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The Hidden Sides of Sourness Perception: Is Acid just a Basic Taste?

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Sourness perception in sensory studies for food & beverages



Sour taste is considered as a basic taste while there is a variety of organic acids in the composition of many food and beverages products.

Different acids are also empirically used as reference standards to familiarize or train panels for descriptive profiles (e.g, lactic acid for yoghurt or tartaric acid for wine).

Are organic acids sensorially different from each other?

Comparison of 4 organic acids commonly found in wine



ALL PREPARED IN 3 WATER CONDITIONS

A Equi-mass concentration (2 g/L)

B Equi-pH (pH = 3,3)

C Equi-molar concentration (0,0013 mol/L)

3 series of 6 TETRAD tests comparing varying water solutions with 12 French wine professionals

Identification test & CATA method for the 4 acids with the best water condition after a familiarization step

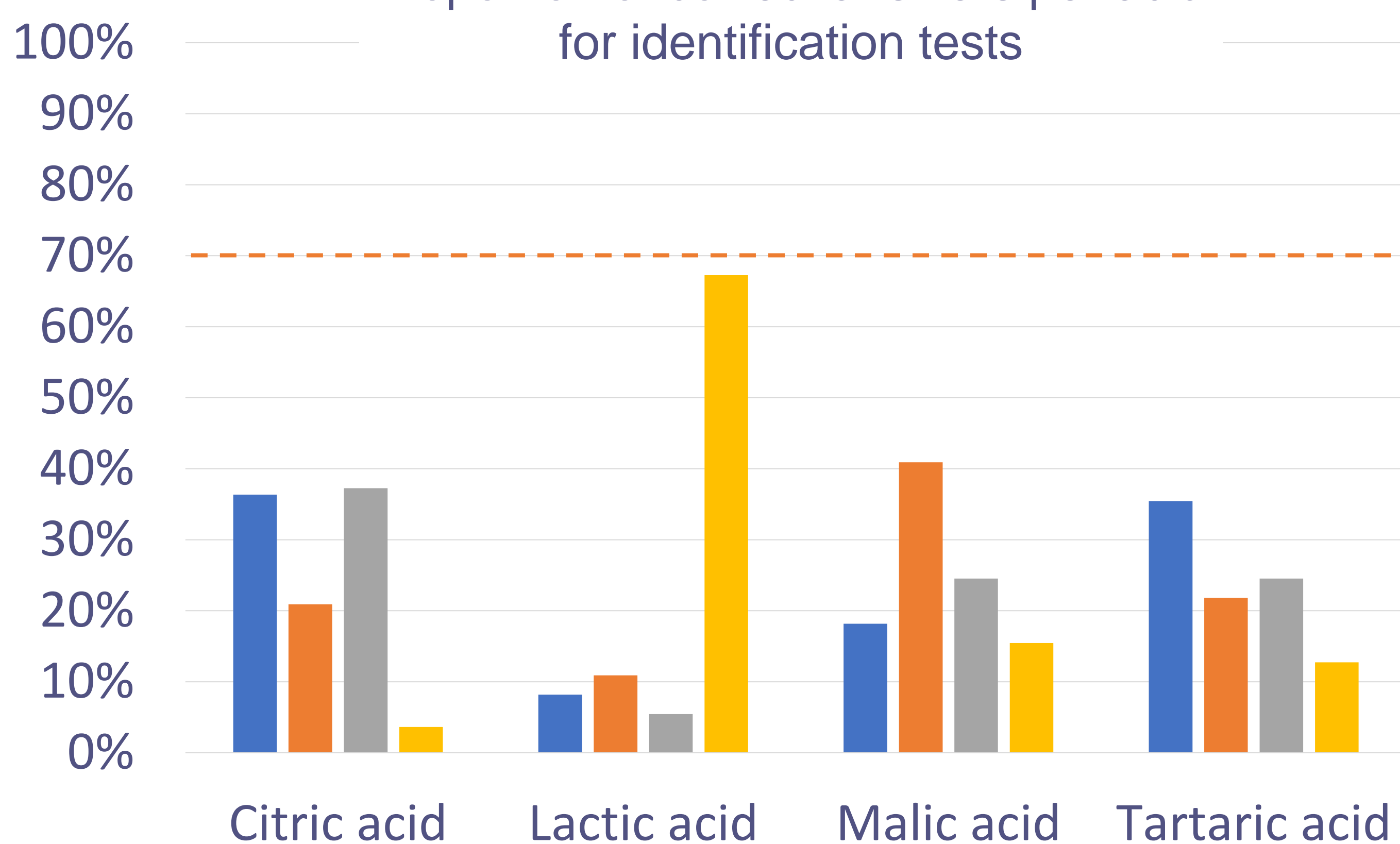
- Lemon
- Apple
- Fruity
- Freshness
- Bitterness
- Astringency
- Lactic
- Roundness
- Metallic
- Acidulous
- Bold
- Other

