

DEVELOPMENT OF A HEALTHY LENTIL-BASED FOOD PRODUCT

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INTRODUCTION

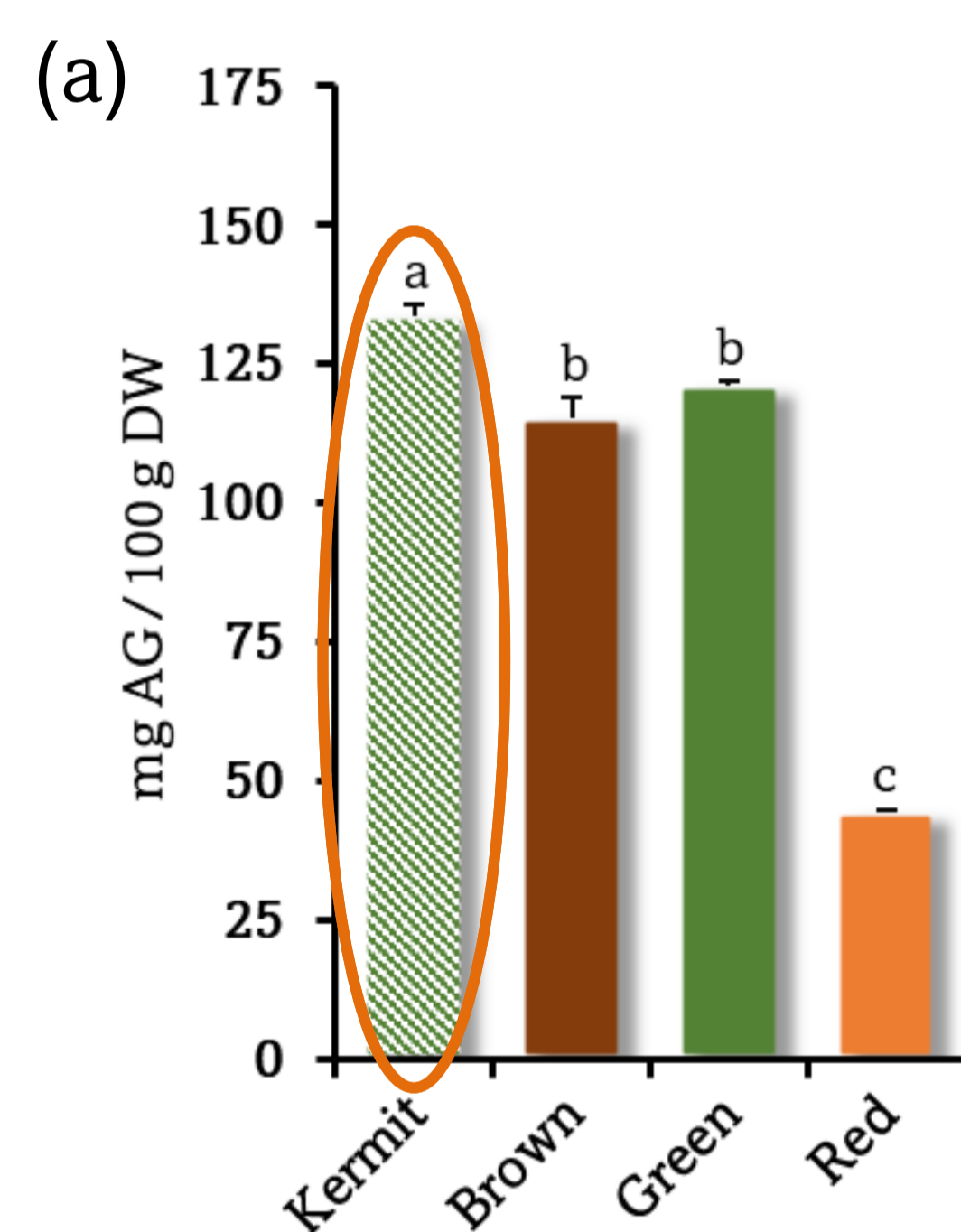
Lentils provide essential nutrients that contribute to human health. They also have a fast-cooking time, high arginine, antioxidant flavonoids, and a low glycemic index which helps avoiding peaks in blood glucose. Recent epidemiological studies even suggest that they may help combat cardiovascular diseases and diabetes mellitus. However, consumption continues to be low, highlighting the need for greater promotion of this legume and the development of new lentil food products. This project aims to identify the best-suited lentil to develop a snack that will be used in a human intervention trial to evaluate its impact on cardiovascular risk factors among diabetic patients.

METHODS

- *Lens culinaris L.* varieties: Kermit, Brown, Green, and Red;
- Determination of total phenolic content by Folin-Ciocalteu [1] and antioxidant activity by ABTS [2];
- Evaluation of lentil mineral profile by ICP-OES [3];
- Assessment of protein percentage through Dumas Nitrogen Analyzer;
- Development of a lentil-based snack and nutritional value evaluation;
- Statistical analysis: mean comparisons were performed by ANOVA on GraphPad software.

