Agrio et Emulsio

Development of Fruity Mustard Creams

Cristina Laranjeira[1], João Garcia[1], Maria Cipriano[1], Maria Lima[1], Marília Henriques[1]

cristina.laranjeira@esa.ipsantarem.pt

FOODBALT-2018

[1]Polytechnic Institute of Santarém-ESAS (**leader**).

Other consortium entities: Superior School of Hospitality and Tourism of Estoril-ESHTE; Polytechnic Institute of Beja-ESAB; INIAV-Dois Portos Pole; TagusValley.

Partners

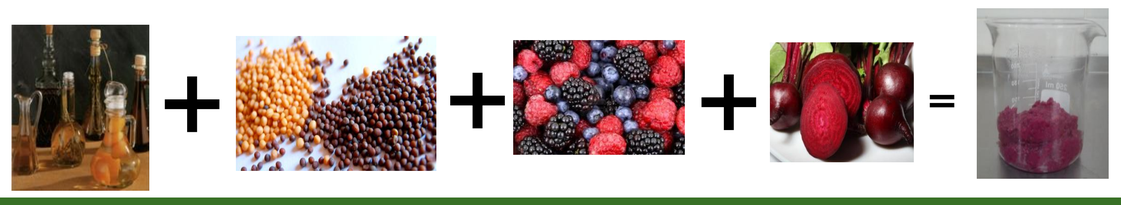
Introduction

- The project ***Agrio et Emulsio*** (POCI-01-0145-FEDER-023583) presents an innovative proposal in **Food Design & Technology** in the areas of vinegar products (***Agrio***) and food emulsions (***Emulsio***).
- Combines its technical features and food pairing ability, with mediterranean traditions, *Nouvelle Cuisine*, concerns about food in health and unique location of ESAS in Ribatejo, where main vinegar and food emulsions' Portuguese industries stands.
- Started in **2009**, with final prototypes developed to date, in ESAS, with students' participation, propose the development of new products, who profile into the **gourmet**, **diet** or **vegan/veggie** markets, through a **sustainable** methodology that values **regional raw materials** and generates nobility, value and technical-scientific knowledge.
- Since 2017, *Agrio et Emulsion* project develops as a multiregional consortium. The project cycle starts and ends in ESAS, with the ***production of prototypes*** in laboratory or small-scale pilot line, simultaneous with demonstration of their ***quality, safety and shelf life*** and definition of strategies of ***marketing***. Partners collaborate through the development, adaptation and/or verification of ***beneficiation and conservation techniques*** (ESAB, INIAV, TagusValley) ***food pairing & food design*** (ESHTE), predicting a future scale-up to industrial production and product entry on the market.

About Moustards, Generation of Ideas

- Mustard creams are oil-in-water emulsions (**o/w**) but its practice is linked to vinegar traditions since the thirteenth century, in France, with the foundation of the first confraternity of ***Maîtres Vinaigrier-Moutardier***.
- In fact, "Mustard" comes from the Latin ***Mustum*** by the ancestral form of preparation for use as a condiment and flavoring.
- The **main ingredients** of mustard sauces are mustard seeds, vinegar and spices and small concentrations of sugar and salt.
- Designations of products, correspond to a clearly defined composition.
- The finished product has a content of dry matter derived from mustard seeds of at least 18% (w/w) and a mustard oil content of al least 5% (w/w).
- The seeds of mustard belong to three species: white (*Sinapis Alba*, Linnaeus), brown (*Brassica Juncea*, Linnaeus) and black (*Brassica nigra*, Linnaeus), the last used in the *Dijon* mustard.
- The **vinegar** assumes solvent and extractive functions: in ***the classic process*** the grains are immersed in this matrix to be maturated, in order to attenuate/balance the burning/stinging sensation of that raw material when it is not previously matured. The phenomenon is a solid-liquid (S/L) cold extraction (maceration).

The **objective** of this study was to develop a **new line** of mustard creams, internally called ***PINK & BLUE mustards***, with the aim of adding fruits and vegetables, particularly red fruits and beets.



Assays, Results and Discussion

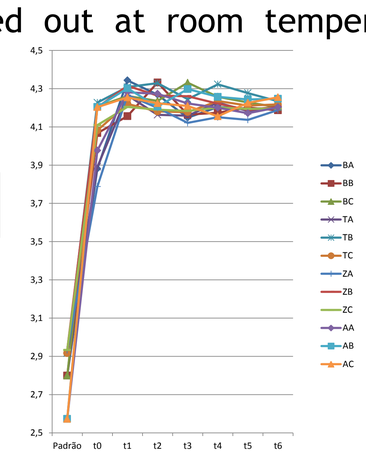
- Technology and methods are divided into ***mustard maturation tests*** and ***prototyping***:
- Thus, by applying the ancestral practice, mustard (seeds, fragments, powder) was first submitted to maturation studies, varying the type of vinegar (white and red vinegars, alcohol vinegar and rice vinegar) and the time of immersion/contact.

