a wide range of Gram-positive bacteria and is particularly effective against the heat resistant spores produced by Gram-positive *Bacillus* and *Clostridium* spp. Nisin has no effect against Gram-negative bacteria, yeasts or moulds.

Nisin is manufactured from the fermentation of a milk-based medium by *Lactococcus lactis* subsp. *lactis*. The nisin from this fermentation is concentrated, dried and standardised with sodium chloride to produce Nisin, which has a known and consistent level of nisin activity.

Nisin is soluble in aqueous environments and is most stable to heat in acidic conditions. At typical usage levels, Nisin does no affect the colour or flavour of the finished product.

APPLICATION AREAS
Nisin is effective in a variety of food products across a wide range of pH levels (3.5-8.0), including:
- Dairy: Cheese products: processed cheese and cheese spreads, club cheese, blended cheese, direct-acidified fresh cheeses, natural ripened cheese; Cream products (flavoured, shipped, thickened, sour cream, etc.); dairy and fat based desserts; yoghurt; recombined and flavoured milks
- Fruit & vegetable preparations including pulp, pasteurised fruit juices, plant protein based beverages, coconout water
- Wips and snacks
- Pasteurised liquid egg products
- Low pH sauces and toppings including mayonnaise and salad dressings
- Pasteurised soups and sauces
- Canned vegetables
- Processed meats
- Hot plate flour products e.g. crumpets
- Fermentation processes and fermentation products such as beer

POTENTIAL BENEFITS
Extend shelf life of food products, prevent spoilage and protect against temperature abuse
- Extremely effective against Gram-positive bacteria and bacterial spores, the major spoilage organisms in heat processed foods

Enhance product quality
- Reduce processing temperatures
- Formulate at higher pH and therefore reduce acidity
- Formulate at reduced salt levels

Reduce manufacturing and distribution costs
- Protect against temperature abuse of chilled products
- Lower processing times and temperatures
• Use ambient instead of chilled storage and distribution of some products, such as cheeses

Meet consumer demand for foods preserved with natural ingredients
• Replacement or partial replacement of chemical preservatives

USAGE LEVELS
Recommended addition levels for Nisin would typically be between 25-500 mg per Kg or litre of food. Exact dosage levels will depend on the nature of the food product, processing condition, microbial load and shelf life requirements. Some loss of nisin activity can be expected during the heat processing of foods with further activity losses during shelf life. These factors are taken into consideration when usage recommendations are made by our Technical Service Team. Advice should be sought for more precise recommendations on specific usage levels.

DIRECTIONS FOR USE
Nisin should be added to heat processed foods by thorough dispersion in the food substrate prior to the heating process. Nisin can be added directly to the food as either a dry powder or as a pre-suspension in water or milk. In some processing situations there may be potential for adding Nisin by other methods such as dipping, or alternatively after a fermentation process, e.g. stirred yoghourt. Advice should be sought for these more specialised food application areas.

SPECIFICATIONS

Physical form
A cream to off-white, micronised spray-dried powder blended with micronised sodium chloride. Nisin is certified kosher dairy (Manchester Beth Din, UK) and is approved as Halal by The Muslim Food Board (UK).

Sodium chloride content
Not less than 50%

Nisin activity
Blended to a minimum of 1000 iu per mg

Moisture (LOD)
Not more than 3% (w/w)

pH of a 10% aqueous suspension
pH 3.3 to 3.8

Heavy metals
- Arsenic: Not more than 1 ppm
- Lead: Not more than 1 ppm
- Mercury: Not more than 1 ppm
- Heavy metals as Lead: Not more than 10 ppm

Other metals
- Copper: Not more than 50 ppm
- Zinc: Not more than 25 ppm
- Copper+zinc: Not more than 50 ppm

Microbiological content
- Mesophilic aerobic bacteria: Not more than 10 cfu/g
- Escherichia coli: Absent in 25 g
- Salmonealle: Absent in 25 g
- Coagulase-positive: Absent in 25 g
- Staphylococci

Shelf life
2 years from date of packaging if stored below 25 ºC in dry conditions away from direct sunlight. Use by date and batch code are stamped on each container.
STORAGE
Nisin can be stored at ambient temperature. It is stable for 2 years from the date of manufacture when stored in the original containers in dry conditions, away from direct sunlight and at 4°C to 25°C.

PACKAGING
Nisin is supplied in 500 g. polyethylene bottles.

COMPOSITION
Nisin is standardised to deliver a specific concentration. The typical composition is:

Nisin 2.5%
Sodium chloride >50%
Protein 12.0%
Carbohydrate 6.0%
Moisture <3%
All percentages are by weight.

PURITY AND LEGAL STATUS
Nisin is food grade and complies with specifications established by the FAO/WHO, the European Purity Criteria for Nisin (E234), the USA Code of Federal Regulations Title 21 Part 184.1538 and the Food Chemicals Codex (FCC) 4th Edition. In the USA, nisin is considered GRAS for use in various foods under 21 CFR 184.1538 and 170.30 under the designation “nisin preparation”. In the EU, nisin is approved under the Miscellaneous Food Additives Regulations 1995 (Statutory Instruments N° 3187) as amended (Commission Directive: 96/77 EC), and may be labelled as “Preservative: E234”, or “Preservative: Nisin”.

Local food regulations should always be consulted concerning the status of this product, as legislation regarding its use in foods varies from country to country. Advice regarding the legal status of this product is available on request.

SAFETY AND HANDLING
A Material Health and Safety Data Sheet is available on request.