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GSICA SISS SIMTREA SISTAL

PRODUCTION OF PLANT-BASED YOGURT LIKE

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STATE OF THE ART

The concerns about environmental impact and sustainability of animal-based diets, as well as human health issues thereof related, have fuelled consumer demand for dairy alternatives, paving the way to plant-based yogurt-like (YL). In this work, a functional YL was developed in collaboration with the company Celery srl (Italy).
The ingredients used for the production of plant-based yogurt-like were rice flour and sprouted barley. Barley was germinated following the procedure described in Montemurro *et al.*, 2019 aiming at its enrichment in γ-aminobutyric acid (GABA). For the optimization of the process, part of barley was additionally heated at 150°C for 3 hours aiming at inactivate the endogenous amylases, responsabile for the loss in viscosity during the shelf-life. The microorganism selected as starter for fermentation is *Lactiplantibacillus plantarum*, H64 isolated from hops (Nionelli *et al.*, 2018).

EXPERIMENTAL PLAN

RICE FLOUR and **SPROUTED BARLEY** (3:1)

→ **GELATINIZATION** (80°C for 15 minutes)

→ **BIOTECHNOLOGICAL TREATMENT**
Fermented with *Lactiplantibacillus plantarum* (H64)
(30°C for 8 hours)

CHARACTERIZATION
Sensorial analisys at the end of fermentation. **Viscosity** and content of **GABA** at the end of fermentation and during refrigerated storage after 7, 14 and 30 days

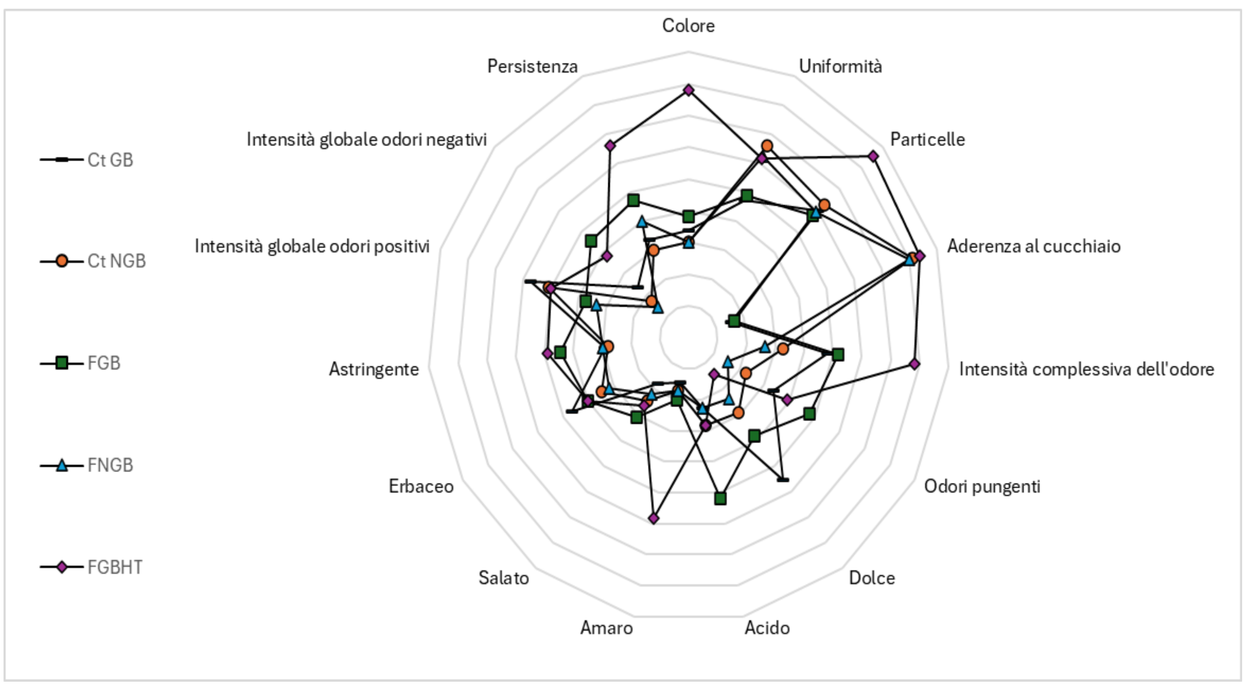
RESULTS: Technological characterization

Table 1. *Viscosity, expressed as Pa*s, of sprouted barley-based beverages (FGB) and non-sprouted barley-based beverages (FNGB) fermented with L. plantarum H64. FGBHT, sprouted barley heat treated. Ct, chemically acidified controls.*

