UPDATE ON UC DAVIS OLIVE CENTER

Sue Langstaff for Dan Flynn

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UCD OLIVE CENTER

- 6 years old
- Complimentary to COOC
- NOT a competitor

UCD OLIVE CENTER

- Website re-design
- http://olivecenter.ucdavis.edu/

UCD OLIVE CENTER

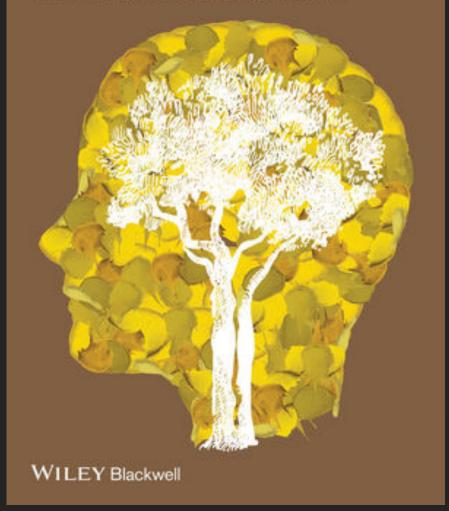
- Please use these resources
- They are there for YOU!

JUDGING OLIVE OIL SENSORY QUALITY

Sue Langstaff *Applied Sensory, LLC*

Olive Oil Sensory Science

Erminio Monteleone and Susan Langstaff



4 Sensory Quality Control

Susan Langstaff Applied Sensory LLC, Fairfield, CA, USA

4.1 Introduction

Flavor and changes to flavor due to the chemistry in olive oil play a major role in dictating standards and the market value of olive oil. These flavors can be amplified, diminished, or disturbed by changing the quality of the fruit, the way it was handled, the manipulation of the paste, the extraction process, and finally the cleaning and storage of the oil (Vossen, 2005). Premium quality, fresh, virgin olive oil is characterized by a fruity aroma with a bitter and pungent finish. For such oil, it is common for consumers to pay high prices.

The development of sensory quality standards for olive oil began in the 1970s to address five main issues (Mailer, 2012):

Virgin olive oil quality criteria and standard limits

Parameters		Extra Virgin	Virgin	Lampante
Ohamiaalmanaatan	Free Acidity (%)	≤ 0.8	≤ 2.0	> 3.3 (IOC) > 2.0 (EC, USDA)
Chemical parameters	Peroxide Value (meq.O ₂ /kg)	≤ 20	≤ 20	> 20 (IOC, EC) No limit (USDA)
	K232 nm	≤ 2.5	≤ 2.6	
UV absorbency	K270 nm	≤ 0.22	≤ 0.25	
	ΔK	≤ 0.01	≤ 0.01	
Sensory attributes (median	Defects	0	≤ 3.5 (IOC) ≤ 2.5 (EC, USDA)	> 6 (IOC) > 2.5 (EC, USDA)
values across panelists)	Fruitiness	> 0	> 0	

Olive oil became the first food in the world whose quality was legally determined at least in part by its sensory properties

