Development of a cowpea immature pod purée: an opportunity for the elderly to improve their autonomy in daily living activities and quality of life

Catarina Passão[1*], Alfredo Aires[1], Miguel Rodrigues[1], Luís Ferreira[1], Irene Gouvinhas[1], Ana Barros[1]

*[1]Centre for the Research and Technology of Agro-Environment and Biological Sciences (CITAB)/Inov4Agro (Institute for Innovation, Capacity Building and Sustainability of Agri-Food Production), University of Trás-os-Montes and Alto Douro (UTAD), Quinta de Prados, 5000-801 Vila Real, Portugal; *cpassao@utad.pt*

Introduction

Cowpea (*Vigna unguiculata* L. Walp.)

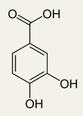
Fabaceae family and native from Africa[1,2]

Tolerance to heat and drought stresses and adaptability to low-fertile soils[2]

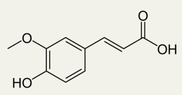
- ✓ High protein (on average from 23-32% on a dry basis) and carbohydrate (50-60%) content with a low-fat level (1%)[3].
- ✓ Valuable source of diverse components such as soluble and insoluble dietary fibre, resistant starch, phenolic compounds, minerals, and B-complex vitamins[3]. Cowpea proteins are rich in essential amino acids[4].
- ✓ Although the most economically relevant part of the crop is the dry seed, the young leaves, green seeds and pods, and flowers are also consumed in some parts of the world[3,5,6,7]. All cowpea plant parts have high nutritive quality[2,8,9].
- ✓ To our knowledge, there are few studies on the nutritional and phenolic composition of cowpea immature pods and green seeds. Previous research had shown that cowpea immature pods exhibited higher values for polyphenolic contents and antioxidant activity as compared to green and dry seeds[10,11].

Phenolic compounds

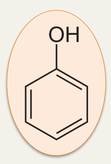
Phenolic acids[12,13]

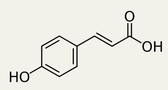


protocatechuic acid



ferulic acid

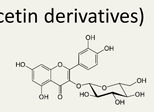




p-coumaric acid

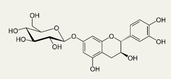
Flavonoids[14,15]

Flavonols
(quercetin derivatives)



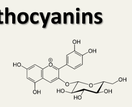
quercetin 3-*O*-glucoside

Flavan-3-ols
(tannins)



catechin-7-*O*-glucoside

Anthocyanins



cyanidin-3-*O*-glucoside

Health benefits

Gastrointestinal diseases[16]

Chronic degenerative diseases[4]

Cancer[17]

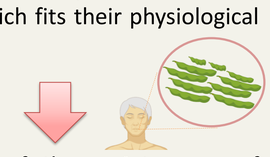
Obesity[4]

Diabetes[18]

Hypercholesterolemia and cardiovascular diseases[19]

Objectives

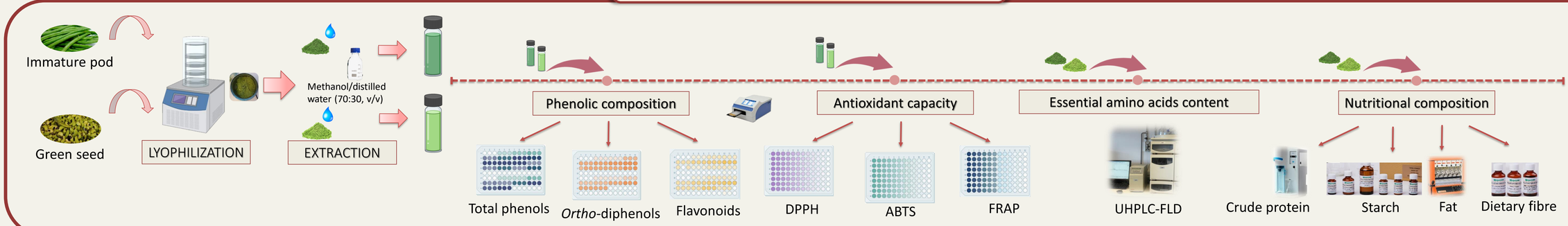
- ✓ Development of a cowpea immature pod ready-to-eat purée for elderly people, which fits their physiological limitations



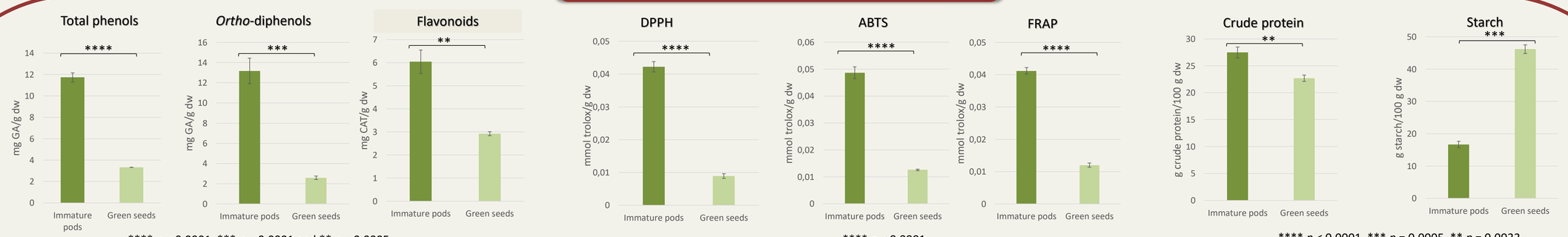
- ✓ Promotion of the maintenance of their muscle mass and the synthesis of neurotransmitters implicated in depression disorder and sleep quality.