with 110 French oenologists from all over France

Main results: a discrimination that needs to be better understood

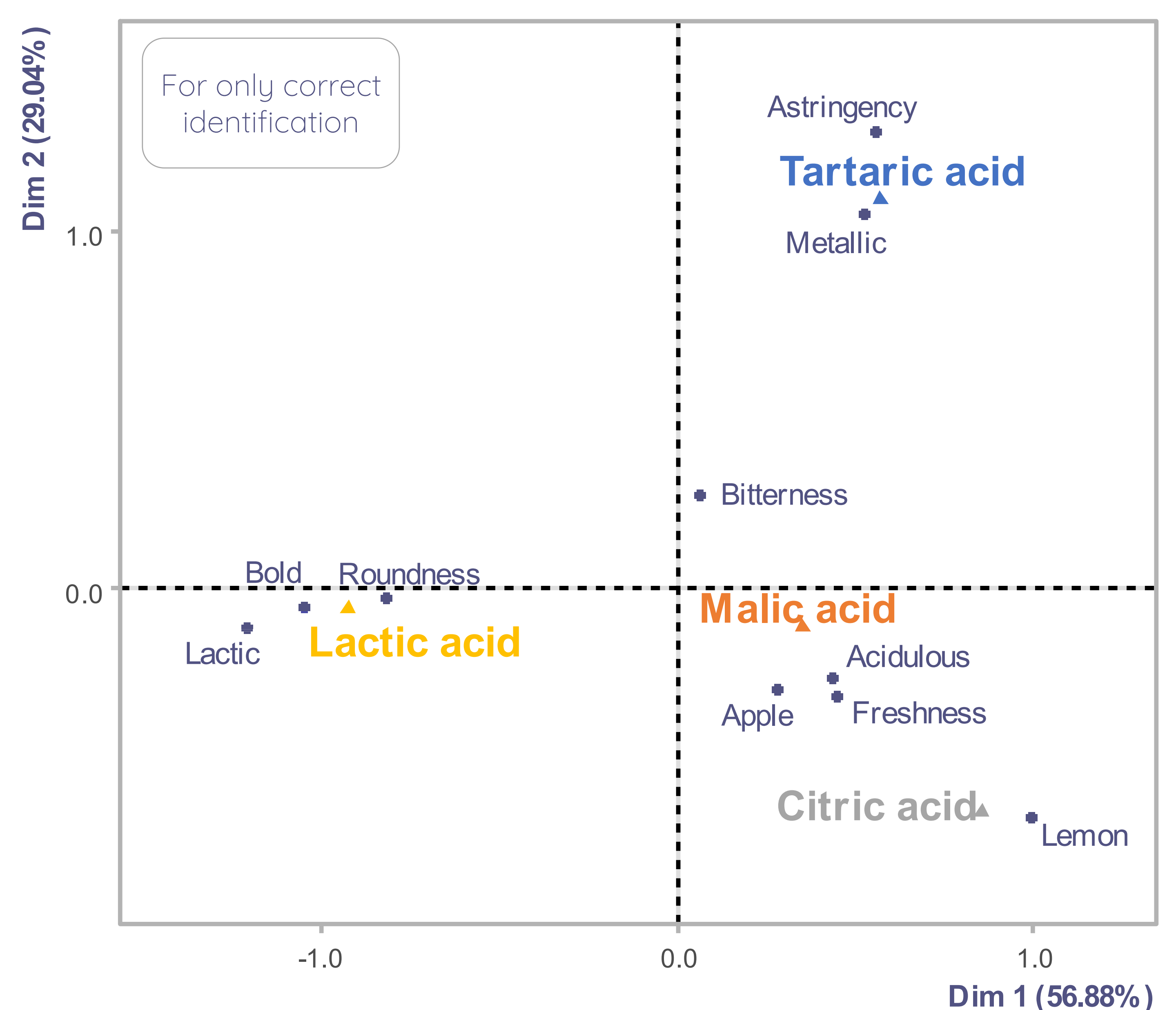
Tetrad tests showed significant differences at alpha = 0,01% between all acids in the equimolar condition only.

Proportion of correct answers per acid for identification tests



- ✓ Only 15% of participants identified all the organic acids.
- ✓ Recurring inversions observed between tartaric and citric acids among oenologists (60%).
- ✓ Tactile sensations like *rough, hard, aggressive* and temporal descriptors were also elicited by few participants.

CA factor map on CATA data



Towards a multisensory perception of sourness?

- Only the equimolar condition permitted to discriminate between the 4 organic acids in water solution
- Identification test showed high variability of the percentage of correct identification with recurring inversions observed between tartaric and citric acids among oenologists.
- Each acid was described differently with multiple sensory markers.
- This study highlighted a discrimination between organic acids under water condition paving the way for possible sensory identification.