🗃 | The Opinion Pages

FOOD CHAINS



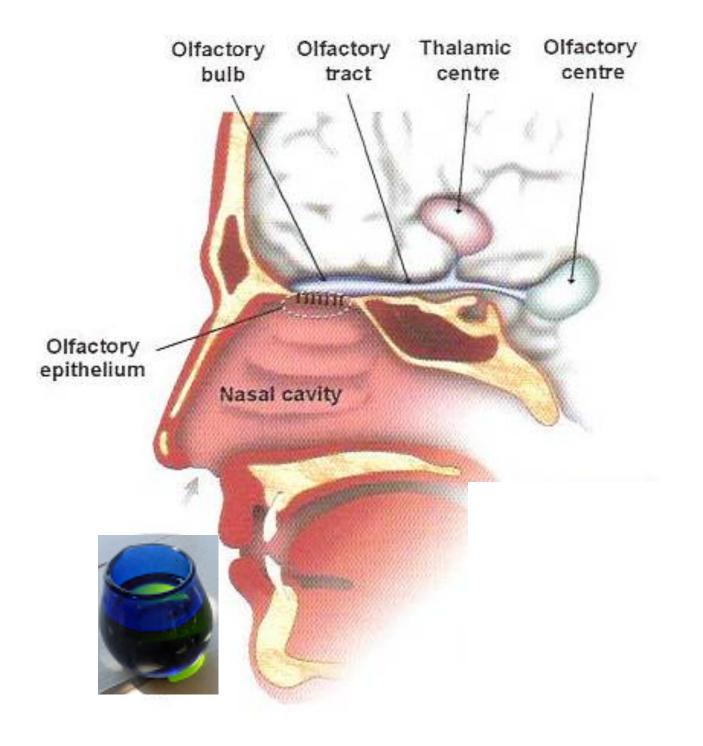
EXTRA VIRGIN SUICIDE

THE ADULTERATION OF ITALIAN OLIVE OIL

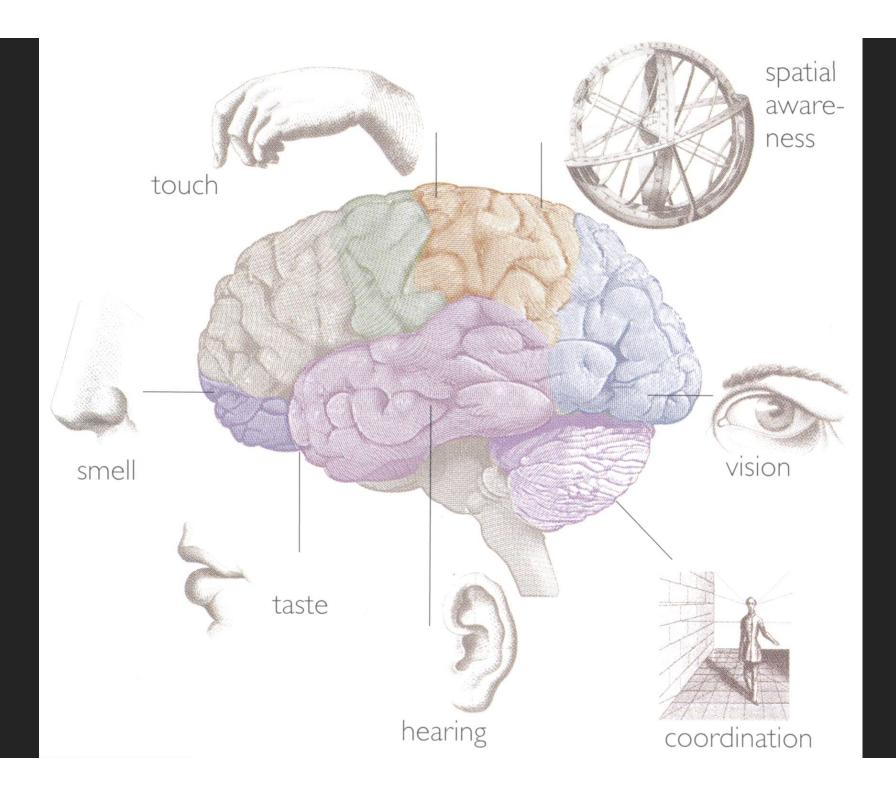
By Nicholas Blechman

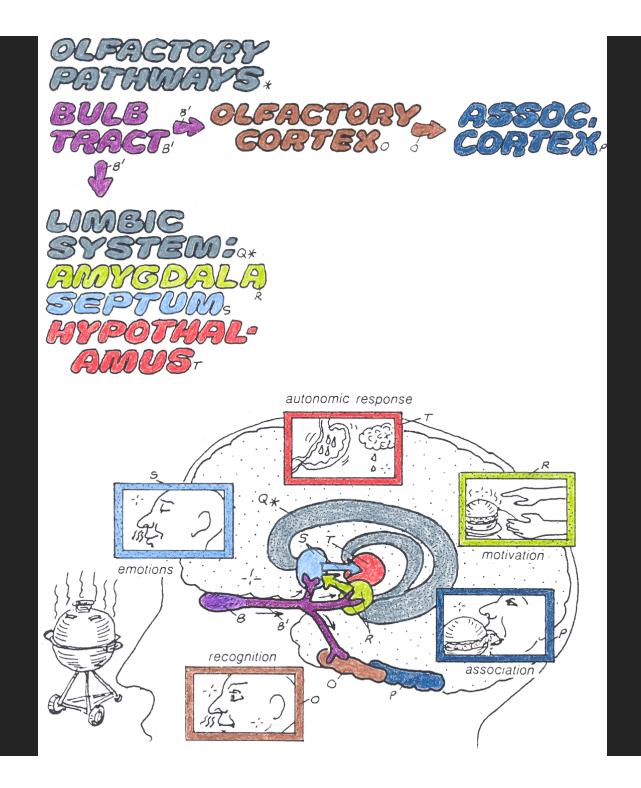


To combat fraud, a special branch of the Italian Carabinieri is trained to detect bad oil. Lab tests are easy to fake, so instead the police rely on smell. What do you need to police olive oil sensory quality?









