Based on the preliminary results obtained on the modified starch, its interaction with alternative sugars and fibers will be evaluated, only at a later stage will we move on to a complex system like cream.

AGRICOLTURA, ALIMENTAZIONE E AMBIENTE

UNIVERSITÀ DI TORINO

UNIVERSITÀ DEGLI STUDI DI PALERMO

28th Workshop on the Developments in the Italian Ph.D research on Food Science, Technology and Biotechnology

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GSICA · SISS · SIMTREA · SISTAL

CHEMICAL-PHYSICAL STUDY OF CRYSTALLIZATION IN CONFECTIONERY PRODUCTS AND ITS IMPLICATION ON PRODUCT QUALITY

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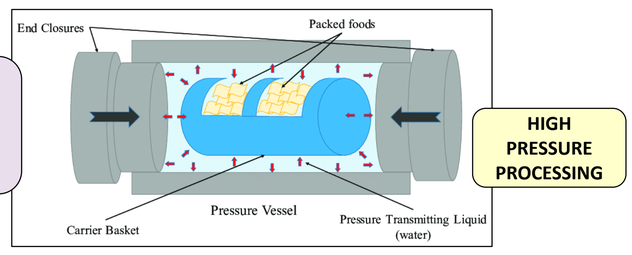
Objective: Investigate how innovative solutions applied on the processing or in the use of different ingredients may extend shelf life of confectionery products.
Because of that, two different solutions will be used:

PASTEURIZATION WITH HIGH PRESSURE PROCESSING (HPP) ON ICE CREAM MIXTURES

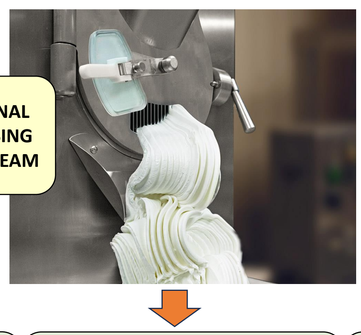
MATERIALS & METHODS



HIGH PRESSURE PROCESSING

STORAGE +4°C

T 0 · T 7 · T 15 · T 30 · DAYS



ARTISIANAL PROCESSING OF ICE CREAM

In collaboration with CAPPADONIA GELATI

PHYSICAL ASSESTMENT (DSC, RHEOLOGY, TEXTURE AND MELTING STABILITY)

SENSORY, COLOR AND VOLATILE PROFILE EVALUATION

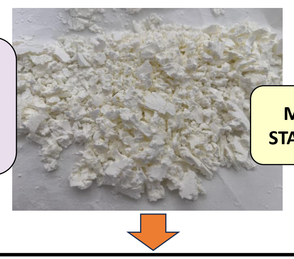
MICROBIOLOGICAL ASSESTMENT UP TO 30 DAYS (MAIN PATHOGENS AND ALTERATIVE MICRORGANISMS)

AIM OF THE PROJECT

The goal is to break down the microbiological flora and inactivate the enzymatic activity through the high pressure treatment, to extend the shelf life of liquid ice cream bases before whipping.
The evaluation of the efficiency of this innovative mild technology will be done on ice cream whipped after different period of storage at fridge temperature (after 0, 7, 15 and 30 days).

MODIFICATION OF NORMAL MAIZE STARCH TO OBTAIN PRE-GELATINIZED V-TYPE GRANULAR STARCH (VGS)

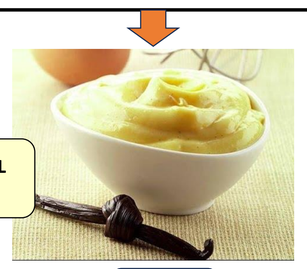
MATERIALS & METHODS



MODIFIED STARCH (VGS)

In collaboration with WAGENINGEN UNIVERSITY & RESEARCH

Evaluation of the gelatinization and retrogradation behavior of the modified pre-gelatinized starch and its interaction with other components, like alternative sugars and fibers e.g..
At a later stage, based on the preliminary results obtained, we will move on to a complex system such as custard.



ARTISANAL CUSTARD

STORAGE - 18°C

T 10 · T 20 · T 30 · T 60 · T 90 · DAYS

CHEMICAL-PHYSICAL ASSESTMENT (DSC, RHEOLOGY, TEXTURE ANALYSIS, CONFOCAL LASER SCANNING MICROSCOPY)

AIM OF THE PROJECT

The goal is to employ modified starch in a complex system such as custard, so that the occurrence of pre-gelatinization of the modified starch can slow down the retrogradation process that normally occurs in starch.
In this way, the custard can be stored in the freezer and thus extend its shelf life.
Analyses will be performed at different storage times (after 10, 20, 30, 60, 90 days).

Activities	Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
A1	***Determination of sweet products***																								
	1) custard/pastry cream																								
	2) ice cream																								
A2	***Evaluation of different plasticizers/treatment***																								
	1) inulin, mixture of sugars, VGS																								
	2) freezing storage (custard)																								
	3) high pressure treatments (ice cream)																								
A3	***Preparation of samples***																								
	1) V-type granular starch																								
	2) custard with single/multiple plasticizers																								
	3) freeze/fridge storage (custard)																								
	4) liquid bases of ice cream																								
	5) fridge T°C storage (ice cream)																								
A4	***Assessing samples***																								
	1) calorimetry, rheology (both)																								
	2) texture, water mobility (both)																								
	3) microbial growth (ice cream)																								
A5	***Evaluation and Interpretation of results***																								
A6	***Writing and Editing Thesis***																								

Dries, D. M., Gomand, S. V., Goderis, B., & Delcour, J. A. (2014). Structural and thermal transitions during the conversion from native to granular cold-water swelling maize starch. *Carbohydrate Polymers*, *114*, 196–205. https://doi.org/10.1016/j.carbpol.2014.07.066