

Formation of first expert tasting panel of black truffle (*Tuber melanosporum*)

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INTRODUCTION

The black truffle (*Tuber melanosporum*) is one of the most prized food condiments for its organoleptic characteristics. Concerning commercial quality control of truffles, UNECE STANDARD FFV-53 classifies truffles in three categories according to morphology, external appearance and weight: Extra, First and Second class (Figure 1). However, truffles are mainly appreciated by their aroma, and this regulation does not take it into account.

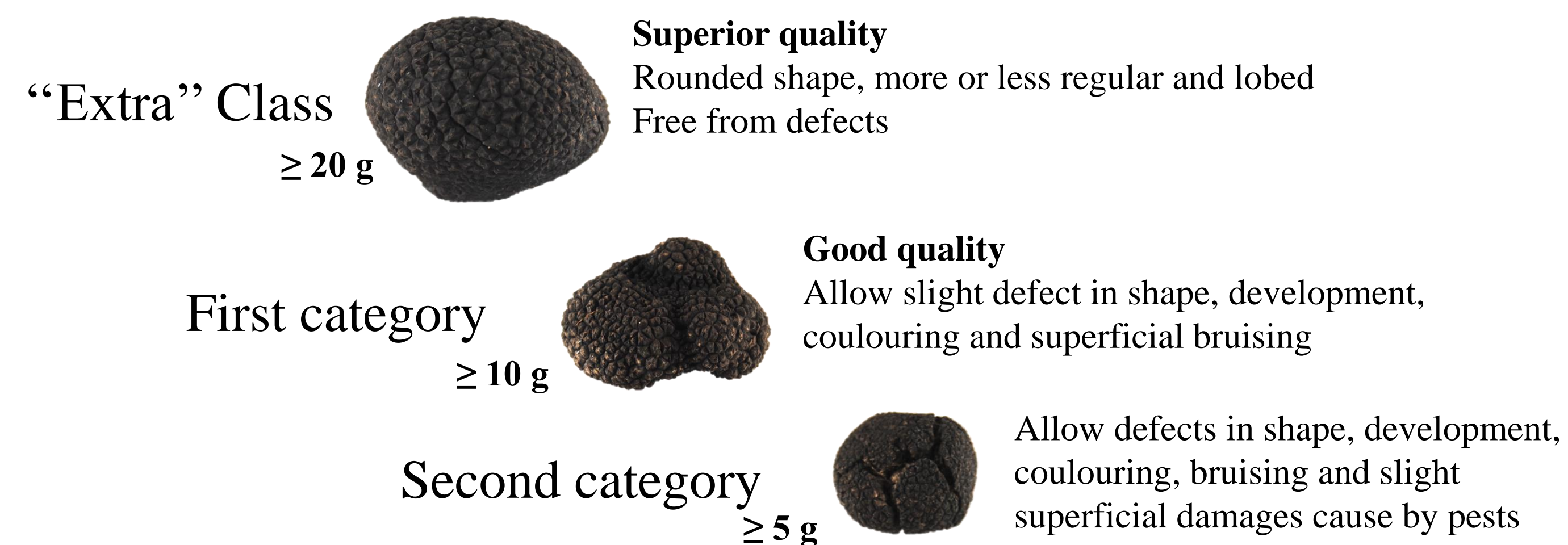


Figure 1. Truffle classification by UNECE STANDARD FFV-53

OBJETIVE

This research allows to establish categories by sensorial parameters, helped by flavour instrumental analysis techniques, creating the first expert tasting panel specialized in black truffle.

MATERIAL & METHODS

A group of experts (producers, retailers, chefs, pickers and food scientists) were selected, taught on truffle quality and the aromatic description terms of truffles, *T. melanosporum* specifically, following the ISONORM 11035 as a pre-training phase. Tasters trained by a preliminary attribute list classified fresh truffles using a 10-point scale.

