Vital Humic BAC-13

Enhancing Manure Management through Bioactive Ingredients

Introduction

Proper manure management is essential for agricultural productivity and environmental protection. Vital Humic BAC-13 incorporates a blend of natural and bio-synthesized ingredients designed to improve manure treatment by facilitating nitrogen cycling, reducing methane, preventing crusting, and accelerating organic matter decomposition. This document outlines the function of key ingredients in supporting these outcomes.

Converting Ammonia to Nitrates in Manure

Nitrification is supported by humic acid and fulvic acid, which enhance the microbial environment. Bacillus subtilis, B. licheniformis, and B. megaterium convert ammonia into nitrites and subsequently into nitrates, with Saccharomyces cerevisiae promoting a balanced microbial ecosystem.

Reducing Methane in Manure

Methane emissions are reduced by promoting aerobic and acidic conditions. Lactic acid-producing Clostridium butyricum and Lactobacillus plantarum lower pH, while Trichoderma viride accelerates decomposition and limits substrate availability for methanogens.

Accelerating Decomposition in Manure

Molasses and evaporated cane juice supply carbon for microbial metabolism, while Norwegian kelp and fulvic acid enhance trace mineral content. Lactobacillus species such as L. buchnerii and L. fermentum facilitate organic matter breakdown.

Preventing Crusting in Manure Ponds

Crusting is mitigated through microbial degradation of fibers and fats. Humic and fulvic acids improve consistency, and Bacillus amyloliquefaciens produces enzymes targeting crust-forming polysaccharides.

Creating More Nitrogen than Natural Decomposition

Nitrogen availability is improved via nutrient support from kelp and potassium salts, and nitrogen-fixing activities of Bacillus pumilus and B. subtilis.

Preventing Manure Foaming

Foaming is reduced by enzymatic degradation of proteins and fats. Clostridium butyricum and Lactobacillus lactis help suppress foam formation, supported by molasses and cane juice as microbial substrates.

Clarifying Liquid Manures

Clarification is enhanced via flocculation and microbial decomposition. Humic and fulvic acids support particle aggregation, while B. megaterium and Trichoderma viride assist in organic breakdown.

Converting Nitrites into Nitrates

This second step in nitrification is carried out by Bacillus subtilis, B. licheniformis, and B. amyloliquefaciens, supported by Saccharomyces cerevisiae for maintaining microbial health.

Scientific References Vital Humic BAC-13 (Manure Management)

- Arogo, J., et al. (2006). Biofilters for controlling animal odor and air emissions. Journal of Environmental Quality.
- Zhu, J. (2000). A review of microbiological processes in manure management. Bioresource Technology.

DISCLAIMER

Note: The product does not treat, prevent, or cure disease. Statements are intended to describe general physiological support roles of nutrients and should comply with CFIA and USDA guidance on structure-function claims.

Vital Humic Commitment to Quality and Transparency in Ingredients and Manufacturing

At our company, we pride ourselves on transparency. We are not afraid to list all our ingredients, including their quantities and, more specifically, the bacterial strains and sub-strains (legacy bacteria) that we use. This openness stems from our confidence in the quality and efficacy of our products. Although the components we use are widely known and accessible, the true secret to our success lies in our unique sourcing and stringent quality control processes.

Vital Humic Ingredient Sourcing and Quality Control

All our ingredients are produced to meet our specific requirements, ensuring they pass our rigorous testing and efficacy standards. These ingredients are manufactured in small batch

quantities exclusively for our purchase, a practice we believe is essential for maintaining a consistent product. Our meticulous approach to sourcing guarantees that every component we use is of the highest quality, contributing to the superior performance of our products.

Small Batch Production

We believe that producing ingredients in small batches is crucial for maintaining consistency and quality. Each batch is carefully monitored and tested to ensure it meets our stringent standards. This attention to detail allows us to deliver products that consistently meet our customers' expectations, providing reliable and effective solutions.

Vital Humic Fermentation Process

One of the key aspects of our manufacturing process is fermentation. This method, while time-consuming, is underpinned by a robust scientific foundation. We did not select our bacterial strains solely for their field performance; their role in the fermentation process is equally critical. These bacteria are chosen for their ability to produce bio-synthesized nanoparticles, which enhance the efficacy of our products.

Extended Fermentation Period

The proprietary fermentation process we employ takes a considerable amount of time, and for good reason. It is essential to allow the bacteria sufficient time to perform their metabolic functions. During this extended period, the bacteria break down molecules into progressively smaller molecules, repeatedly undergoing metabolism. This process not only creates new molecules but also enhances the bacteria's ability to thrive in various environments and conditions.

Bio-synthesized Nanoparticles

Vital Humic bacterial strains play a pivotal role in the production of bio-synthesized nanoparticles. These nanoparticles are integral to the effectiveness of our products, as they enhance the delivery and performance of the active ingredients. By harnessing the natural abilities of our bacteria, we can produce products that are more effective and efficient.