This study aims to analyze the nutritional and phenolic composition and antioxidant capacity of the cowpea at two different growth stages, namely **immature pods** and **green seeds**.

Material and methods



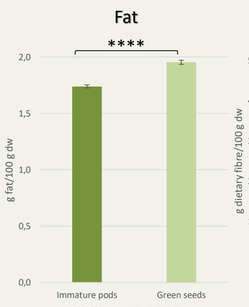
Results and discussions



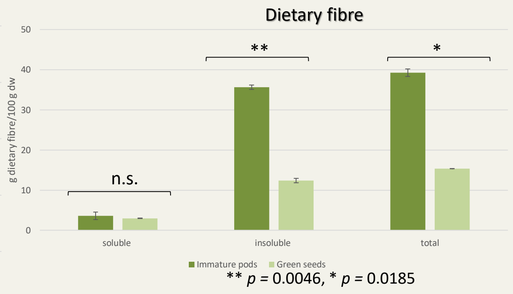
**** $p < 0.0001$, *** $p = 0.0001$ and ** $p = 0.0005$

**** $p < 0.0001$

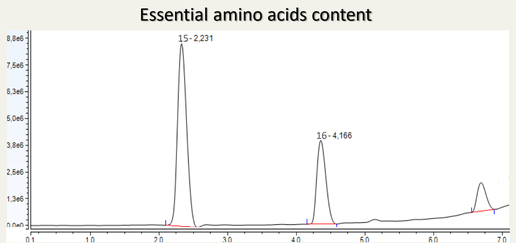
**** $p < 0.0001$, *** $p = 0.0005$, ** $p = 0.0033$



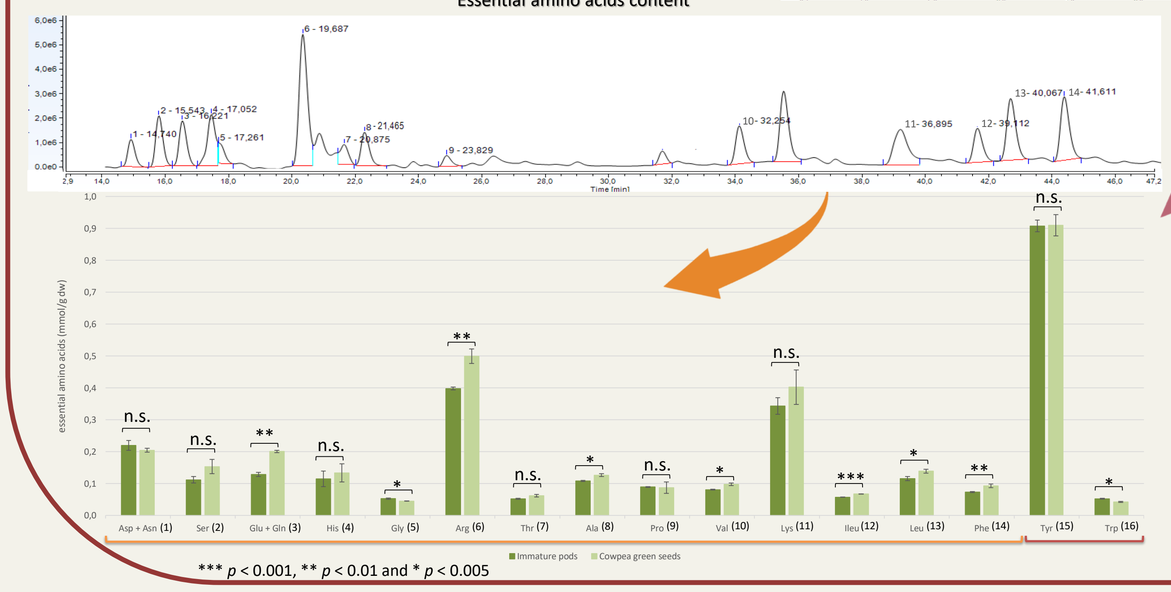
**** $p < 0.0001$



** $p = 0.0046$, * $p = 0.0185$



Essential amino acids content



*** $p < 0.001$, ** $p < 0.01$ and * $p < 0.005$

Conclusions

- ✓ The results suggest that cowpea immature pods have remarkable potential to be included in the development of a new functional food product, which could contribute significantly to the improvement of sleep quality, to reduce depressive symptoms and to improve the quality of life and autonomy in activities of daily living of the elderly. To our knowledge, here we present the first study concerning the nutritional composition of cowpea immature pod, suggesting that it is a great asset, allowing farmers to make their business more profitable and diversified.

References

scan me

Acknowledgements: CP received a grant (BI/UTAD/41/2021) from I&D project «SoilRec4+Health – Soil recover for a healthy food and quality of life», co-founded by the European Regional Development Fund (FEDER) through NORTE-2020 (NORTE-01-0145-FEDER-000083).

Funding: This work was financially supported by national funds from I&D project «SoilRec4+Health – Soil recover for a healthy food and quality of life», co-founded by the European Regional Development Fund (FEDER) through NORTE-2020 (NORTE-01-0145-FEDER-000083) and by National Funds by FCT - Portuguese Foundation for Science and Technology, under the project UIDB/04033/2020.