

# XI International Workshop on Edible Mycorrhizal Mushrooms



## BOOK OF ABSTRACTS

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## VOLATILOME STUDY OF CULTIVATE BLACK TRUFFLE (*Tuber melanosporum*) TO DISTINGUISH GEOGRAPHICAL ORIGIN

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Truffles are worldwide-appreciated hypogeous fungi due to their distinctive aroma. They contain more than 200 volatile molecules, including sulfur compounds (dimethyl-sulfide (DMS) and dimethyl-disulfide (DMDS)), alcohols (1-octen-3-ol and 2-methyl-1-propanol), and other important compounds such as 3-octanone, 1-octen-3-one, and 3-methylbutanal. The variability of these molecules, and consequently their impact on aroma, can be influenced by a range of factors including climatic conditions, host tree, cultivation practices, soil microbiome, and others. In this study, a total of 33 black truffles (*Tuber melanosporum*) from Spain (8 locations), France, and Italy were collected and immediately cleaned and cooled (4 °C). Twenty-four hours after harvesting, volatile organic compounds (VOCs) from the truffles were extracted using solid-phase microextraction (SPME) and analyzed by gas chromatography-olfactometry (GC-O). The analysis was conducted by five judges, with each sample analyzed in triplicate. The overall results revealed slight differences based on geographical origin. Over 20 VOCs were identified, with DMS (truffle odor), DMDS (dark chocolate odor), 2,3-butanedione (buttery odor), methyl 2-methylbutanoate (apple odor), and ethyl-2-methylbutanoate (strawberry odor) being the most prevalent across all origins. Truffles from Spain exhibited a higher modified frequency of key truffle compounds, especially DMS and DMDS, compared to France and Italy. Few differences were found among Spanish locations, although gas chromatography-mass spectrometry (GC-MS) would be necessary to detect greater variations. GC-O, recognized as a valuable tool for discerning postharvest treatments applied to truffles, could also be employed to differentiate geographical origins. Consequently, it could allow for the characterization of the aromatic profile of each productive region.

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