Virgin olive oil quality criteria and standard limits SENSORY ONLY USDA LIMITS

Parameters		Extra Virgin	Virgin	Lampante
Sensory attributes (median	Defects	0	≤ 2.5	> 2.5
values across panelists)	Fruitiness	> 0	> 0	





FUSTY

mushy black brined olives, sweaty socks/ gym clothes, old/decomposing olives, olive mill waste pond, lactic

> Presence of bacteria/mold: Enterobacter Clostridium Pseudomonas

Olives stored too long have undergone an advanced stage of anaerobic fermentation

2-methyl-1-propanol = 1.0 n-octane = 0.94 propanoic acid = 0.72butanoic acid = 0.653-methyl-1-butanol = 0.10 ethyl butanoate = 0.03

values represent minimum quantity of

mg per kg of oil to be detected

A unique and specific vocabulary has been established by the International Olive Council (IOC) to describe the sensory properties of virgin olive oil. The various negative sensory descriptors are listed below each IOC attribute.

FROZEN

DRIED

5:N5ORT DESCRIPTIONS

POSSBECAUSES

SPONSIBLE

MUDDY SEDIMENT Primary **Reasons for** the Development of Sensory Defects in Virgin Olive Oil:

The

• The presence of certain volatile compounds produced

- by over-ripening of the fruit Oxidation of unsaturated fatty acids
- Anaerobic and aerobic fermentations
- Significant attack by molds and bacteria (fruit has been stored for long periods of time prior to oil extraction)

BIOGENESIS OF FUSTY, WINEY/VINEGARY AND MUSTY DEFECTS Storage Day 0: Bacteria, yeast, molds present on fruit ~ Storage Day 4: Pseudomonas and Clostridium contribute to beginning of texture loss (skin breakdown) FUSTY ~ Storage Day 6: Growth of Acetobacter transforms ethanol produced by yeasts; development of molds FUSTY, MUSTY, WINEY/VINEGARY

MUSTY, HUMID, EARTHY

THE DEFECTS WHEEL® FOR OLIVE OIL

Why a Guide to Olive Oil Defects?

WINEY LINEGART 400 Quick and accurate identification of off-aromas and flavors is advantageous for olive oil producers, retailers and consumers. For the producer, early remedial action can often prevent the problem, before the fault becomes more serious or irreversible. For the retailer, HERTED, BURNT avoiding losses associated with defective oils improves the profit margin. Olive oil consumers should also know more about off-aromas and flavors so that rejection is based on genuine defects, not unfamiliarity.

OLIVE OIL SENSORY DEFECTS ASSOCIATED WITH:

Metallic

Crushing

Metallic

Fruit Condition Frozen Dried Fusty

Malaxing Storage/Bottling Heated, Burnt Rancid Muddy sediment Metallic

Fusty Winey/Vinegary Musty, Humid, Earthy GRUBBY DEFECT: The olive fly (*Bactrocera oleae*) can lay eggs in developing olives and the larvae feed on the pulp. If oil is made from these olives, the larvae give a distinctive dirty flavor to the oil, described as grubby. OINTEL OINTEL

PROFILE SHEET FOR VIRGIN OLIVE OIL

INTENSITY OF PERCEPTION OF DEFECTS:

Fusty/ muddy sediment			
Musty–humid– earthy			
Winey–vinegary– acid–sour			
Frostbitten olives (wet wood)			
Rancid			
Others (specify)			
ľ	TENSITY OF PERC	EPTION OF POSITIVE ATT	RIBUTES:
Fruity	greenly	ripely	
Bitter			
Pungent			

INTENSITY SCALING (RATING STRENGTH OF SENSATION)

CATEGORY SCALES

Fruitiness:

0 1 2 3 4 5 6 7 8 9 10 minimum extreme

GRAPHIC SCALES



REFERENCE STANDARDS

Compounds which have consistent, characteristic (representative) aromas at suitable intensities

Virgin olive oil quality criteria and standard limits SENSORY ONLY USDA LIMITS

Parameters		Extra Virgin	Virgin	Lampante
Sensory attributes (median	Defects	0	≤ 2.5	> 2.5
values across panelists)	Fruitiness	> 0	> 0	

Comparison chart

	Mean	Median
Definition:	The mean is the arithmetic average of a set of numbers, or distribution.	The median is described as the numeric value separating the higher half of a sample, a population, or a probability distribution, from the lower half.
Applicability:	The mean is used for normal distributions.	The median is generally used for skewed distributions.
Robustness:	The mean is not a robust tool since it is largely influenced by outliers.	The median is better suited for skewed distributions to derive at central tendency

FUSTY 1.4	MEAN (AVERAGE):	MEDIAN:
0	1.4+0+0+0+0.5+0+0+2	1.1 + 0 + 0 +
0		1.1
0.5	X=0.31	0.5
0	$\Lambda = 0.01$	0.4
0		0
1.1		0
0		0
0		0
0.4		0
		0
N = 11		0

Virgin olive oil quality criteria and standard limits SENSORY ONLY USDA LIMITS

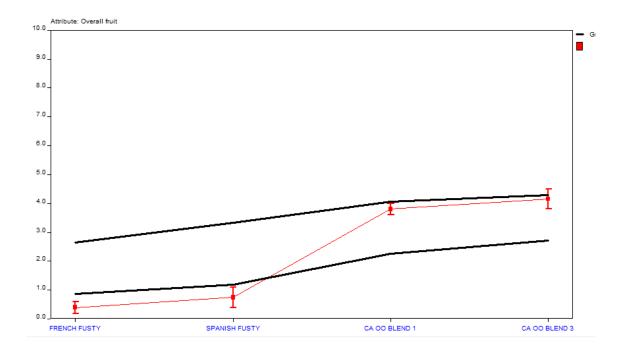
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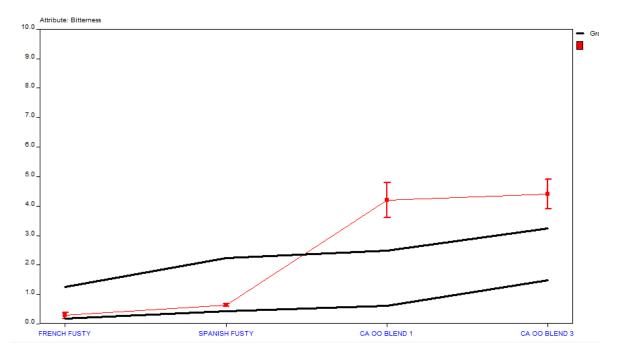
EXTRA
VIRGINVIRGINLAMPANTE0 > 0 to $\leq 2.5 > 2.5$