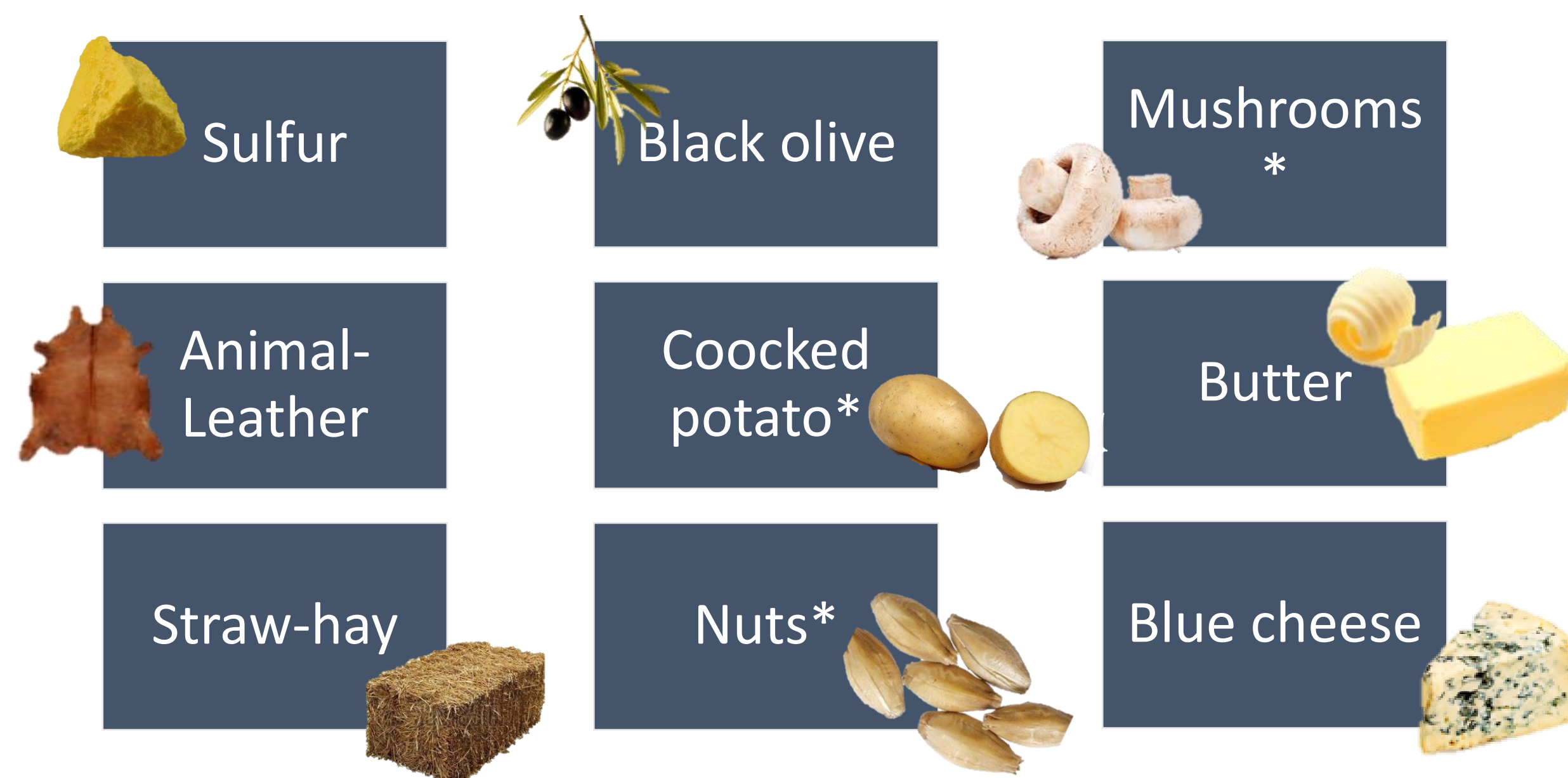


Figure 2. GC-O technique

Principal component analysis (PCA) was performed to visualize correlations among terms (synonyms and antonyms) for concept alignment and agreed on the terms of the final list. Once trained, panellists were devoted to evaluating truffles. Samples were also submitted to aroma analysis by olfactometry (CG-O) (Figure 2), to correlate both sets of data.

RESULTS

Attribute list were selected by PCA analyses.

