

Specification

FINISHED PRODUCT INFORMATIONS

PRODUCT: E - POLYLYSINE

MSDS No.: BPPL 155 (Available on Request)

SPECIFICATION NO.: FP- 155

1. **NOMENCLATURE** : Epsilon Poly L-Lysine
2. **CAS NO.** : 28211-04-3
3. **EMPIRICAL FORMULA** : $C_{6n}H_{14n-2(n-1)}N_{2n}O_{2n-(n-1)}$ (n=25-35)
: $(C_6S_{12}N_2O)_n$
4. **HS CODE NO. (ITC CODE)** : 294190
4. **MOL . WT.** : 3200 to 4500
5. **MELTING POINT** : 172.8°C
6. **DESCRIPTION** : Milky Yellow to White Powder.
: Soluble in Water.
7. **PACKING** : 250 gms / 500 gms. Plastic Bottle
: 1000 gms. (1.0 Kg) Plastic Bottle
: 10 Bottles / 20 Bottles / Case
: As per customer's requirement.
8. **STORAGE** : Store in cool (0-20°C), and dry conditions.
: Keep away from direct sunlight in original unopened packs.
9. **SHELF LIFE** : 2 Years.

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- 1. DESCRIPTION** : Milky Yellow to White Powder.
- 2. SOLUBILITY** : Soluble in Water.
- 3. MOISTURE CONTENT** : NMT 5.0%
- 4. pH(1% Aqueous solution)** : 4.0 to 6.5
- 5. PURITY** : More than 98% (Generally, 99%)
- 6. ARSENIC (As)** : NMT 1 ppm
- 7. HEAVY METALS (Pb)** : NMT 1 ppm
- 8. ASH** : NMT 3.0% (Generally, less than 1.0 %)
- 9. MICROBIAL LIMIT TEST**
 - Total Colony Count : NMT 100 cfu/gm.
 - Coliform group : NMT 30 / 100 gms.
 - E. Coli : Absent
 - Salmonella : Absent (CFU/ 25 gms)

What is ϵ -Polylysine?

ϵ -Polylysine is a Naturally occurring Homo-polymer of L-lysine with a degree of polymerization of 25 to 35 and Mol. weight of approximately 5000. It is produced by Bacterial Fermentation and it has an Antimicrobial effect against Yeast, Fungi and Gram-Positive and Negative Bacteria, making it suitable for Versatile applications in the Food, Feed, Nutraceutical and cosmetic industry.

How does it work?

ϵ -Polylysine attaches to the cell membrane of the Microbial, followed by a destroy of the complete membrane structure and the option to the material to damage the energy metabolism which will cause the material, energy and information transmission of the cell to stop.

This will eventually leads to the intracellular lysosomal membrane rupture, induce the micro-organisms to autolysis and the break of the Intracellular lysosomal membrane causing death of the bacterial cell.

Why ϵ -Polylysine is used?

ϵ -Polylysine is one of the Natural Preservatives, and it is unique in its Broad Antibacterial Spectrum.

It has been used in many food applications for more than 20 years. Due to the benefits of ϵ -Polylysine, there is a huge potential to protect a wide variety of food, as well as personal care products.

Extend shelf life

Compared with NISIN and other Natural Preservatives, ϵ -Polylysine has a wide Antibacterial spectrum and there is an obvious killing effort to Gram-positive and Gram-negative bacteria, Yeasts, Molds and Viruses.

It has a good antibacterial effect to gram-negative bacteria, E. coli and Salmonella, which are hard to be controlled by other natural preservatives. It also has inhibitory effect to the heat resistance of Bacillus and some viruses, but higher concentration is required to inhibit Yeasts and Molds.

Health and Safety Information

ϵ -Polylysine has been used in food preservation since the late 1980s, and there is no health or safety issues world wide. Due to its high effectiveness against harmful bacteria and Mycotoxins, the usage of ϵ -Polylysine could help to solve concerns of health and safety issues in food and personal care industry.

History of safe use

ϵ -Polylysine was first commercialized in Japan at the end of 1970s.

Late 1980s, it was approved for use in Food by the Japanese Ministry of Health, Labour and Welfare as a preservative.

In 2004, it became GRAS (Generally Recognized As Safe) certified in the United States of America.

In China, the use of ϵ -Polylysine has been allowed on variety of food applications since May 2014.

In 2009, ϵ -Polylysine was assigned INCI name as POLYEPSILON-LYSINE by the International Nomenclature Committee, and classified as hair conditioning and skin conditioning.

Application of e Polylysine

- With features of solubility in water, Good Heat Tolerance and; Extensive Antimicrobial against fungi, e- Polylysine can be used under various conditions. See the effects of temp. and pH on the activity of e-Polylysine as under: (Table 1 and Table 2)

Table- 1 : Effect of Temp. on the Activity of e Polylysine

Temp. & Duration	MIC (mg/Ltr)
Untreated (Room Temp.)	50
80°C,for 60 minutes	50
100 °C, for 30 min	50
120 °C, for 20 min	50

MIC = Minimum Inhibition Concentration

Table- 2 : Effect of pH on the Activity of e Polylysine

Bacteria for Test	MIC (mg/Ltr)			
	pH =5.0	pH =6.0	pH =7.0	pH =8.0
Bacillus Subtilis	3.0	3.0	3.0	3.0
Bacillus Cereus	25.0	100.0	50.0	12.5
Escherichia coli	25.0	25.0	50.0	50.0
Staphylococcus aureus	12.5	25.0	12.5	< 6.3

- e-Polylysine was generally recognized as a safe food preservative by FDA in October,2003.
- It is widely used in food preservation.
- In food application, it is usually applied with Alcohol, Organic Acids, or Glyceride, etc..

- It can be used in
 - Cooked rice,
 - Cakes,
 - Snacks,
 - Noodles,
 - Drinks,
 - Brewing,
 - Meat products,
 - Canned food, etc.

- Polylysine is dissolved in cold boiled water or distilled water to 5-10% , then put it into the food according to the recommended dosage and mix fully. If it is used together with other food preservatives, it will can affect better.

- No Influence on Food Flavor