Bio-G-Lacto – Microbial Stabilization for Raw Milk and Other Food Applications

Introduction

Bio-G-Lacto is an innovative enzyme-based product developed by BGA-Dictum GmbH, specifically designed for microbial stabilization in various food products. The product is based on the highly effective lactoperoxidase system, which plays a crucial role in prolonging shelf life and ensuring food safety, particularly in raw milk, sauces, dressings, and egg-based products.

Applications of Bio-G-Lacto

1. **Raw Milk**
   - In regions where pasteurization is uncommon, such as India, raw milk poses significant health risks due to microbial contamination. Raw milk is often consumed after only minimal cooling, leading to frequent cases of foodborne illnesses, some of which result in fatalities.
   - Bio-G-Lacto is specifically formulated to address these issues by inhibiting the growth of harmful pathogens such as *Escherichia coli*, *Listeria monocytogenes*, and *Salmonella*. Studies have demonstrated that Bio-G-Lacto can effectively double the time it takes for bacterial counts to reach critical levels in untreated raw milk.
   - The product's role in enhancing the safety of raw milk is crucial in preventing illnesses associated with contaminated milk consumption. By applying Bio-G-Lacto, dairy producers can offer a safer product with a significantly longer shelf life, even in the absence of pasteurization.
2. **Sauces and Dressings**
   - Bio-G-Lacto also plays an essential role in sauces, dressings, and other liquid-based food products, where microbial growth needs to be carefully controlled to maintain product freshness and quality.
   - The product is effective in inhibiting the growth of lactic acid bacteria and other spoilage organisms, allowing for extended shelf life without the use of artificial preservatives. Its clean-label characteristics align with modern consumer demand for natural and safe food additives.
3. **Egg-Based Products**
   - Liquid eggs, boiled eggs, and other egg-based products benefit from the application of Bio-G-Lacto. By inhibiting the growth of pathogenic

microorganisms, Bio-G-Lacto ensures the safety and stability of these products, particularly in cases where refrigeration may be insufficient.

Effectiveness of Bio-G-Lacto in Raw Milk

The most critical application of Bio-G-Lacto is in raw milk. Raw milk is highly susceptible to bacterial contamination, particularly in regions where refrigeration and pasteurization are limited. The unique properties of Bio-G-Lacto allow it to significantly extend the microbial stability of raw milk, making it safer for longer periods without requiring additional processing steps like pasteurization.

- **Escherichia coli**: Studies have shown that Bio-G-Lacto, when applied at the correct dosage, can suppress the growth of *E. coli* in raw milk, extending the time it takes for bacterial counts to reach harmful levels.
- **Listeria monocytogenes**: In challenge tests, Bio-G-Lacto demonstrated clear inhibitory effects on *Listeria* growth in milk, with significant microbial reduction even at lower dosages.
- **Salmonella**: The product effectively inhibits the growth of *Salmonella* species, another major pathogen of concern in raw milk.

These results make Bio-G-Lacto a vital tool for ensuring the safety of raw milk, particularly in markets like India, where pasteurization is less common.

Lactoperoxidase System – Mode of Action

The lactoperoxidase system, the foundation of Bio-G-Lacto, is a natural enzyme system known for its potent antimicrobial properties. Its effectiveness is based on the formation of short-lived oxidation products, which react with the cell membranes of microorganisms, leading to their inhibition or inactivation.

- **How it works**: When Bio-G-Lacto is added to food products, the lactoperoxidase enzyme catalyzes the oxidation of thiocyanate in the presence of hydrogen peroxide. This process produces hypothiocyanite, a compound with powerful antimicrobial properties.
- **Specificity**: The oxidation products specifically target the cell membranes of bacteria, yeasts, and molds, inhibiting their growth and preventing spoilage without affecting the food's organoleptic qualities.
- **Broad-spectrum antimicrobial effect**: The lactoperoxidase system is highly effective against a wide range of microorganisms, including Gram-positive and Gram-negative bacteria, as well as yeasts and molds. It works against common foodborne pathogens such as *E. coli*, *Listeria monocytogenes*, and *Staphylococcus aureus*, as well as spoilage organisms like *Pseudomonas*. One of the key advantages of the lactoperoxidase system is that it is highly specific to microbial cells, leaving other components of the food unaffected. This allows Bio-G-Lacto to be used without compromising the quality or taste of the product.

Superior Enzymatic Activity

The lactoperoxidase system in Bio-G-Lacto is superior to other antimicrobial systems due to its high enzymatic activity and specificity. The enzymes used in Bio-G-Lacto are of high quality, ensuring that the product works effectively even at low dosages.

- **Quality and Production Process**: The effectiveness of the lactoperoxidase system depends significantly on the quality of the enzymes used. Bio-G-Lacto is produced with strict quality controls to ensure that the enzyme system remains stable and active throughout the product's shelf life.
- **Dependence on enzyme yield**: The production process for Bio-G-Lacto ensures a high yield of active enzymes, which is critical for maintaining its antimicrobial effectiveness.

Compliance and Safety

Bio-G-Lacto complies with international food safety standards, including Codex Alimentarius, the European Union (EU), and the U.S. Food and Drug Administration (FDA). It is classified as a processing aid, meaning it does not remain active in the final product and does not require labeling under EU regulations (89/107/EEC; EU 1333/2008).

- **No Residues**: Bio-G-Lacto leaves no active residues in the final product, as its antimicrobial activity is completed during food processing. This ensures that the product is safe for consumption and does not alter the final food product's characteristics.
- **Safe to Use**: Bio-G-Lacto is safe for use in various food products, helping maintain food safety without the need for artificial additives or preservatives.

Conclusion

Bio-G-Lacto is a cutting-edge enzyme-based solution for microbial stabilization in raw milk and other food products. Its application in raw milk, particularly in regions where pasteurization is not widely practiced, makes it an essential tool for improving food safety and reducing the risk of foodborne illnesses. The superior antimicrobial activity of the lactoperoxidase system ensures that Bio-G-Lacto provides long-lasting protection against pathogens, making it a critical addition to the modern food industry.

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