



## COMPARISON OF ESSENTIAL OIL AND AROMA FROM GUARANA FRUIT

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The volatile compounds found in fruits and flowers play a crucial role in ecological interactions, particularly in pollination processes. The aroma of a fruit or flower results from a complex mix of volatile compounds that attract specific pollinators. Amazonian guarana, scientifically known as *Paullinia cupana* (Sapindaceae), is one of the primary forest products in the Western Amazon. The harvesting of non-timber forest products has gained increasing interest as an economic alternative for the region, with guarana being a significant export commodity. Products derived from Amazonian guarana have a distinctive chemical profile that is unique to the Amazon region<sup>1</sup>. One factor influencing this uniqueness may be its pollination, which in the area is mainly carried out by stingless bees of the genus *Melipona*. To understand pollinator specificity, studies have been conducted on the chemical composition of propolis produced by guarana, which is exclusively pollinated by *Melipona seminigra*. Previous studies have shown that the non-volatile compounds present in guarana extracts share very similar compositions<sup>2</sup>. We have now investigated the aromas and essential oils of guarana fruits to further explore pollinator specificity. Because essential oils and aromas are typically composed by different constituents, the studies employed two methods: Clevenger hydrodistillation extraction for essential oils and headspace by solid-phase microextraction (HS-SPME) to analyze the aromas. The essential oil and aroma were extracted from both the outer rind (epicarp) and the aril (white pulp) of the guarana fruit (*Paullinia cupana*). The essential oil extraction lasted for two hours, while aroma extractions used the HS-SPME technique with Polydimethylsiloxane (PDMS) and Carboxen-PDMS fibers. Compositional analyses of the essential oils and aromas were conducted using gas chromatography-mass spectrometry (GC-MS) and gas chromatography-flame ionization detection (GC-FID) techniques. Identification was based on retention indices and an analysis of the mass spectra, which were compared with existing libraries. The comparative analysis revealed that the essential oil and aroma of the guarana fruit possess distinct chemical profiles, allowing for the identification of terpenes, esters, alcohols, ketones, and aldehydes.

**Keywords:** *Paullinia cupana*, essential oil, volatile profile, HS-SPME; Amazonian biodiversity

<sup>1</sup>Salles et al, *Food Chemistry*, V 371, p13068, 2022.

<sup>2</sup>Oliveira et al, *Biochemical Systematics and Ecology*, v. 112, p. 104769, 2024.

