QUANTIFYING ASTRINGENCY IN WINE

MAKING THE BRIDGE BETWEEN SCIENCE AND MARKET ENVIRONMENT

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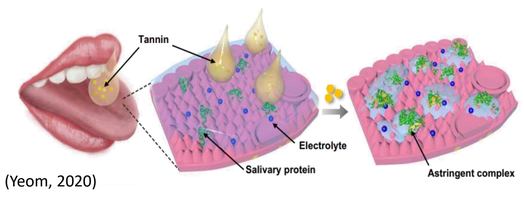
ASTRINGENCY

Complex organoleptic sensation accompanied by a shrinking or drawing feeling in the mouth, which is characteristic of some food products, such as red wine, grapes, unripe bananas (Rinaldi & Moio, 2020). This sensation is promoted by the interaction between polyphenolic compounds, such as tannins, and certain salivary proteins.



(Yeom, 2020)

The high affinity between salivary proteins and tannins
⇩
Formation of stable complexes that precipitate

Binding of tannins and proteins that line the oral mucosa
⇩
Loss of saliva lubrication --> dryness and roughness

PROBLEM

RECOGNIZED...

- Astringency can lead to consumer rejection
- Sensation not fully understood

OBSERVED...

- Evaluation through taste panels involving subjectivity
- Knowledge the chemical characteristics of wine

SOLUTION

APPLY...

Test to quantify the astringency of wines, *in vitro* "outside the mouth"

ESTABLISH...

- Knowledge of salivary proteins*wine interactions
- Complement the solutions currently available with a biological component

ENTREPRENEURSHIP PROJECT

SENSEPREDICT is a business project, that emerged from the work developed by the Laboratory of Applied Animal Physiology at MED-Universidade de Évora, committed to combine science with entrepreneurship.

This project aims to develop a technology that allows the precise quantification of astringency, and it has the support of the StartUP Voucher program funded by IAPMEI, an initiative that supports the development of business ideas.

INVENTION

A TOOL TO QUANTIFY ASTRINGENCY OF WINE

- Test based on biological characteristics (salivary proteins*polyphenols in wine interaction)
- Mimic *in vitro* what happens in the mouth
- Decrease subjectivity of taste panels
- Complement the solutions currently available

ADVANTAGES

SUSTAINABILITY

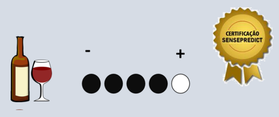
- More sustainable and reduction of production losses

CONSUMERS

- Knowledge of the astringency perceived by individual consumers
- To help in tailored wine choices

WINE PRODUCERS

- Consumer knowledge and distinguish different consumer groups (e.g.: by age, men vs women).
- Possibility to certify astringency level
- Evaluation throughout the production process



OTHER APPLICATIONS

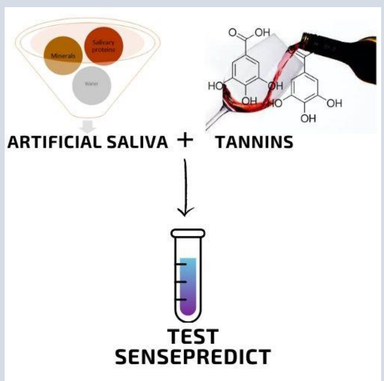
- Apply to other food products;
- Develop tools to evaluate other sensorial sensations (bitter or acid)
- Apply our tool using sensors

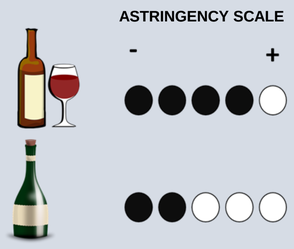
METODOLOGY

STEP 1. DEVELOPMENT OF THE TEST

Selection of salivary proteins involved in astringency → **Artificial saliva** → **SENSEPREDICT**

- Monitoring protein with higher affinity to precipitate tannins
- Sensory tests

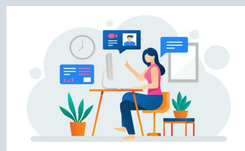




STEP 2. BUSINESS PLAN

Market research → **Divulgation** → **Intellectual property** → **Start-up creation**

- **INTERVIEWS** with wine producers



- **ONLINE SURVEY**

- **SOCIAL MEDIA** LinkedIn, Facebook, twitter, Instagram
- **WEBSITE**

https://sensepredict.wixsite.com/meusite

- **PATENT AND TRADEMARK REGISTRATION**

PRELIMINARY RESULTS

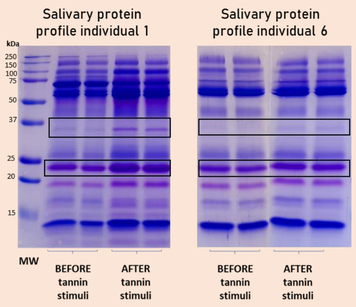
PROTEIN PROFILE

Fig. 1 Alterations observed for different tannin concentrations (0-0.1-0.5-1.0-1.5-2.5-3.5 and 5.0g/L) in supernatant and precipitate

- **Increasing concentrations of tannins results in increased precipitation of salivary proteins.**
- **These changes allowed to identify the proteins most involved in the astringency process.**

SENSORY ASSAYS

SENSORIAL ESSAY
water solution + oenological tannins



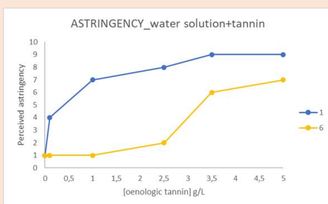


Fig 2. PERCEIVED ASTRINGENCY– water solutions with different concentration of oenological tannins

We complemented our *in vitro* results with sensory tests where participants identified the level of perceived astringency, using a 9-points scale.

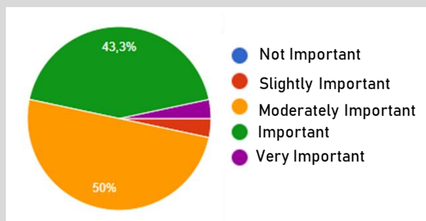
We observed that:

- Participants have considerable differences in salivary protein profile.
- Tannins (in solution and in wine) induced changes in saliva protein profile.
- Relationship between the level of perceived astringency and the increased expression of particular protein bands (e.g. ~23kDa and ~35kDa).

ONLINE SURVEY

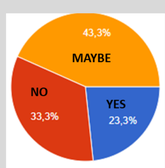
Quantifying astringency is **important**!

30 answers



It would be valued to have a certification (quantitative scale on the label) of astringency.

30 answers



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