Evaluation of the nutritional, chemical and mineral composition of intercropped almonds cultivated in Croatia

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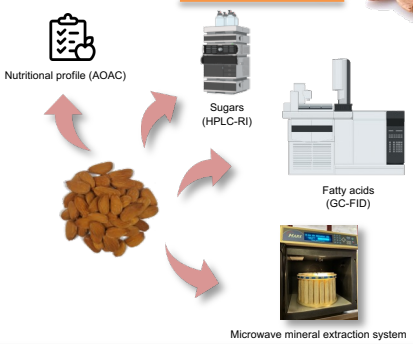
Introduction

In recent years, crop diversification in agroforestry systems has been recognized as a sustainable strategy to improve land use efficiency, restore environmental balance, mitigate climate change, provide economic benefits and guarantee food security [1,2]. In addition, intercropping contributes in improving the nutritional quality of almonds, promoting biodiversity and the efficient use of agricultural resources [3]. This particular study aimed to evaluate the nutritional chemical, and mineral aspects of almonds to investigate the benefits resulting from crop interactions, using different almond cultivars like Ferragnès, Texas, AI, and Ferraduel.

Methodology



Results

The results indicated that the Ferraduel cultivar had the highest moisture and carbohydrate content, with values of 6±0.2 g/100g fw and 30±0.1 g/100g fw, respectively (**Figure 1**). Regarding the chemical composition, the Ferragnès cultivar had the highest oleic acid content, and the AI cultivar had the highest sucrose content of 10±0.4 mg/mL.

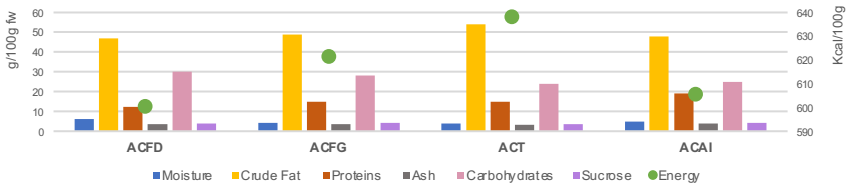


Figure 1. Nutritional profile and sugar content of intercropped almonds produced in Croatia.

ACT – Intercropped almond corresponding to the Texas cultivar; **ACAI** – Intercropped almond corresponding to the AI cultivar; **ACFG** - Intercropped almond corresponding to the Ferragnès cultivar; **ACFD** - Intercropped almond corresponding to the Ferraduel cultivar.

In terms of mineral content, the AI cultivar had the highest concentrations of magnesium, iron and zinc, with values of 114±0.3 mg/Kg, 62±3 mg/Kg and 31±1 mg/Kg, respectively (**Table 1**).

Table 1. Mineral content of intercropped almonds produced in Croatia

	[K] (g/Kg)	[Na] (mg/Kg)	[Ca] (mg/Kg)	[Mg] (mg/Kg)	[Fe] (mg/Kg)	[Mn] (mg/Kg)	[Cu] (mg/Kg)	[Zn]/(mg/Kg)
ACT	8200±0.05	62±6	2000±0,1	109±4	46±3	17.2±1	15.4±1	24±0.2
ACFD	6400±1.7	39±8.2	2100±0,3	115±7	56±4	18±3	16.3±3	26.1±7
ACFG	8000±0.1	48±2	2500±0,01	110±1.1	60±1.3	19±0.3	12.2±1	30.2±0.04
ACAI	8000±0.02	54.1±4.1	2500±0,04	114±0.3	62±3	19±0.3	15±1	31.3±1

Conclusions

This approach helps promote sustainable agriculture while ensuring food security and environmental conservation, with potential for further improvements through additional research.

This project aims to protect, restore and promote the sustainable use of terrestrial ecosystems, while working to reverse soil degradation and halt biodiversity loss through the implementation of agricultural practices that result in a significant reduction in environmental impact (Goal 15).

References

[1] Maitra, S. et al. Agronomy, 2021, 11(2), 343.
[2] Almagro, M. et al. Agriculture, Ecosystems & Environment, 2023, 345, 108320.
[3] Rodríguez B. et al. Agronomy, 2023, 13(3), 749.

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