

What’s inside a “Metato”?

The Case Study of Chestnut Flour Obtained by Traditional Drying Method: Chemical, Aromatic, and Sensory Properties.

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INTRODUCTION & AIM

Chestnuts are traditionally dried and processed into flour, which is gluten-free and rich in starch and micronutrients. Over the past decade, demand for chestnut flour has steadily increased, driven by consumer perception of its associated health benefits.

As the market for chestnut flour expanded from small-scale to large-scale production, alternative methods were developed to replace traditional processes. However, these innovations often result in a **loss of product identity**, particularly in terms of **sensory attributes** and **typicity**.

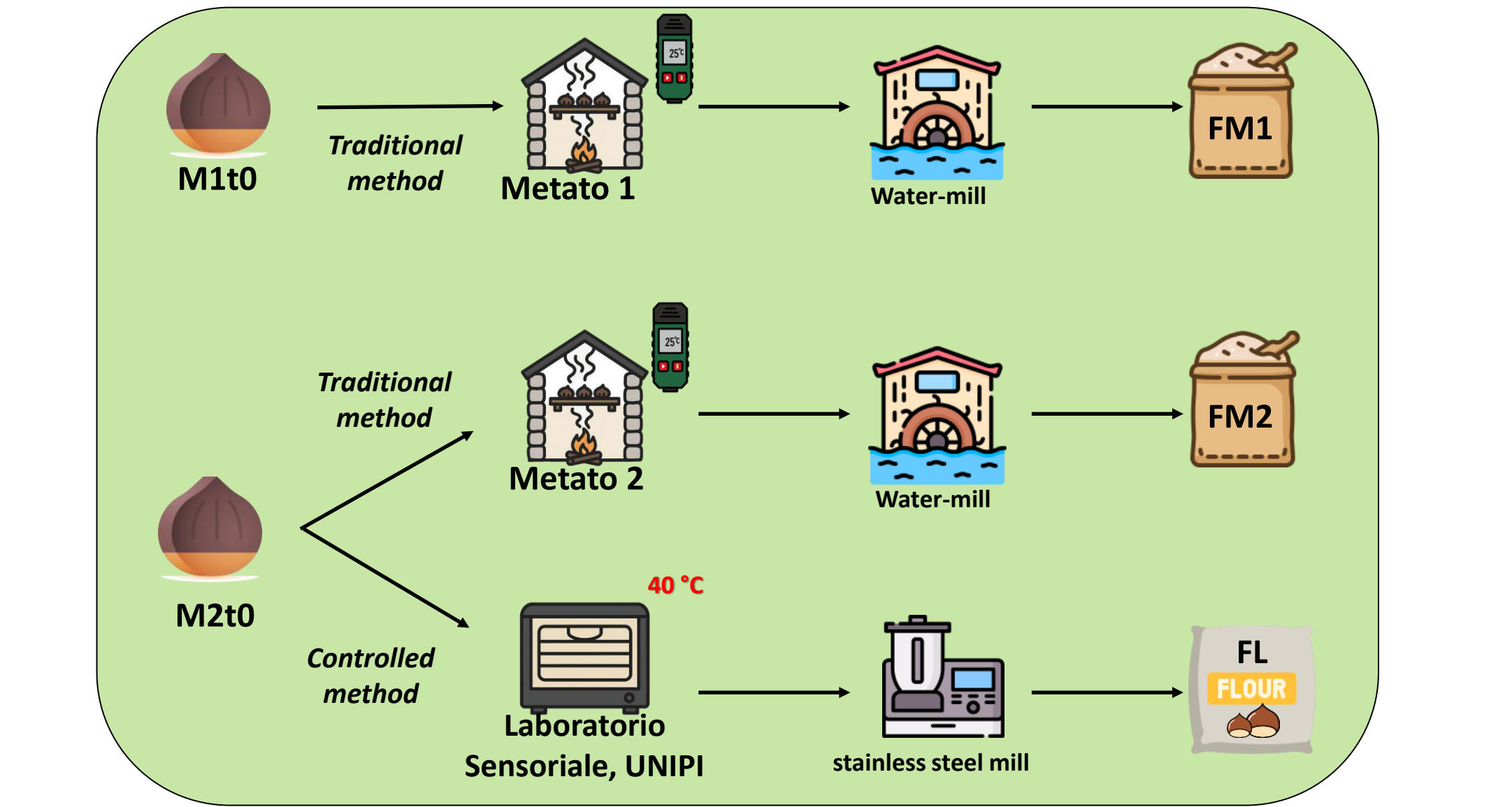
Despite this shift, traditional production methods remain active in Italy, as evidenced by the certification of 15 chestnut-based products, including two PDO chestnut flours.