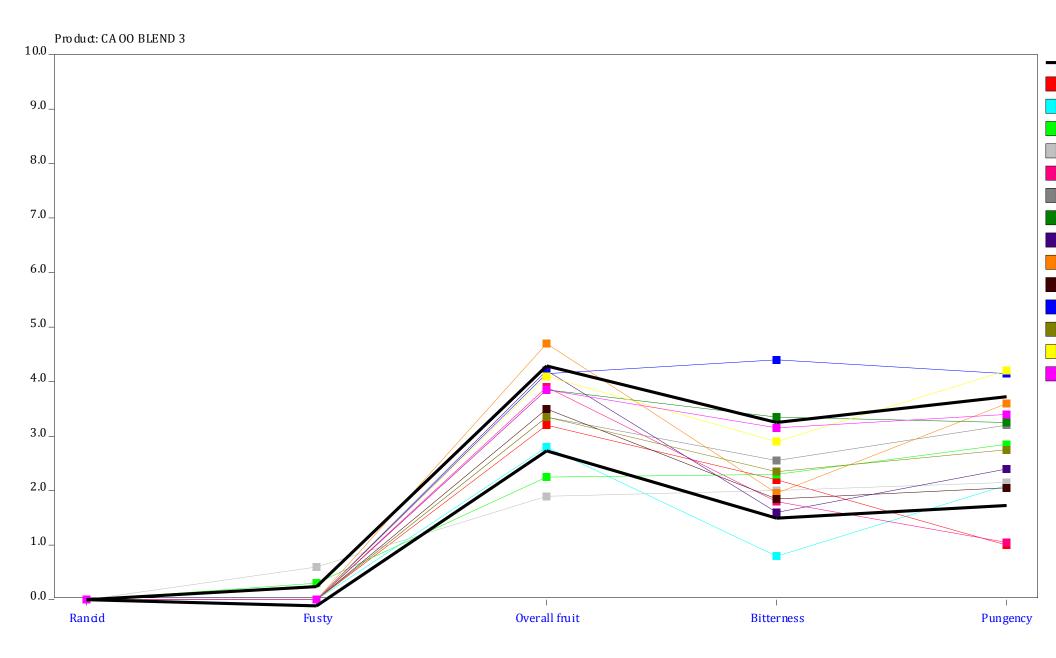
SUE'S JOB

Analyze the sensory data and evaluate:

- individual panelist discriminating ability
- individual panelist reproducibility
- individual panelist agreement with the panel as a whole
- panel discriminating ability
- panel reproducibility





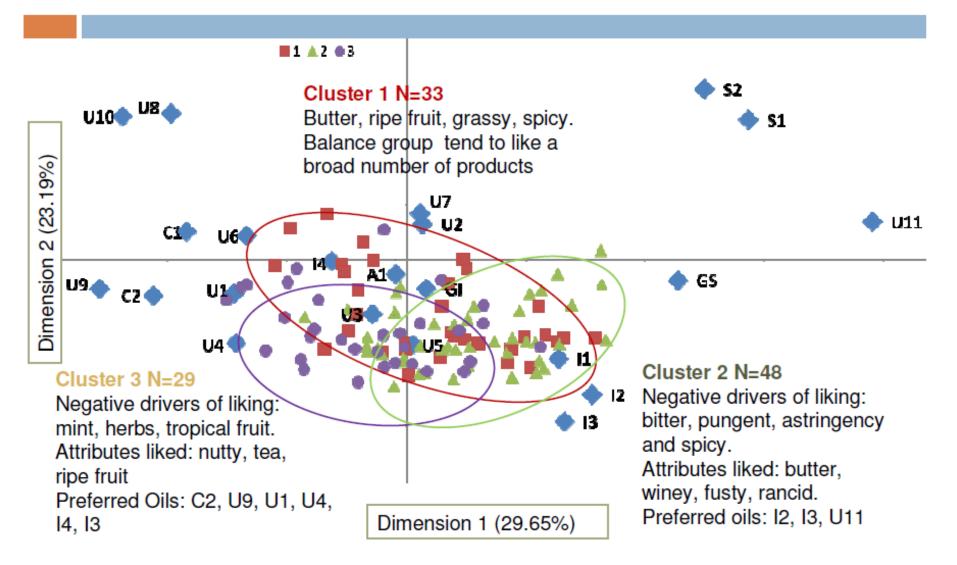






QUALITY DETERMINED BY **EXPERTS DOES NOT CORRELATE WITH** CONSUMER PREFERENCES

Three preference clusters emerged

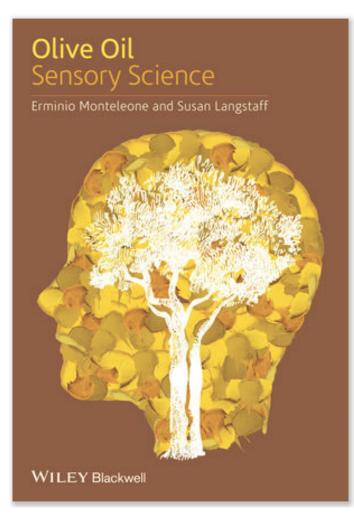


WANT TO LEARN MORE?

Sensory Evaluation of Olive Oil Certificate Course

The Sensory Evaluation of Olive Oil will lead participants through tastings of dozens of olive oils from around the world, allowing them to become immersed in the extraordinary attributes of foreign and domestic oils, as well as the defects common to extra virgin olive oil.

WHEN: May 9 and May 10, 2014WHERE: UC Davis



Olive Oil Sensory Science

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