Sterigenics
A Sotera Health company

The Role of Irradiation in the Production of Bioinputs for Sustainable Agriculture

Bioinputs are agro-industrial products or processes derived from living organisms or their byproducts. These include microorganisms, enzymes, plant extracts, and other biological materials, and are often referred to by terms such as Biological Defense, Biodefense, and Agricultural Biologicals. They may be classified as biofertilizers, biopesticides, among other related categories.

Used to promote crop growth, improve soil health, and control pests, bioinputs leverage natural, biological means. The use of bioinputs contributes to agricultural sustainability by enhancing soil fertility, promoting ecological balance, and supporting more sustainable farming practices. Moreover, bioinputs help boost agricultural productivity by improving crop yields and fostering healthier, more resilient crops.

Bioinput Production and the Importance of Contamination Control

The production of bioinputs involves inoculating microorganisms onto substrates, requiring strict contamination control to maintain microbial culture integrity. As even small amounts of unwanted microorganisms can proliferate and compromise the bioinput's performance, the entire production chain needs to be carefully managed to prevent contamination.

One of the especially critical points are the raw materials, as they often come from natural sources, such as sugar mixtures, grains, or soil-based materials. This makes the incorporation of raw materials one of the most crucial steps in the process, highlighting the need for substrates to undergo prior treatment capable of eliminating these unwanted contaminants.

The Beneficial Role of Radiation Technologies

Radiation technologies have been scientifically proven and widely used across many industries for over 70 years. Both Gamma and Electron Beam (E-beam) irradiation offer effective solutions for reducing microbiological contamination in substrates used for bioinput manufacturing. These non-invasive methods effectively eliminate or minimize microbial contamination (depending on customer needs), supporting a high level of control over non-contaminants during the process and contributing to the delivery of a high-quality end product.

Radiation Technologies for Treating Key Elements in Bioinput Production

Radiation technologies are used to treat different media for the inoculation and growth of bioinputs, including:

Culture Media

Provides ideal conditions for the growth and reproduction of microorganisms, ensuring effective inoculation.

Peat

Supports the viability and growth of bioinputs in peat substrate, even when microbial contamination levels are higher than desired.

Grains and Other Natural Substrates

Reduce risks of contaminants and microbiological load, while providing a healthy and nutritive environment for the effective inoculation of the substrate.

For more information, please contact our Brazil Sterigenics team at:
Comercial@sterigenics.com | + 55 11 3540-0600 | sterigenics.com

Sterigenics offers industry-leading radiation services, resulting in the elimination or reduction of unwanted microorganisms, thereby enhancing the potential of fungi and bacteria used as pesticides and fertilizers in the agricultural environment.

Advantages of Using Radiation Technologies

Radiation technologies, offer significant advantages in reducing microbial contamination across various industries. These methods are scientifically proven and effective in enhancing product quality and safety.

Productivity

Scientifically proven, non-invasive, and reliable processes. Efficient solutions applied directly to packaging, eliminating handling steps. Scalable processes to support business growth.

Sustainability

Environmentally friendly processes with no use of chemical substances. No residual products.

Quality

Compliance with ISO 9001 quality standards. Certified processes supported by expert advisors to facilitate smooth market transitions.

Conclusion

The use of bioinputs plays a vital role in promoting agricultural sustainability, improving crop productivity, and fostering healthier, more resilient farming systems. By leveraging biological materials like microorganisms, enzymes, and plant extracts, bioinputs contribute to soil health, ecological balance, and the enhancement of agricultural practices. However, maintaining the quality and efficacy of bioinputs depends heavily on strict contamination control during production. Effective microbial load management, especially during substrate preparation, is crucial to prevent contamination from compromising the bioinput's performance. Radiation technologies, such as Gamma and Electron Beam (E-beam), offer highly effective alternatives for microbiological reduction, ensuring the integrity of the final product.

About Sterigenics

Sterigenics is a leading global provider of outsourced terminal sterilization services for the medical device, pharmaceutical, food safety and advanced applications markets. With our industry recognized expertise, we help to ensure the safety of millions of patients around the world every year. Across our 48 global facilities, we offer our customers a complete range of sterilization services, primarily using the three major technologies: Gamma irradiation, Ethylene Oxide processing and Electron Beam irradiation. We are committed to addressing the growing need for sterilization across the world and partnering with our customers to eliminate threats to human health.

For more information, please contact our Brazil Sterigenics team at:
Comercial@sterigenics.com | + 55 11 3540-0600 | sterigenics.com