This study aimed to evaluate the quality of traditional chestnut flour produced through **firewood drying** in structures known as “metati”, in terms of sensory and chemical features.

For this purpose, two producers of traditional chestnut flour were selected and processing conditions of their metato were monitored and compared with an industrial laboratory scale trial.

Traditional
Vs
Industrial

METHOD

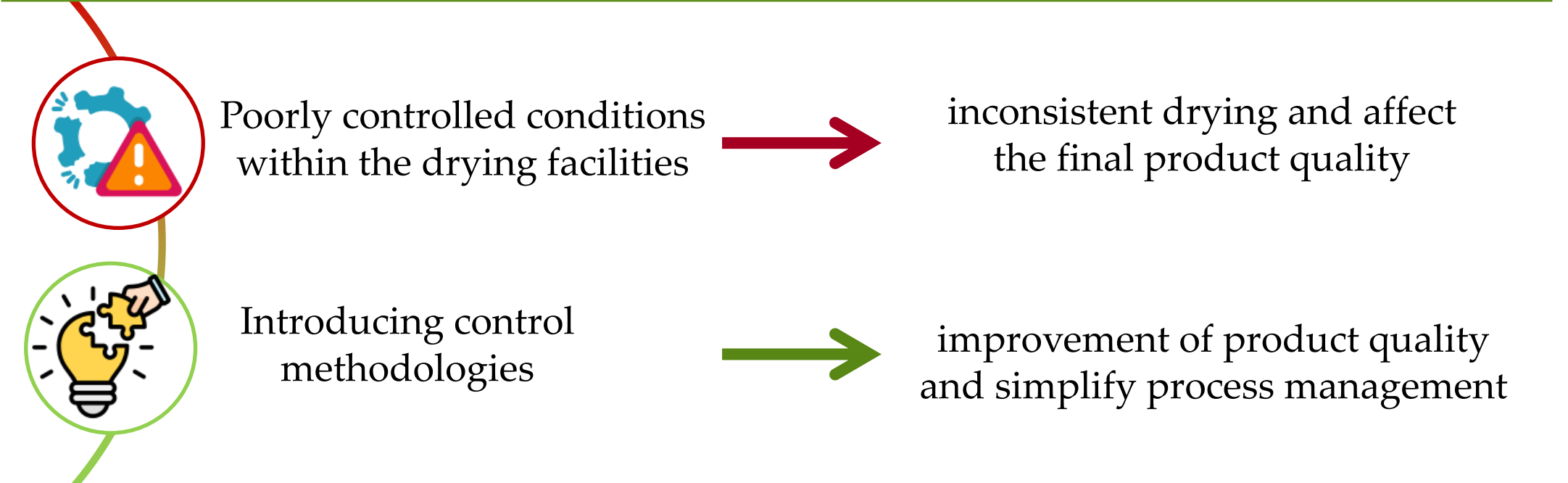


The chestnuts and flour samples were provided by local growers of Garfagnana (Lucca, Italy) and coded as follows:

- M1t0: Batch 1 of Fresh chestnuts
- M2t0: Batch 2 of Fresh chestnuts
- FM1: Traditional flour obtained in metato 1 from M1t0 chestnuts
- FM2: Traditional flour obtained in metato 2 from M2t0 chestnuts
- FL: Laboratory-processed flour from M2t0 chestnuts

After the milling process, flours were analyzed with chemical and sensorial analysis and in terms of aromatics compounds.