Assays, Results and Discussion (Cont.)

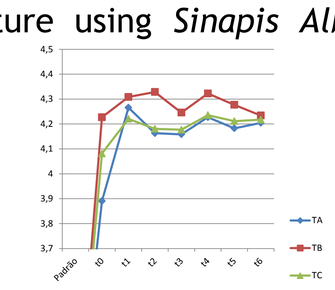
- ***Maturation*** reached equilibrium on the 16th day (**t6**), but pH evolution shows a practically stationary state from the 7th day (**t5**). Best results were obtained with seeds and powdered mustards in red wine vinegar, 4%(m/v) total acidity.
- The assays were carried out at room temperature using *Sinapis Alba* mustard species.

pH

Cooked red beet maturation in red wine vinegar and orange juice

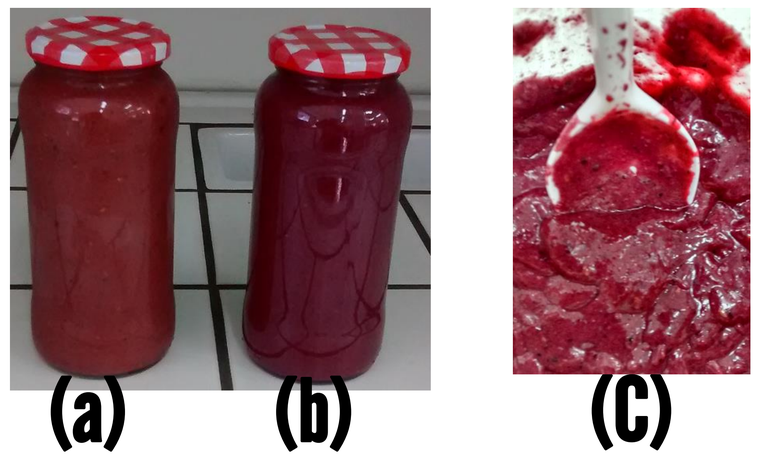


Maturation of mustard assays



Ti - Maturation of mustard displayed in red wine vinegar (T) 4% (m/v) acidity.
TA – Maturation of mustard seeds
TB – Maturation of mustard fragments
TC – Maturation of mustard powder

- **Prototyping** articulated technical, analytical (physicochemical, rheological, microbiological) and sensory tests.
- In development of fruity mustard creams several ingredients were tested in successive process assays: mixtures of matured mustard (seeds and or powder) with beet and/or red fruits (raspberry and blueberry) in various proportions; water, olive oil, honey (of rosemary and eucalyptus), salt, sugar and spices (ginger, black and pink pepper, long-pepper, nutmeg, cinnamon, clove of the Indian, curry, cumin and cardamom).
- As final prototypes, the panel of tasters selected a mustard cream with beet and raspberry **(a)** and one with raspberry and blueberry **(b** and **c)**.



Perspectives of the final prototypes of fruity mustards with beet and raspberry (a) and with raspberry and blueberry (b and c).

- Each final prototype has a distinct profile of ingredients, mustard, fruits (raspberry and beet or blueberry), olive oil, water, salt, sugar, honey and some of the spices tested.

Conclusions

- ***PINK & BLUE mustards*** are a new and innovative proposal of mustard creams for the gastronomic market, with the possibility of future production on an industrial scale.
- Both creams presented, retain the *sui generis* taste of mustard tinted with the fruit flavour plus an innovative purple rose colour.
- At present time, they are undergoing experimental tests of food pairing and design (ESTHE), final heat treatment tests (TagusValley and ESAS) and stability tests (ESAS), predicting a long shelf life for these two prototypes.

References

1. **Laranjeira C.M. & Lima M.G. (2016).** Scal Agrio et Emulsio: New products development. Project Idea. **In:** *Atelier of Practice Based Research Projects*. ESTTM: Peniche, 12-13 July, 2016. Available: https://drive.google.com/file/d/0B8UgA50PnzIlbXdUVXFDR2ZQMmc/view
2. **Laranjeira C.M., Lima M.G., Henriques M., Ruivo P.** *et al.* **(2016).** *Agrio et Emulsio*: *New products development* . Project application to the Aviso Nº2/SAICT/2016, submitted on September 30. Approved July 7, 2017.
3. **FIC EUROPE (2006).** *Code of Practise: Mayonnaise, Mustard, Tomato Ketchup, Fruit and Vegetables in Vinegar.* FIC Europe c/o AGEP s.a., Brussels. p 11-22.
4. http://www.moutarde-de-meaux.com/histo-origine-vinaigre.php

Acknowledgments to the sponsor of the Operational Program Competitiveness and Internationalization and Regional Operational Program of Lisbon, in the ERDF component. Special thanks to all the students and staff involved in the project and to the *chef* Rodrigo Castello (*Taberna Ó Balcão*).

Cofinanciado por:

COMPETE 2020 PORTUGAL 2020 UNIÃO EUROPEIA Fundo Europeu de Desenvolvimento Regional