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REVALORIZATION OF LOW-QUALITY TRUFFLES USING SFE TO OBTAIN AROMATIC AND FLAVORING EXTRACTS**E. Tejedor-Calvo^{1,2}, P. Marco¹, C. Soler-Rivas²**

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Abstract

Truffles are a well-known worldwide product mainly appreciated for their unique aroma. The current truffle categorization (UNECE Standard FFV-53) [1], only consider physical aspects in truffle quality evaluation. Therefore, damaged truffles or those with small size are considered as low-quality units and achieve a lower prize (10 times less). Nowadays it is considered that between 20-30% of the truffles harvested are considered non-categorized (data provide for the Spanish truffle association). So, they could be a potential source of flavoring and aromatic, as well as bioactive compounds, that can be extracted (revalorizing these other truffles) and used to design natural extracts to improve their aromatic and bioactive properties.

A methodology to obtain aromatic compounds from truffles using supercritical CO₂ has been used [2,3]. Some parameters like time, pressure and flow rate were optimized. Also, the addition of trapping material was explored to enhance flavoring compounds detection. Gas chromatography coupled to mass spectrometry (GC-MS) and olfactometry (GC-O) was used to detect the volatile organic compounds (VOCS) and the aromatic compounds respectively, whereas an electrospray ionization quadruple time-of-flight mass spectrometry (UHPSFC/ESI-QTOF-MS) was used to detected more than 30 lipidic compounds with flavoring properties.

As results, we optimized the aromatic extract process with supercritical fluids, extracting a total of 95 aromatic compounds such as hydrocarbons, alcohols, aldehydes, esters, ketones, benzene derivatives and sulphur compounds. The use of oil as trapping material in SFE process, such as gelatin or grape seed oil, allowed capturing some key VOCs (2,3-butanodione, 2-methyl-1-butanol, octanal and dimethyl disulphide) and lipid compounds (ergosterol, brassicasterol, ergosta-7,22-dienol, oleic and linoleic).

So far, there is no aromatic extract that evokes the real smell of truffles to use it as food flavoring, except ours. However more studies to scale up the process for the industry is needed. These results opened a new direction in the revalorization of the truffe and their use in food or cosmetics field.

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References:

- [1] UNECE Standard FFV-53 recommendation, 2017.
- [2] Tejedor-Calvo et al. (2021) LWT, 150, pp. 111954.
- [3] Tejedor-Calvo et al (2023) Food Research International, 164, pp. 112422