VII Simpósio de Microbiologia Agrícola
Inovação e Sustentabilidade para transformar o campo
18 a 21 de maio de 2026

Biological Safety of Commercial and On-Farm Bioinputs for Agricultural Use

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The advent of bioinputs has introduced new perspectives for a sustainable and efficient agribusiness, establishing them as essential biotechnological tools for global food security. Many of these products are formulated based on living microorganisms, such as bacteria and fungi, which play important roles in agricultural management. Their production may occur in commercial biofactories or in *on-farm* systems intended for use within rural properties. Regardless of the production system, ensuring microbiological quality is essential, due to the risk of contamination by undesirable microorganisms, including human pathogens. This study aimed to evaluate the microbiological quality of commercial and *on-farm* bioinputs. Samples were obtained through contact with producers and associations, to whom sampling kits were provided. The quantification of the target microorganism and the detection of microbial contaminants were performed using selective culture media, like Wallerstein Nutrient Agar, Brilliant Green Agar, Violet Red Bile Agar. Plates were incubated under specific conditions for bacteria (37°C) and for yeasts and molds (28°C), and colonies were evaluated based on morphology and colony-forming unit (CFU) counts. A total of 21 samples collected between February and December 2025 were analyzed, including 13 from *on-farm* systems (DF, GO, RO) and 8 from commercial biofactories (MG, SP, PR, RS). Most samples showed concentrations of the target microorganism consistent with the declared values, except for three *on-farm* samples. Microbial contaminants were detected, above the allowed limit, in nine *on-farm* samples and one commercial sample. Taxonomic identification, based on partial sequencing of the 16S rRNA gene, revealed the presence of potentially pathogenic microorganisms, such as *Enterobacter cloacae*, *Enterobacter asburiae*, and *Klebsiella pneumoniae*. Additionally, four *on-farm* samples did not contain the declared microorganism. These results indicate failures in the production process, with implications for human and environmental health, reinforcing the need for strict quality control to ensure the safety and efficacy of bioinputs.

KEYWORDS: bioinputs, biological safety, contaminants, agrobusiness

FUNDING: Embrapa, FAPDF, CNPq and INCT Industrial Biotechnology