RESULTS & DISCUSSION

TOTAL PHENOLIC CONTENT



ANTIOXIDANT ACTIVITY

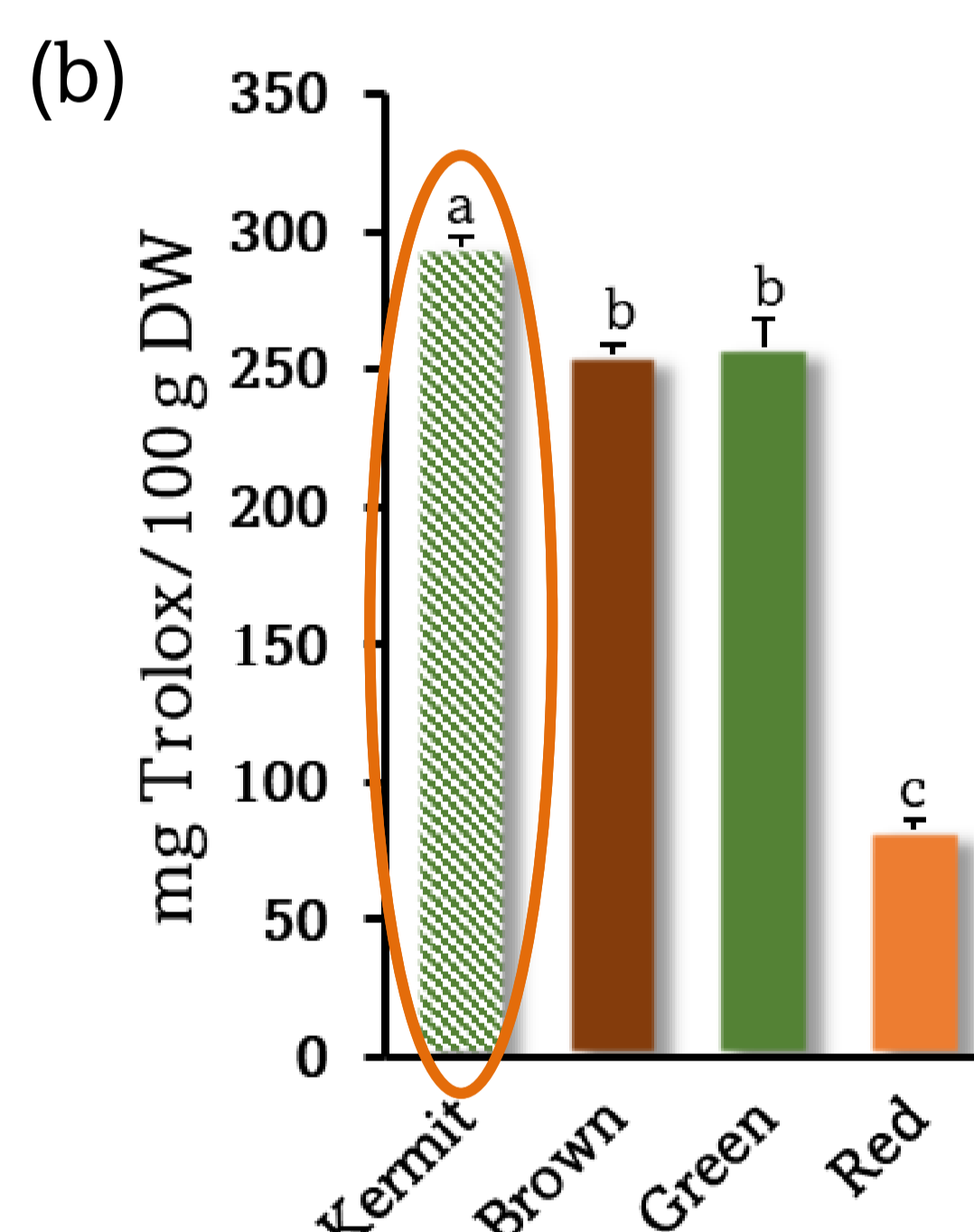
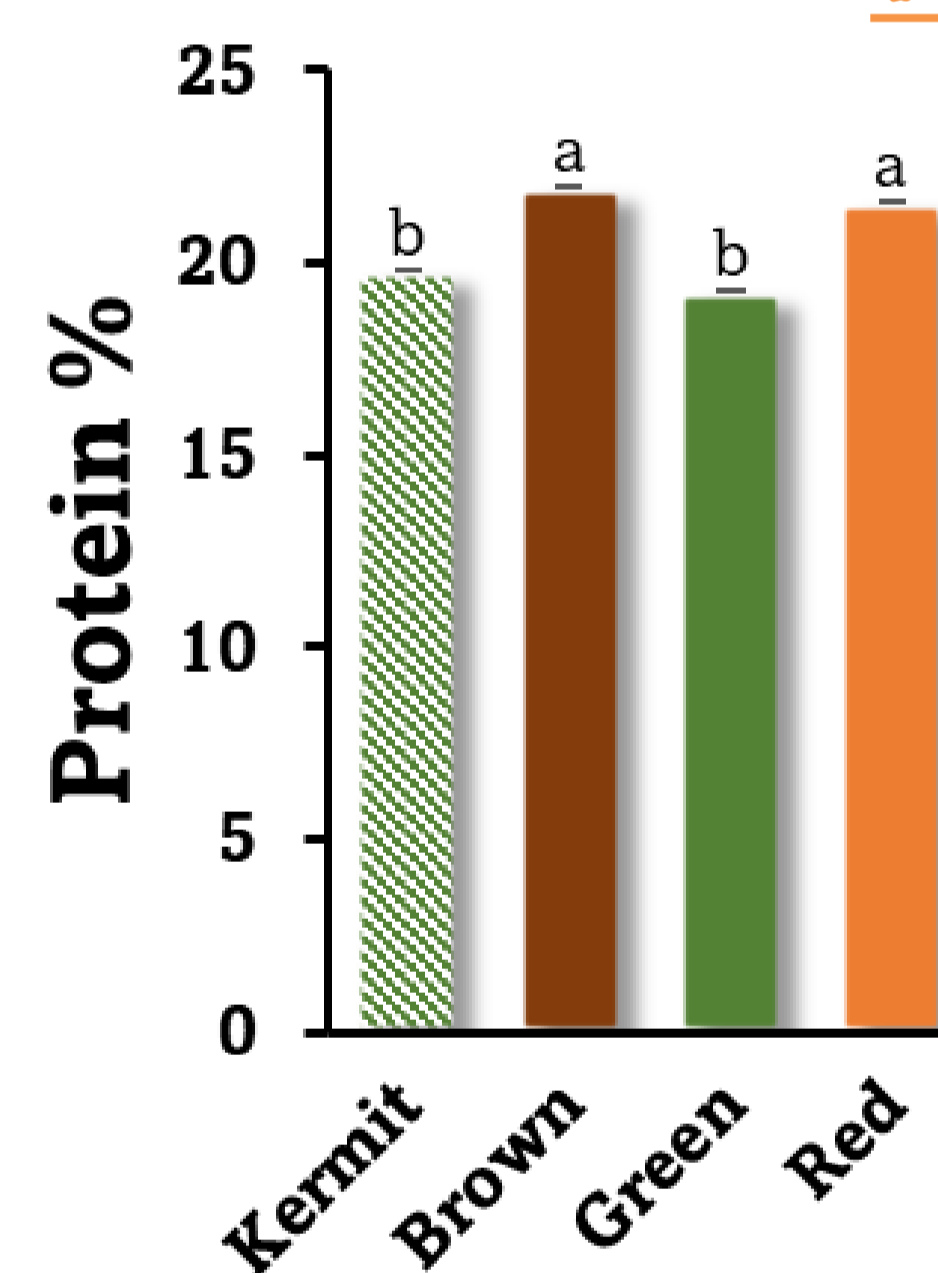


