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INTERACTIONS BETWEEN ENDOPHYTIC MICROORGANISMS AND CARAMBOXIN PRODUCTION IN Averrhoa carambola

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Caramboxin is a neurotoxin found in the fruits of starfruit (*Averrhoa carambola*), structurally analogous to the aminoacids phenylalanine and tyrosine, and associated with severe intoxication cases, particularly in patients with renal insufficiency. Literature evidence indicates that several fungi are capable of synthesizing toxins derived from amino acid backbones. Preliminary studies from our group, using MALDI imaging, demonstrated that the toxin is localized in the outer region of the seed, raising the hypothesis that endophytic fungi may be involved in its biosynthesis. In this context, the present research aimed to isolate, identify, and investigate the ecological and chemical diversity of starfruit endophytic fungi, with emphasis on caramboxin detection. Samples were collected at different ripening stages, followed by fungal isolation and morphological characterization. Subsequently, culture media were used for the prospection of specialized metabolites produced by the cultivated microorganisms, analyzed by Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry (MALDI-TOF MS). The results revealed significant chemical diversity in microbial extracts, with detection of ions corresponding to amino acids, amines, alkaloids, phenolic compounds, flavonoids, and structural lipids, with emphasis on nitrogen-containing compounds in the 120–480 m/z range. Moreover, the HCCA matrix showed greater sensitivity for low abundance molecules, enabling the detection of metabolites potentially related to caramboxin biosynthesis, whereas the DHB matrix favored the visualization of more labile molecules, albeit with lower spectral intensity. The simultaneous presence of phospholipids and secondary metabolites suggests that the extracts reflect both the metabolic diversity of endophytic fungi and the preservation of cellular constituents. Altogether, these findings highlight the biotechnological potential of starfruit-associated endophytes and contribute to the understanding of their possible role in caramboxin biosynthesis.

Keywords: *Endophytic microorganisms; Averrhoa carambola; Caramboxin.*