CONCLUSION



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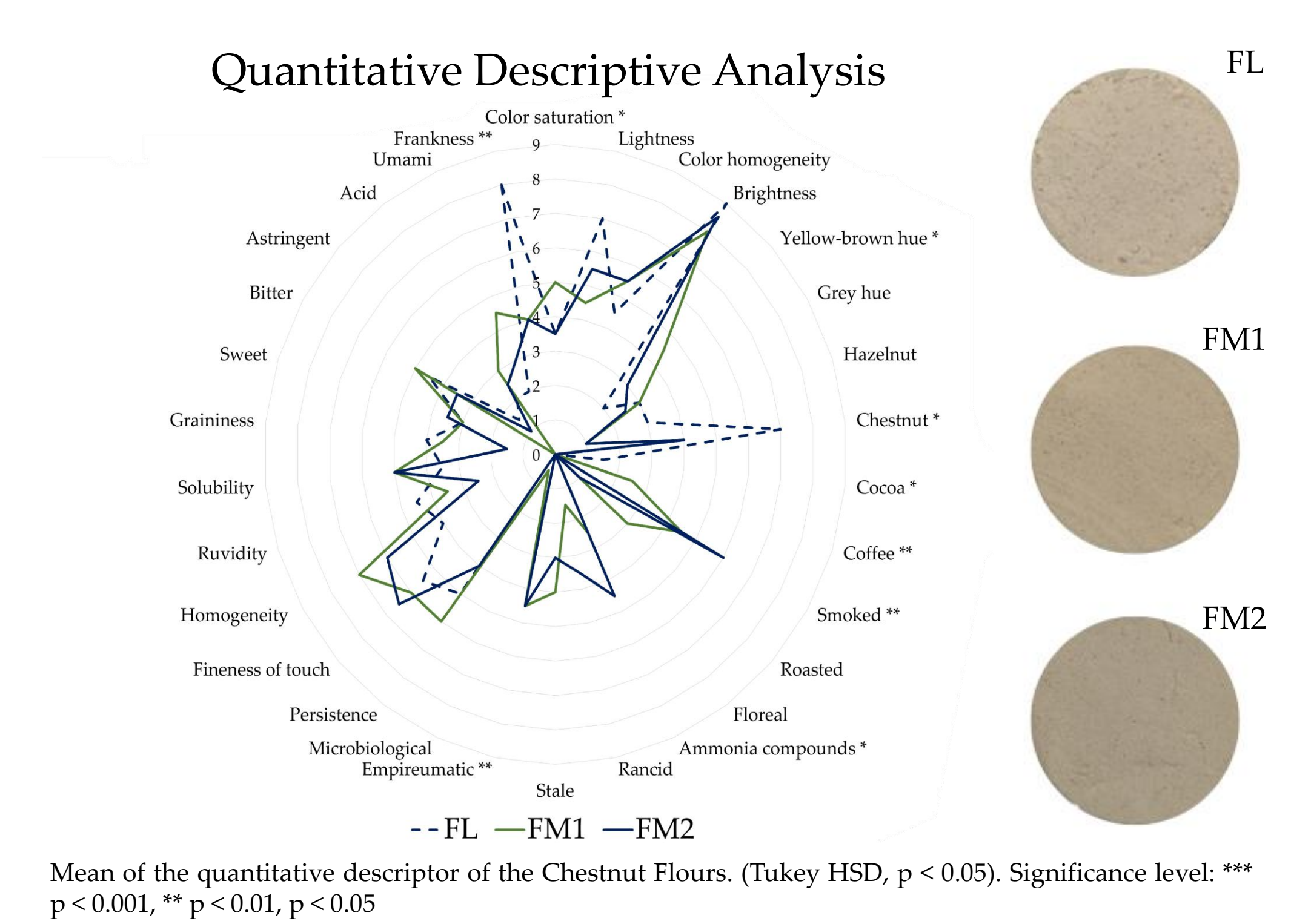
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RESULTS & DISCUSSION

Carbohydrates and Bioactive compounds

Parameters	Units	p-value ¹	FL	FM1	FM2
Total Starch	g/100 g dm	**	43.93±1.86 ^a	40.20±0.39 ^b	39.43±0.81 ^b
Sucrose	g/100 g dm	***	19.04±2.14 ^a	21.57±0.51 ^a	15.93±0.69 ^b
Reducing sugars	g/100 g dm	***	1.28±0.07 ^b	3.14±0.15 ^a	1.09±0.09 ^a
Vitamine C	mg/kg dm	**	323±32 ^a	111±5 ^b	285±16 ^a
Total phenols	GA eq. mg/100g dm	***	351±20 ^a	228±52 ^b	293±21 ^a

The values represent the mean (± SD) of 3 samples. Different letters in each row correspond to statistically different values (Tukey HSD, p < 0.05). ¹ Significant level: ** = p < 0.01; *** = p < 0.001.



VOCs

		Relative Abundance (%)		
	p-value ¹	FL	FM1	FM2
Chemical classes				
Terpenes				
Monoterpene hydrocarbons	***	47.2±0.15 ^a	2.00±0.06 ^b	- ^c
Non-terpene derivatives				
Alcohols/ethers/phenols	***	15.2±0.49 ^c	34.9±0.89 ^b	49.1±0.53 ^a
Esters	**	4.8±0.1 ^a	3.8±0.18 ^{ab}	2.2±0.15 ^b
Aldehydes/ketones	***	12.8±0.54 ^c	24.5±0.06 ^a	17.3±0.10 ^b
Acids	***	18.8±0.78 ^b	32.0±0.99 ^a	21.2±1.35 ^b
Others	**	0.8±0.02 ^c	2.5±0.02 ^b	5.2±0.02 ^a
Total identified		99.6±0.01	99.7±0.1	95±0.55

Composition of the VOCs emissions (Relative Abundance (%)) of the Chestnut flours. Values are presented as the mean ± standard deviation (SD) of 3 samples. The superscript lowercase letters in the row indicate statistical differences among the samples (Tukey HSD, p < 0.05). ¹ Significance level: *** p < 0.001, ** p < 0.01, p < 0.05

