APPLICATIONS OF NISIN

NISIN , as an effective **Natural Food Preservative**, can be used in a number of Foods under the permission by local legislation.

Some of the applications of NISIN are listed as follows:

1) Dairy Products
2) Meat Products and Marine Products
3) Plant Protein Foods
4) Canned Food
5) Fruit Juice Drinks
6) Liquid Egg and Egg-Contained Products
7) Alcoholic Beverage
8) Salad Sauce And Dressings
9) Sealed Foods With Heat Process

1) DAIRY PRODUCTS :

a) Addition of 0.05 gm /kg. NISIN to pasteurized milk, the storage period can be **expanded over 2 times.**

b) Adding 0.08 gm. / kg. to 0.1gm. /kg. NISIN to second Disinfected Milk and sterilizing at 115°C for 15 minutes can make the products to reach the commercially **"No bacteria standard".**

c) Usage of 0.05 gm. / kg. NISIN in sour milk and fruit milk (about pH = 4) and sterilizing at 90 °C for 20 minutes can **prolong** the Shelf Life from **6 days up to over 1 month** at ambient Temperature.

d) Usage of 0.05 gm / kg. NISIN at UHT in Bacteria-Free packing milk, can reduce the rate of putrefaction from 0.04% to 0%.

e) Addition of 0.08 gm. / kg. to 0.1 gm. / kg. NISIN to No-sugar canned condensed milk, can inhibit the out-growth of Heat-Resistant spores and **decrease 10 minutes in heat process time.**

f) Addition of 0.08 gm. / kg. NISIN and treatment at 121 °C for 3 minutes (i.e. FO=3) can maintain the Shelf life of low or Non-Fat Milk, No - salt Cream, and Flavor Milk to 6 weeks at 40 °C .

g) Addition of 0.05 gm. /kg. to 0.1gm. / kg. NISIN to processing **Cheese** can **solve the putrefaction** caused by Gram-positive bacteria (such as Clostridium botulinum and other Anaerobic Clostridium, Lactobacillus bulgaricus etc.).

2) MEAT PRODUCTS AND MARINE PRODUCTS :

a. **Meat Foods :**

Addition of 0.05 gm. / kg. to 0.15 gm. / kg. NISIN combined with a few of other food preservatives to the low temperature Meat products can expand the **storage period** to **more than 3 months** at Ambient Temperature.

b. **Marine products :**

Addition of 0.1gm. / kg. to 0.15 gm. / kg. NISIN to Fish or Mollusks or other marine products can effectively inhibit the spoilage Gram-positive bacteria, and prolong the Shelf life **over 5 times.**

3) PLANT PROTEIN FOODS :

a. Addition of 0.1gm. / kg. to. 0.15 gm. / kg. NISIN to Soya-bean Milk can prolong the Shelf life **over 3 times.**

b. Addition of 0.1gm. / kg. NISIN to Lactones bean Curd can expand the Shelf life **over 5 times.**

c. Addition of 0.1gm. / kg. NISIN combined with a few of other food preservatives to Bean Cheese and sterilization appropriately can prolong the Shelf life to **6 months.**

d. Addition of 0.1gm. / kg. NISIN to Peanut milk (the microbial colonies is less than 40 cfu / ml after pre-treatment) can increase the Shelf life to more than **one month.**

4) CANNED FOOD :

Canned foods are often contaminated by some extremely heat- resistant bacteria spores.

These spores will grow to cause food decay in appropriate condition.

Addition of 0.1gm. /kg NISIN to Canned Food can **Prolong the food storage to 2 years at blazing Temperature**.

Moreover, its use in canned foods can also decrease the heat- treatment degree by 50%, which not only **saves the energy**, but also **improves the Nutritional Value,** Appearance and Quality of foods.

