10th Brazilian Conference on Natural Products
XXXVI RESEM
4-7 November 2025, Belo Horizonte, MG, Brazil

Section: 02

BIOPROSPECTING OF CAPSICUM SPP. IN COLOMBIA: INTEGRATING BROMATOLOGICAL TRAITS AND TARGETED METABOLOMICS

esteban castaño llanos*[1, 2], daniel pardo-rodriguez[3], juan c. henao-rojas[1], leidy p. moreno caicedo[5], mónica p. cala[3] and guillermo montoya[2, 4]

[1] Centro de Investigación La Selva, Agrosavia. Km 7 Vía Rionegro – Las Palmas, Sector Llanogrande, Rionegro, Antioquia 054048, Colombia. [2] Facultad de Ingeniería, Diseño y Ciencias Aplicadas. Escuela de Ciencias Aplicadas e Industria Sostenible, Departamento de Ciencias Farmacéuticas y Químicas, Universidad Icesi. Cali, Valle del Cauca 760031, Colombia. [3] Metabolomics Core Facility—MetCore, Vice-Presidency for Research, Universidad de los Andes, Bogotá 110111, Colombia. [4] BioInc. Center for Biomass Valorization Research, Universidad Icesi. Cali, Valle del Cauca 760031, Colombia. [5] Corporación Colombiana de Investigación Agropecuaria – Agrosavia. Centro de Investigación Palmira. Palmira - Valle del Cauca, Colombia
*escalla99@hotmail.com

The genus *Capsicum* comprises five widely cultivated and consumed species worldwide, valued not only for their sensory attributes like pungency, aroma, and color, but also for their remarkable phytochemical profiles. In recent years, *Capsicum* fruits have attracted growing interest as functional foods due to their richness in bioactive compounds such as polyphenols, flavonoids, carotenoids, and lipids, which are associated with antioxidant, anti-inflammatory, and metabolic regulatory effects. Significant diversity in the biochemical and functional composition of *Capsicum spp.* has been documented, largely influenced by genetic, environmental, and agronomic factors. This variability highlights their potential for applications across the food industry, nutraceutical development, and preventive health products. This study characterized 25 genotypes of *Capsicum spp.* from the Agrosavia Colombian germplasm bank, evaluating their bromatological traits (ash content, crude lipids, crude protein, crude fiber) and functional properties (β-carotene, capsaicinoids, FRAP, DPPH, and TPC), alongside a targeted flavonoid and polyphenol profiling by LC-ESI(-)-QqQ. The results revealed a clear species differentiation among *C. baccatum*, *C. chinense*, and *C. annuum* based on 13 metabolites, with ferulic acid, vanillic acid, and *p*-coumaric acid being the most discriminant. Bromatological and functional potential analyses indicated that *C. annuum* excelled in β-carotene, protein, Na and Fe content, while *C. chinense* exhibited the highest antioxidant activity and lipid content. This work identified a set of promising genotypes with desirable traits for the chili industry, enabling the selection and prioritization of materials for breeding programs and the sustainable exploitation of chili pepper biodiversity in Colombia. These findings provide a scientific basis for both the conservation and the industrial application of *Capsicum* genetic resources. The authors thank the support from Icesi University, Agrosavia and the financial support of Ministry of Science, Technology, and Innovation of Colombian Government. Grants 451-2021, and 435-2021.

Keywords: *Capsicum spp, bioprospecting, germplasm bank, metabolomics.*