	Parameters	Viscosity (Pa*s)			
	Sample/Time	Tf	7 days	14 days	30 days
1	Ct NGB	3.3±0.14a	2.2±0.07a	1.7±0.07a	1.6±0.07a
2	Ct GB	0.1±0.00b	0.1±0.00c	0.1±0.00c	0.1±0.00d
3	FNGB	3.4±0.07a	1.7±0.00b	1.5±0.00b	1.5±0.00b
4	FGB	0.1±0.00b	0.1±0.00c	0.1±0.00c	0.1±0.00d
5	FGBHT	3.3±0.28a	1.7±0.00b	1.7±0.07a	1.6±0.00c

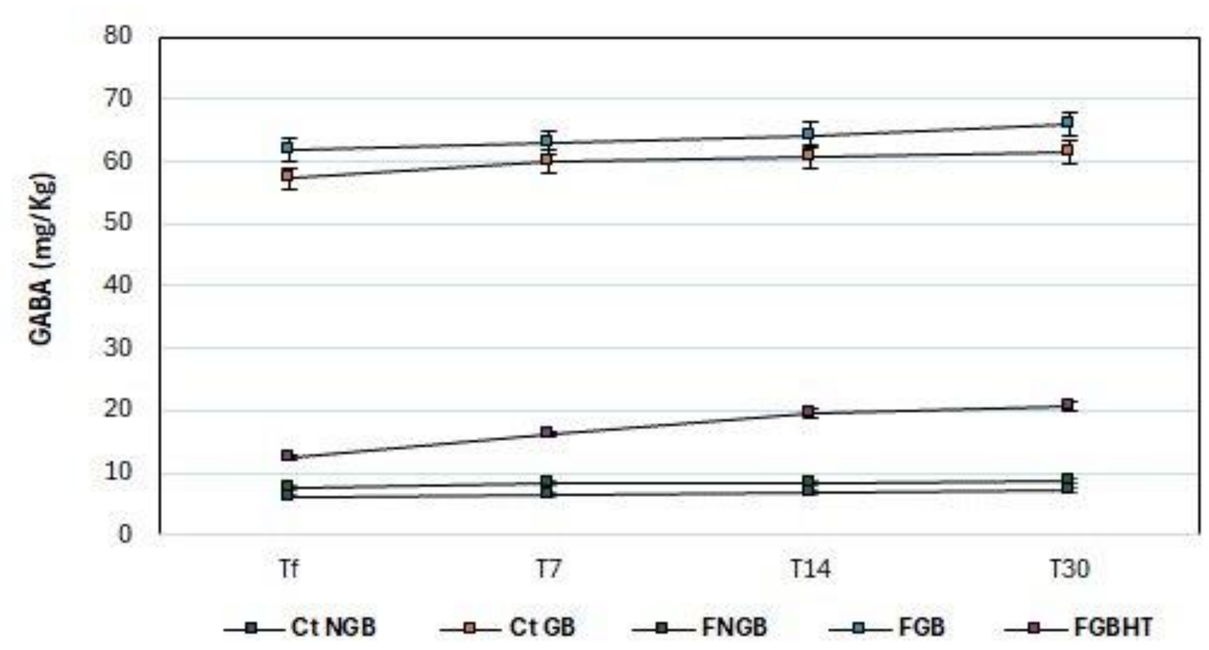
RESULTS: Sensorial analysis

Figure 2. *Sensorial analysis, after 8h of fermentation at 30°C, of sprouted barley-based beverages (FGB) and non-sprouted barley-based beverages (FNGB) fermented with L. plantarum H64. FGBHT, sprouted barley heat treated. Ct, chemically acidified controls.*



RESULTS: Functional characterization

Figure 1. *Content in γ-aminobutyric acid, expressed as mg/kg, of sprouted barley-based beverages (FGB) and non-sprouted barley-based beverages (FNGB) fermented with L. plantarum H64. FGBHT, sprouted barley heat treated. Ct, chemically acidified controls.*



CONCLUSIONS

This thesis project aimed to develop the process of obtaining a fermented drink based on rice and barley. Screening for lactic acid bacteria to be used as a starter led to selection of a strain of *L. plantarum* which was then used to optimise the production process. The germination process gives a high amount of amino acids to the matrix, but negatively affects the gelatinization capacity of beverages, making it impossible to obtain textures similar to those of yogurt. For this reason, a 150°C pre-treatment of the sprouted barley was provided, aimed at the inactivation of amylase. If on the one hand this treatment has allowed gelatinization, on the other hand had a negative impact on the total amino acid content and the production of a compound functional as GABA. Some beverage characterization analyses (e.g. VOCs) are still ongoing. However, if a compromise between the nutritional and technological characteristics of the product, the production process needs to be further optimized.

REFERENCES

Montemurro, M., Pontonio, E., Gobbetti, M., & Rizzello, C. G. (2019). Investigation of the nutritional, functional and technological effects of the sourdough fermentation of sprouted flours. International Journal of Food Microbiology, 302, 47-58.
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