Can a new sensory concept be shared by consumers and professionals?

Example of semantic and sensory analyses of minerality in wine

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Why minerality is important in wine?

Minerality is a new word, appeared 20 years ago and is frequently used to describe and sell wines. Moreover, it has no clear definition and seems to refer to different meanings or sensory perceptions. The aim of this study was to explore the "minerality concept" from two points of view: mental representation from consumers and wine professionals and sensory agreement among wine professionals.

Material & Methods

Open-ended questions

Survey and respondents

1898 wine professionals and 1697 consumers have answered to a on-line survey:
If I speak to you about minerality in wine, what comes to mind?

From textual responses to numerical data

- Correcting mistakes (spelling & orthographic)
- Lemmatization = convert all nouns and adjectives to singular masculine, different verbal form to infinitive, etc. *(TreeTagger software)*
- Removal of functional words (prepositions, articles…)
- Creation of two lists of words (professionals and consumers)

Statistic analyses

- A Chi-square was performed on the two lists of words.

Sensory analysis - Exemplarity measurement

Wines and professional tasters

- 80 Chasselas wines in equal numbers from each of the four French-speaking cantons – vintage 2012
- 62 Swiss & 19 Burgundy wine professionals

Sensory protocol – 1 question

- Do you think that this wine is a good example or a poor example to illustrate to your friend what minerality in wine is?'

Poor example ——— Good example

Statistic analyses

- Interjudge (dis)agreement was evaluated by two different ways: PCA and Kendall's W scores.

Results

Terms frequently used by both professionals and consumers

Wine and Minerality ➔ but words to explain

Terroir	Stone	Aroma
(637 pro. & 394 cons.)	(837 pro. & 392 cons.)	(371 pro. & 294 cons.)

Specific terms used by professionals and consumers

Types	professionals		consumers	
	number	%	number	%
gun (flint)	561	29.56	139	8.19
freshness	372	17.97	62	3.65
flint	372	19.60	85	5.01
acidity	294	15.49	80	4.71
note	269	14.17	42	2.47
chalk	155	8.17	29	1.71
salinity	153	8.06	13	0.77
expression	152	8.01	21	1.24
aromatic	150	7.90	20	1.18
subtlety	111	5.85	10	0.59
Riesling	107	5.64	16	0.94
tenseness	82	4.32	7	0.41
length	77	4.06	6	0.35
balance	76	4.00	< 5	0.00
complexity	71	3.74	7	0.41
smoky/toasted	51	2.69	< 5	0.00

Types	professionals		consumers	
	number	%	number	%
taste	252	13.28	588	34.65
soil	299	15.75	308	18.15
to think	203	10.70	287	16.91
earthy	90	4.74	246	14.50
mineral ions	69	3.64	240	14.14
indetermination	5	0.26	223	13.14
vine	77	4.06	155	9.13
water	35	1.84	83	4.89
to grow	12	0.63	72	4.24
like/as	<5	0.00	61	3.59
different	24	1.26	60	3.54
ground	12	0.63	47	2.77
composition	11	0.58	42	2.47
link	17	0.90	40	2.36

Table 1: Comparison of the most frequent terms used by professionals (left) and consumers (right).

- For both groups, Terroir is an important topic used to speak about minerality in wine.
- Wine professionals associated minerality with sensory perceptions (aromas and flavours in yellow in Table 1).
- Topics covered by consumers were more various with 13% who did not know what minerality means, as bottled mineral water or the connexion between soil and vine.

Sensory agreement between wine professionals

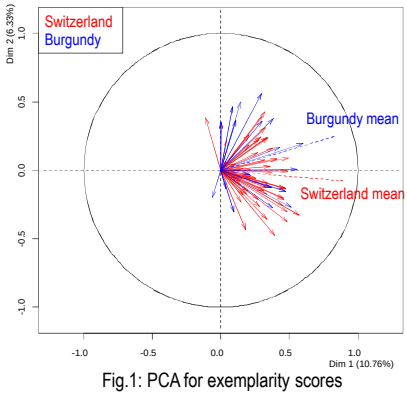

Fig.1: PCA for exemplarity scores

Swiss professionals		Burgundy professionals	
Kendall's W	p-value	Kendall's W	p-value
0.1	< 0.001	0.13	< 0.001

Table 2: Kendall's W values for Swiss and Burgundy professionals

- Most judges are located on the same side of the first axis.
- The low quality of the projection (only 10.76% on the 1st axis) displays a poor agreement between judges (without clear antagonism).
- Swiss and Burgundy professionals have a shared sensory perception of minerality.
- Kendall's W values are low but quite better for Burgundy professionals (but they are less numerous).
- The correlation coefficient between scores provided by Swiss and Burgundy professionals is 0.6.

Conclusion

- Minerality in wine is difficult to define using words. However, it is possible to identify a few clear topics: Terroir, specific sensory perceptions like flinty (or gunflint), acidity and salinity, wine containing mineral ions referring to bottled water.
- Based on the sensory task, no clear consensus among tasters have been found but in average, Swiss and Burgundy professionals have a common sensory perception of minerality.

References:
- Deneulin, P. & Bavaud (2016). Food Quality and Preference.
- Loison, A. et al (2015). Food Quality and Preference.

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