Foods 2025 Conference

The 6th International Electronic Conference on Foods

28–30 October 2025 | Online

Green Pea Microgreens as Novel Foods:

A Study on Nutritional Composition and Antioxidant Properties

Matilde Rodrigues[1], Cátia Magalhães[1,2], José Pinela[1,3*]

[1] CIMO, LA SusTEC, Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

[2] School of Agriculture, Polytechnique Institute of Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal

[3] National Institute for Agricultural and Veterinary Research (INIAV, I.P.), Rua dos Lágidos, Lugar da Madalena, 4485-655 Vairão, Vila do Conde, Portugal

*jose.pinela@iniav.pt

INTRODUCTION

Microgreens have gained increasing attention as promising novel foods due to their high concentrations of micronutrients (vitamins and minerals) and bioactive compounds such as polyphenols. These young edible seedlings not only contribute to diet diversification and the prevention of micronutrient deficiencies but also align with the current consumer demand for sustainable and micronutrient-dense foods. Among the various species, green pea (*Pisum sativum* L.) microgreens stand out for their protein content, balanced amino acid composition, and pleasant organoleptic characteristics, which enhance consumer acceptance [1,2]. Despite their market potential, a comprehensive characterization of their nutritional composition and bioactive properties remains limited. This study aimed to cultivate green pea microgreens and to characterize their proximate composition, mineral content, and antioxidant activity, providing insights into their nutritional value for human nutrition.

METHODOLOGY

The microgreens were grown under greenhouse conditions using Siro Bio substrate (NPK 9:2:2, 2 kg/m³), with irrigation via nebulization. They were harvested 25 days after sowing, and the emergence rate was monitored daily. Post-harvest, biomass yield and moisture content were determined. Chlorophyll content was analyzed by spectrophotometry, mineral composition by atomic absorption spectrometry, and soluble sugars and organic acids by high-performance liquid chromatography. A hydroethanolic extract was prepared to quantify total phenolics (Folin-Ciocalteu method) and evaluate antioxidant activity through DPPH free radical scavenging and thiobarbituric acid reactive substances (TBARS) formation inhibition assays [3].

Analytic determinations:

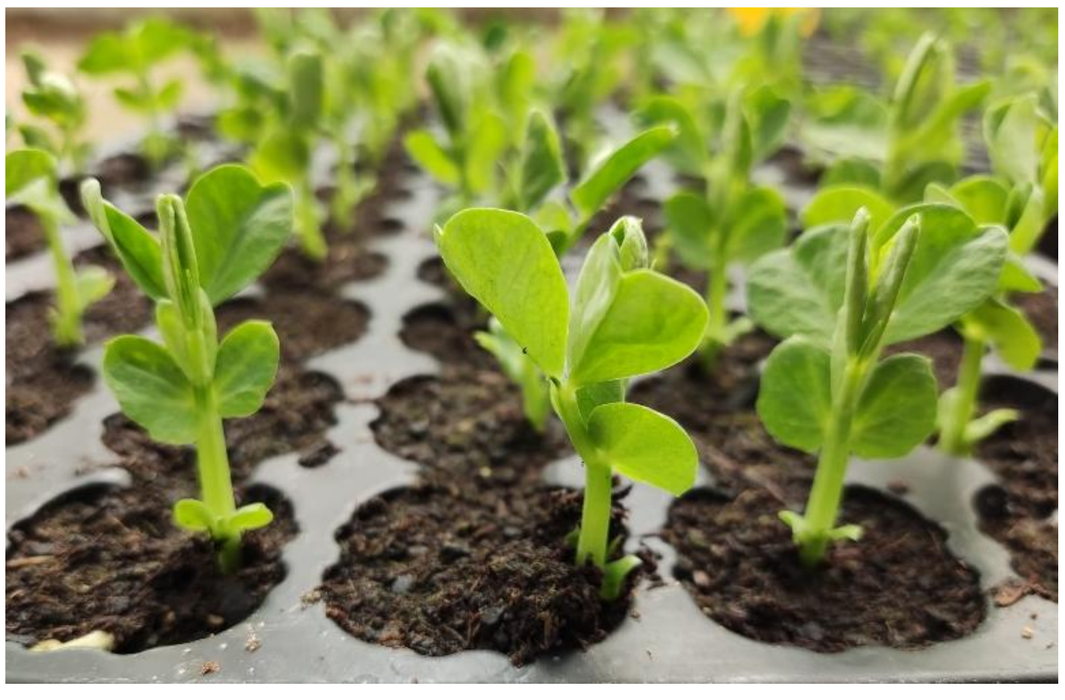
- Moisture content: Infrared moisture analyzer.
- Chlorophylls: Spectrophotometric method.
- Mineral composition: Atomic absorption spectroscopy (AAS).
- Free sugars and organic acids: High-performance liquid chromatography (HPLC).

Antioxidant properties:

- Total phenolics: Folin-Ciocalteu colorimetric assay.
- Antioxidant activity: DPPH and TBARS *in vitro* assays.

RESULTS

The microgreens showed an emergence rate of about 80% and a predominance of chlorophyll *a* over chlorophyll *b*. Glucose was the sole detected free sugar (2.18 g/100 g, dw). Among organic acids, oxalic (13.75 g/100 g dw), citric (0.51 g/100 g dw), and fumaric (0.02 g/100 g dw) acids were quantified, while ascorbic acid was found only in trace amounts. Mineral analysis revealed high levels of potassium (5.67 g/100 g dw), calcium (3.14 g/100 g dw), iron (10.17 mg/100 g dw), and zinc (6.38 mg/100 g dw), highlighting the microgreens' potential as a mineral-dense food. The extract showed a total phenolic content of 133 mg GAE/g extract but demonstrated moderate antioxidant activity compared to the positive control, Trolox.



CONCLUSION

This study expands the current knowledge on the nutritional value and antioxidant properties of green pea microgreens, reinforcing their suitability for inclusion in balanced and sustainable diets. These results could also aid in updating food composition databases.

ACKNOWLEDGMENTS

The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) for financial support through national funds FCT/MCTES (PIDDAC): CIMO, UIDB/00690/2020 (10.54499/UIDB/00690/2020) and UIDP/00690/2020 (10.54499/UIDP/00690/2020); and SusTEC, LA/P/0007/2020 (10.54499/LA/P/0007/2020); national funding by FCT, through the individual research grant (2024.04986.BD) of M. Rodrigues.

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