5) FRUIT JUICE DRINKS :

The putrefaction of fruit juice is caused mainly by Alicyclo Bacillus spp., which is an Acidic and heat resistant spore - forming bacteria and suitable to grow & reproduce at temp. of 25°C – 60 ° C and at pH 2.5 - 6.0.

Alcalophilus spp. can contaminate the product in the process of drinking, production or water using.

The addition of 0.05 gm. / kg. to 0.1gm. / kg. NISIN can prevent the growth and reproduction of the survival Alicyclobacillus *spores* and guarantee the quality of products.

6) LIQUID EGG AND EGG-CONTAINED PRODUCTS :

Addition of 0.05 gm. / kg. to 0.1gm. / kg. NISIN to liquid egg or egg-contained products can effectively inhibit heat-resistant spores and prolong the Shelf life from **7 days to over one month.**

7) ALCOHOLIC BEVERAGE :

NISIN can not inhibit Y*east* and therefore, is allowed to be used in
The Fermentation of Alcoholic Beverage, such as Beer, Fruit wine
And other wine products.

a. **Yeast pre-treatment**: NISIN can **replace** the **traditional method** of acidic rinse to eliminate the contamination of *Lactolactis* in *yeast*, which **will increase** the Living Activity, Fermentation and Aggregation of Yeast.

1.0 gm./ kg. to 1.5 gm. /kg. NISIN is added to *yeast syrup* and stir well, then keep it for 4-6 hours.

b. **Decrease pasteurized time**: Add 0.01gm / kg. to 0.05 gm. / kg. NISIN to the products at the end of pasteurization.

c. **Inhibit bacteria**: Addition of 0.025 gm. / kg. to 0.1gm. / kg. NISIN before Fermentation, the residual amount of NISIN in the finished wine can reach 0.01gm. / kg. to 0.05 gm. / kg.

Addition of 0.1gm. / kg. NISIN during the process of Fermentation of the Grape wine can prevent the pollution caused by *Lactobacillus brevis, L. casei and Leuconostoc* spp. et al.

8) SALAD SAUCE AND DRESSINGS :

Addition of 0.05 gm. / kg. to 0.2 gm. /kg. NISIN to these types of products can inhibit Lactic-acid bacteria and spores, reduce the putrefaction of Low - Fat and Low - Salt products, and prolong the Shelf life by **over 3 times.**

9) SEALED FOODS WITH HEAT PROCESS :

High heat process will affect the quality of sealed foods, and low heat process will not kill the heat-resistant spores.

The addition of 0.05 gm. / kg. to 0.2 gm. / kg. NISIN to these types of foods can solve above mentioned problems effectively.

IMPORTANT POINTS TO REMEMBER DURING APPLICATIONS .

1. NISIN can **inhibit** the **Gram-positive bacteria**, but has **no action** on **Gram-negative bacteria, Yeasts and Moulds.**

The usage of NISIN combined with other food preservatives will increase the effect when the products contaminate Gram-negative Bacteria, Yeasts and Moulds.

2. The effect of NISIN, as a Food Preservative is affected by the factors below:

a. **The type of products:** The contaminated microbes vary in products, and NISIN possesses different inhibiting action on different microbes.

b. **The degree of pollution and environment conditions:** The deeper of pollution and the poorer of environment conditions, the more the NISIN should be used. And the usage of NISIN will not be effective for the rotten products.

c. **The pH of products:** NISIN is effective with a wide range of pH level (3.5--8.0). It is stable at low pH value.

d. **The Moisture, Fat and Salt in the products:** the products with high moisture, high fat and low salts will need more usage of NISIN.

e. **The types of flavor additives:** The mixture of oxidizing flavor additives can decrease the effect of NISIN .

f. **The process and the package materials:** The appropriate process and the cleaned package materials will optimize effects for the usage of NISIN.

g. **The homogeneous degree of the mixture of the product and NISIN** : The parts of the product without touch with NISIN are not effective .

h. The amount of NISIN used varies with **Storage Temperature** and the **Shelf life.**