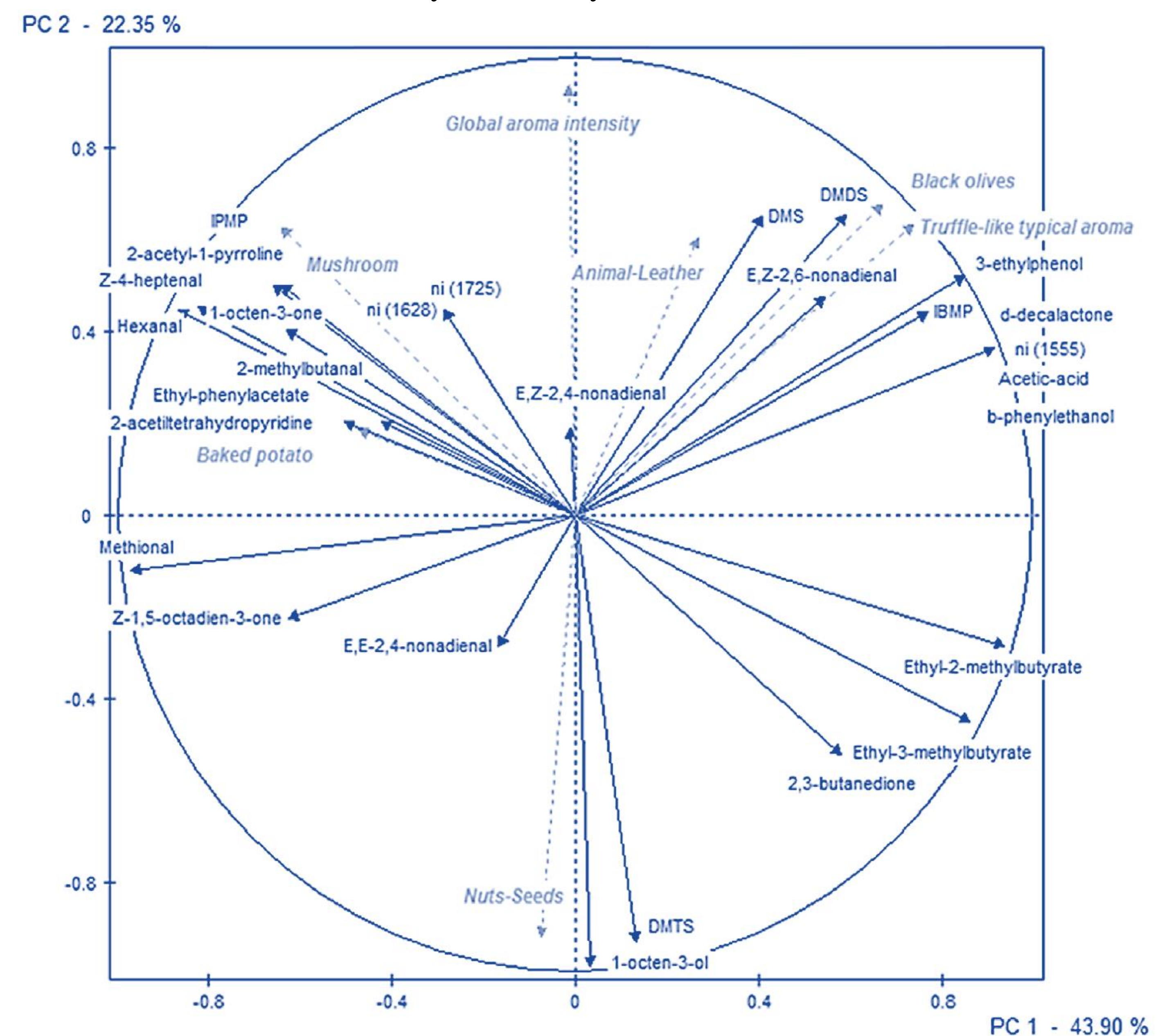


Figure 3. Circle of correlation for gas chromatography-olfactometry descriptors on principal components 1 and 2 of *T. melanosporum* truffles. Sensory attributes (in grey) are projected as illustrative variables (Campo et al. 2017).

A tasting sheet called “ATRUTER model” was designed with attributes selected. Firmness, limpity, morphological factor, including maturity, and aromatic quality were evaluated over 100 points. Final aroma attributes included were: “intensity”, “aromatic complexity”, “equilibrium of aroma”, “durability” and “quality”. From these data, the panel’s performance was checked regarding the ability to discriminate among products, and in terms of reproducibility and the homogeneity of the panel in the use of the descriptors.

TASTING SHEET
ATRUTER (Rating over 100 points)

TASTER: _____ DATE: _____
SAMPLE CODE: _____ Genus: *Tuber*

4) **QUALITATIVE ASSESSMENT.** Smell each truffle and assess the following aspects:

Intensity	1	2	3	4	5	6	7	8	9	10
Aromatic equilibrium	1	2	3	4	5	6	7	8	9	10
Duration	1	2	3	4	5	6	7	8	9	10
Aromatic complexity	1	2	3	4	5	6	7	8	9	10
Aromatic quality	1	2	3	4	5	6	7	8	9	10

1) **LIMPITY.** Smell each truffle and assess the following aspects:

Limpity (A)	1	2	3	4	5
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2) **FIRMNESS.** Press lightly the truffle and assess the following aspects:

Firmness (B)	1	2	3	4	5	6	7	8	9	10
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3) **MORPHOLOGY.** Observe each truffle and evaluate the following aspects:

Size / Weight	1	2	3	4	5
Shape	1	2	3	4	5
Peridium (uniformity)	1	2	3	4	5
Peridium ripeness	1	2	3	4	5
Gleba ripeness	1	2	3	4	5

5) **PENALTY.** Assess if at this point it is convenient that the sample receives a penalty on the score obtained. Expose exactly the reasons:

Penalty (E)	5	10	15	20	25
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SUM (C) _____ **SUM (D)** _____

TOTAL (A) + (B) + (C) + (D) - (E): _____

Figure 4. Tasting sheet for Black Truffle.

CONCLUSIONS

Based on these indicators, the panel was deemed successfully trained, and it is used to support the scientific assays, to detect frauds in truffle products, to qualify truffles, truffled products and restaurants where the black truffle is used.

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References:

Campo, E., Marco, P., Oria, R., Blanco, D., Venturini, M. E. (2017). What is the best method for preserving the genuine black truffle (*Tuber melanosporum*) aroma? An olfactometric and sensory approach. *LWT – FOOD SCI TECHNOL*, 80, 84–91.
ISO 11035:1994 Preview. Sensory analysis -- Identification and selection of descriptors for establishing a sensory profile by a multidimensional approach.
UNECE STANDARD FFV-53 - Concerning the marketing and commercial quality control of Truffles. 2017 Edition. United Nations.

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