Figure 1 – Total phenolic content (a) and antioxidant activity (b) of *Lens culinaris L.* varieties. Each value represents mean \pm SEM in (a) mg of gallic acid equivalent or (b) mg of Trolox equivalent per 100 g of dry extract (DW). Different letters indicate significant differences ($p < 0.05$).

MINERAL PROFILE



PROTEIN LEVEL



Brown and Red had about **10% more protein**, although all varieties presented values between 19-22%

Figure 2 – Percentage of protein of *Lens culinaris L.* varieties. Each value represents the mean \pm SEM. Different letters indicate significant differences ($p < 0.05$).

LENTIL-BASED SNACK

Vegan



100% oatmeal flour muffin

50% lentil/oatmeal flour muffin

Health claims:

SOURCE OF PROTEIN

HIGH FIBER CONTENT

LOW SUGAR CONTENT

Table 1 – Nutritional composition of 100 g of lentil/oatmeal flour and oatmeal flour muffins.

Nutritional composition	Lentil/oatmeal flour muffin	Oatmeal flour muffin
Energy (kcal)	231	275
Total fat (g)	5.1	6.4
Carbohydrates (g)	41.2	51.4
Protein (g)	8.1	5.5
Fibre (g)	5.8	5.0

CONCLUSIONS & FUTURE PERSPECTIVES

- The nutritional analysis of different lentil varieties allowed the choice of the most suitable ones for the study. In this case, the Kermit variety, which had the highest phenolic content and antioxidant activity, seems to be the most suitable to develop a snack with a pleasant taste and texture, rich in protein and fibre, and low in sugar. And most importantly, nutritionally adequate for the intervention trial.
- Soon, it is intended to test the lentil-based snack acceptability and determine its glycemic index.

REFERENCES

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- [2] Gonçalves, et al. (2009). Effects of elevated CO₂ on grapevine (*Vitis vinifera L.*): volatile composition, phenolic content, and in vitro antioxidant activity of red wine. *J Agric Food Chem* 57(1), 265-273.
- [3] Santos, et al. (2020) The Effect of Sprouting in Lentil (*Lens culinaris*) Nutritional and Microbiological Profile. *Foods*. 9(4): 400.

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