

Bioprospecting of natural bioactive compounds research for the prevention of non-communicable diseases

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Abstract: This study presents an integrative bioprospecting strategy aimed at exploring various vegetable matrices for the identification of health-promoting molecules to counteract and prevent the non-communicable diseases (NCDs). The initial phase involves employing conventional solid-to-liquid extraction techniques to qualitatively explore the phytochemicals within selected matrices such as persimmon and myrtle leaves, *Vigna unguiculata* pods and *Asimina triloba*'s leaves and fruits. Analytical chemistry technologies, particularly high-resolution mass spectrometry, are then utilized to characterize the phytochemical composition, supplemented by spectrophotometric tests for assessing radical scavenging, hypoglycemic, and hypolipidemic effects.

Promising matrices, identified based on phytochemical composition and NCD prevention potential, undergo further investigation using green extraction techniques, including pressurized liquid extraction (PLE) for optimal recovery of polar or medium-polar components and supercritical fluid extraction (SFE) to retrieve lipophilic fractions without the use of environmentally impactful apolar solvents. Some selected and promising extract will be subsequently subjected to a simulate digestion protocol simulating human physiological processes to evaluate potential modification in bioactivity.

This comprehensive approach seeks to unveil nutrient-rich matrices with diverse bioactive compounds, contributing to the development of formulations with enhanced health benefits and potential applications in the prevention of NCDs. The integration of conventional and green extraction methods underscores a sustainable and environmentally conscious approach to harnessing the therapeutic potential of natural sources.

References

1. Valdés, Alberto, Alejandro Cifuentes, and Carlos León. "Foodomics evaluation of bioactive compounds in foods." *TrAC Trends in Analytical Chemistry* 96 (2017): 2-13.
2. Mir-Cerdà, Aina, et al. "An overview of the extraction and characterization of bioactive phenolic compounds from agri-food waste within the framework of circular bioeconomy." *TrAC Trends in Analytical Chemistry* (2023): 116994.