UNIVERSITY OF LIFE SCIENCES ”KING MIHAI I” FROM TIMISOARA
”YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES”

05-06 November 2026



The Opuntia genus: nutritional and bioactive potential, with implications for food safety and biosecurity

Elisabeta Condoroș[1], Răzvan Buiu[1], Andrei – Dorin Mărginean[1], Camelia Moldovan[1], Viorica-Mirela Popa[1*]

Faculty of Food Engineering, University of Life Sciences ”King Mihai I” from Timișoara, Calea Aradului 119A, 300645, Romania

**Corresponding author, e-mail: mirelapopa@usvt.ro*

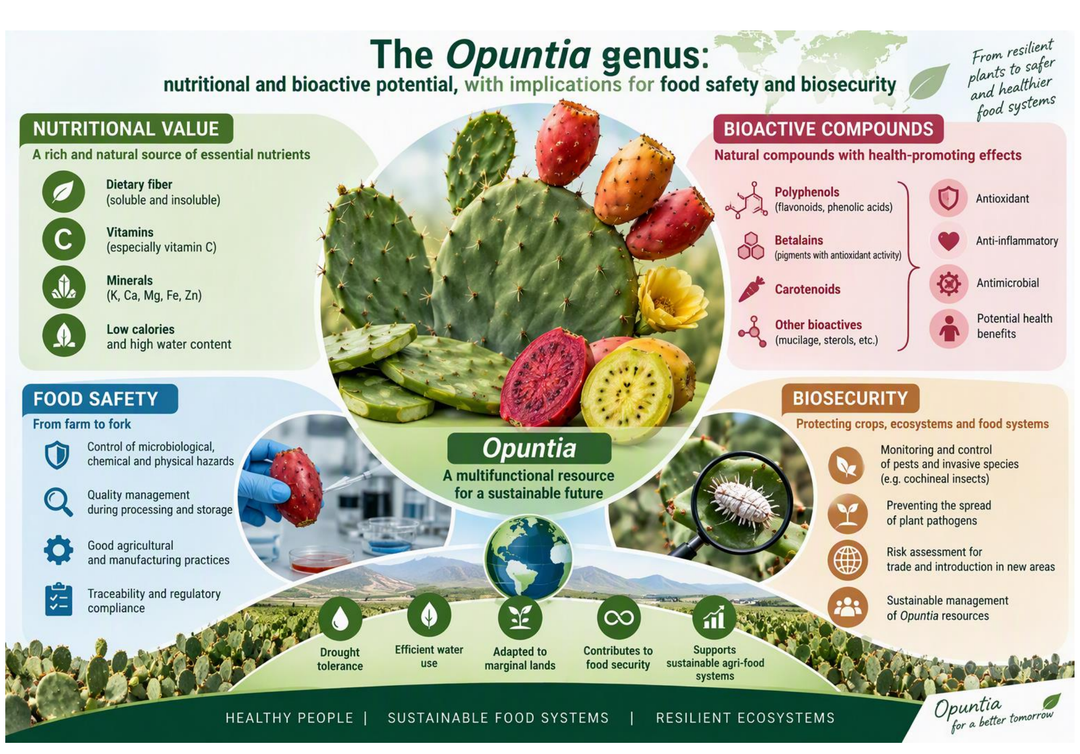
***Abstract**: Interest in identifying alternative plant resources with nutritional and functional potential has led to intensified research on the Opuntia genus, of the Cactaceae family. Published studies highlight the presence of constituents with nutritional and biological value, such as dietary fiber, minerals, phenolic compounds, flavonoids, and pigments with antioxidant activity. Research on species such as Opuntia ficus-indica has highlighted the potential for utilizing the fruits and cladodes in the development of food products, as well as the possible antioxidant and metabolic effects of bioactive compounds. From the perspective of food safety and biosecurity, however, the use of species in this genus requires careful evaluation of the raw material, given the variations in composition among species and the influence of cultivation, harvesting, and processing conditions. Botanical identification, provenance and traceability, control of biological and chemical contaminants, and the evaluation of relevant antinutritional factors are important considerations for establishing conditions for food use. Furthermore, the bioactive properties reported in scientific literature must be interpreted considering the specific species studied and the level of available evidence, without if effects demonstrated for one species automatically apply to all species of the genus. In this context, this paper aims to synthesize the nutritional and bioactive potential of the Opuntia genus, highlighting the implications for food safety, and explores the possibility of utilizing the species Opuntia robusta in the development of an experimental food product. This approach aims to link the utilization of an alternative plant resource with the need to identify and control risks, with the goal of obtaining a product that meets the relevant food quality and safety requirements.*

• Introduction

The use of the *Opuntia* genus also involves important considerations related to food safety and biosecurity, ranging from the control of contaminants and microbiological hazards to ensuring the traceability and quality of derived products. Therefore, the assessment of the nutritional and bioactive potential of *Opuntia* species should be carried out in parallel with an analysis of their impact on food chain safety and on the development of resilient and sustainable agri-food systems.

• Results and discussions

From a food safety and biosecurity perspective, the incorporation of *Opuntia*-based products into the food chain requires appropriate control measures to minimize microbiological contamination, chemical residues, and quality deterioration during processing and storage. Ensuring traceability, good agricultural practices, and effective quality management systems is essential for maximizing the benefits of *Opuntia* while maintaining consumer safety.



• Conclusions

The Opuntia genus combines nutritional richness, bioactive functionality, and environmental adaptability, making it a promising candidate for future sustainable food systems, provided that food safety and biosecurity requirements are effectively managed.