Joint Event on

18th European Biosimilars Congress

35th Annual European Pharma Congress

April 14-15, 2025

Webinar

A green alternative to synthetic pesticides: Botanical pesticides and their role in global food safety

Alexandra Andreea Botnaru, Liliana Avasilcai, Paula Cristina Morariu, Branco Adrian Morariu and Ionela Daniela Morariu
Mexico

Statement of the Problem: There is an increasing awareness that the global food system must emphasize nutritional quality, health, and environmental effect over just quantity. Food pollutants, such as pesticides, present a significant risk to food safety due to their persistent properties and harmful effects. The hazards linked to synthetic pesticides have prompted the exploration of biopesticides. The purpose of this study is to explore the role of botanical pesticides as a green alternative to synthetic pesticides, emphasizing their impact on global food safety, environmental sustainability, and human health.

Methodology and Theoretical Orientation: Critical study data were examined to compare botanical pesticides with synthetic competitors, emphasizing their primary advantages.

Findings: Reports indicate that plants from the Myrtaceae, Lauraceae, Rutaceae, Lamiaceae, Asteraceae, Apiaceae, Cupressaceae, Poaceae, Zingiberaceae, Piperaceae, Liliaceae, Apocynaceae, Solanaceae, Caesalpinaceae, and Sapotaceae families possess bioactive chemicals exhibiting efficacy against agricultural pests. Synthetic pesticides have more specific targets and are generally neurotoxicants, yielding effects similar to those of botanical pesticides. Phytopesticides contain several phytochemical substances that display different ways of action. In order to handle pests successfully, it is essential to comprehend the mechanism of action, encompassing the physical, biological, and chemical interactions between the insect and the pesticide. A topical application of undiluted essential oils on the dorsal surface of conscious cockroaches showed notable differences in efficacy: thyme, sweet orange, and lavender oils were the most potent, resulting in 100% death within 24 hours and a knockdown effect lasting less than 30 seconds. Conversely, linseed and cottonseed oils had the lowest efficacy, yielding 70% and 40% mortality after 24 hours, respectively. Botanical pesticides are more cost-effective, environmentally friendly, and sustainable. Moreover, they do not contribute to greenhouse gas (GHG) emissions and have low toxicity.

Conclusion and Significance: Botanicals provide residue-free food and a secure ecosystem, while also being far less harmful to natural insect predators. To mitigate the adverse impacts of conventional pesticides, botanical pesticides may be utilized as alternative or supplementary instruments in integrated pest management (IPM) to accomplish superior outcomes sustainably.

Biography

Alexandra Botnaru is a resident pharmacist in Clinical Pharmacy at a specialized clinical hospital and a PhD candidate in Food Science field at University of Medicine of Pharmacy of Iasi, Romania. Her subject of interest is the analysis of pesticide residues in food products. As a graduate of the Faculty of Pharmacy, she enhances her skills through an academic and professional career centered on chemical risk assessment in food and advanced contaminant detection technologies.

Received: January 25, 2025; **Accepted**: January 28, 2025; **Published**: April 28, 2025