
IDENTIFICATION OF VOLATILE COMPOUNDS IN CURED VANILLA SAMPLES FROM ESPÍRITO SANTO USING HEADSPACE SOLID-PHASE MICROEXTRACTION COUPLED WITH GAS CHROMATOGRAPHY-MASS SPECTROMETRY

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Vanilla is among the most valuable spices worldwide and finds extensive use in the food, perfumery, and cosmetics industries. Because its cultivation and curing processes are labor-intensive and delicate, vanilla is also one of the most expensive spices on the market. Despite synthetic substitutes, natural vanilla maintains high demand due to its complex aroma, primarily attributed to vanillin (4-hydroxy-3-methoxybenzaldehyde). Brazil has significant potential for the cultivation of both native and exotic species. In the state of Espírito Santo, some farmers have invested in vanilla cultivation and bean curing. However, the lack of studies on its chemical composition hampers the full valorization of this product. Therefore, this study aimed to characterize vanilla beans produced locally using gas chromatography coupled with mass spectrometry (GC-MS). Five locally produced samples were analyzed and compared with two established commercial products. Volatile compounds were extracted through solid-phase microextraction (DVB/CAR/PDMS) and analyzed according to Silva (2023). Peaks in the chromatogram were identified by comparing mass spectra with reference data. A total of 24 volatile compounds were detected and distributed among different chemical classes (aldehydes, alcohols, phenols, acids, esters, and others), highlighting the aromatic complexity of this spice. Vanillin was detected in all samples, confirming its role as the main quality marker. Based on peak areas, the analysis also indicated differences in vanillin content among the local samples, some even exceeding that of the commercial samples. We also observed that when vanillin content was lower, other sensory compounds, such as guaiacol and 4-methylguaiacol, were more prominent. These variations might be associated with cultivation conditions, stages of maturation, and curing processes. Therefore, the chemical characterization of vanilla beans from Espírito Santo not only enhances the value of the local product but also provides a scientific basis for future improvements in the production process, supporting small farmers and facilitating integration into the specialized market.

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