Scientific Foundation and Innovation

Our approach to manufacturing is deeply rooted in scientific principles. We continuously innovate and refine our processes to ensure we are producing the best possible products. This commitment to science and innovation is reflected in every aspect of our production, from ingredient sourcing to the final product.

Research and Development

Our extensive research and development efforts are a testament to our commitment to quality and innovation. We invest heavily in R&D to ensure we are utilizing the latest scientific advancements in our products. This focus on research allows us to develop unique and effective solutions that meet the evolving needs of our customers.

Commitment to Customer Satisfaction

Ultimately, our goal is to provide our customers with products that are both effective and reliable. We believe that our transparency, quality control, and scientific approach set us apart from the competition. By maintaining these high standards, we aim to build long-lasting relationships with our customers based on trust and satisfaction.

Quality Assurance

Our quality assurance processes are designed to ensure that every product we produce meets our rigorous standards. From raw material sourcing to final product testing, we leave no stone unturned in our quest for quality. This meticulous approach ensures that our customers receive products they can rely on.

Disclaimer

This document is intended for informational purposes only and does not constitute a warranty or guarantee of product performance. The manufacturing and quality control descriptions are based on current practices and may be refined over time in line with scientific and regulatory developments. Always consult with a qualified expert when evaluating inputs for specific agricultural, horticultural, or ecological applications.

Vital Humic Proprietary Fermented Bio-Synthesized Nanoparticles

Understanding the Role of Bacteria and Their Impact on Plant Health

Introduction

In recent years, the development of bio-synthesized nanoparticles has gained significant attention due to their eco-friendly nature and potential applications in various fields, including agriculture. These nanoparticles are produced through biological processes, often involving the fermentation of specific bacteria. This document explores the production of bio-synthesized nanoparticles, the role of certain bacteria, and their efficacy as adjuvants or surfactants in agriculture. Additionally, it examines the adverse effects of traditional adjuvants and surfactants on plant health.

Bio-Synthesized Nanoparticles in Fermentation Processes

Vital Humic bio-synthesized nanoparticles are tiny particles produced through biological processes, typically by microorganisms such as bacteria, fungi, and plants. These nanoparticles are synthesized through various mechanisms, including intracellular and extracellular routes, during the fermentation process. Vital Humic's proprietary fermentation process involves the cultivation of microorganisms under controlled conditions, leading to the production of nanoparticles as by-products of their metabolic activities.

Production Mechanism

During Vital Humic proprietary fermentation, microorganisms secrete enzymes and other biomolecules that facilitate the reduction of metal ions to form nanoparticles. The nanoparticles are stabilized by capping agents present in microbial culture. The size, shape, and properties of these nanoparticles can be influenced by factors such as the type of microorganism, growth conditions, and the presence of specific nutrients or additives.

Bacteria Assisting in the Production of Vital Humic Bio-Synthesized Nanoparticles

Lactobacillus plantarum Lp-G18

Known to produce silver nanoparticles (AgNPs) with antimicrobial properties beneficial in agricultural applications.

Bacillus subtilis BS-GA28

Synthesizes gold nanoparticles (AuNPs) that offer high biocompatibility and stability, ideal as agricultural adjuvants or surfactants.

Bacillus amyloliquefaciens BA-GA77

Produces zinc oxide nanoparticles (ZnO-NPs), known to support plant growth and resistance against pathogens.

Efficacy of Bio-Synthesized Nanoparticles as Adjuvants or Surfactants

- Enhanced Efficacy: Improves the delivery and absorption of active ingredients, reducing required application rates.
- Biocompatibility: Naturally produced and biodegradable, minimizing environmental and ecological risks.
- Controlled Release: Enables sustained release of actives for long-lasting effects.

Adverse Effects of Traditional Adjuvants and Surfactants on Plant Health

While synthetic surfactants and adjuvants may improve application efficiency, they can negatively impact plant and environmental health.

Phytotoxicity

Synthetic surfactants may cause leaf burn, chlorosis, and stunted growth, reducing photosynthetic activity and crop yield.

Soil and Water Contamination

Persistent compounds may accumulate, harming soil microbiota and contaminating aquatic systems.

Non-Target Effects

Synthetic compounds may affect beneficial insects, soil organisms, and overall biodiversity.

Conclusion

Vital Humic bio-synthesized nanoparticles, derived from proprietary fermentation processes, offer a sustainable and effective alternative to traditional adjuvants and surfactants in agriculture. With support from microbial agents like Lactobacillus plantarum, Bacillus subtilis, and Bacillus amyloliquefaciens, these nanoparticles enhance agricultural spray efficacy while protecting plant and environmental health. Ongoing research continues to reveal their potential in sustainable agricultural solutions.