

Traditional vs. innovative rice cakes: the contribution of *Alcobaça* apple and *Spirulina*

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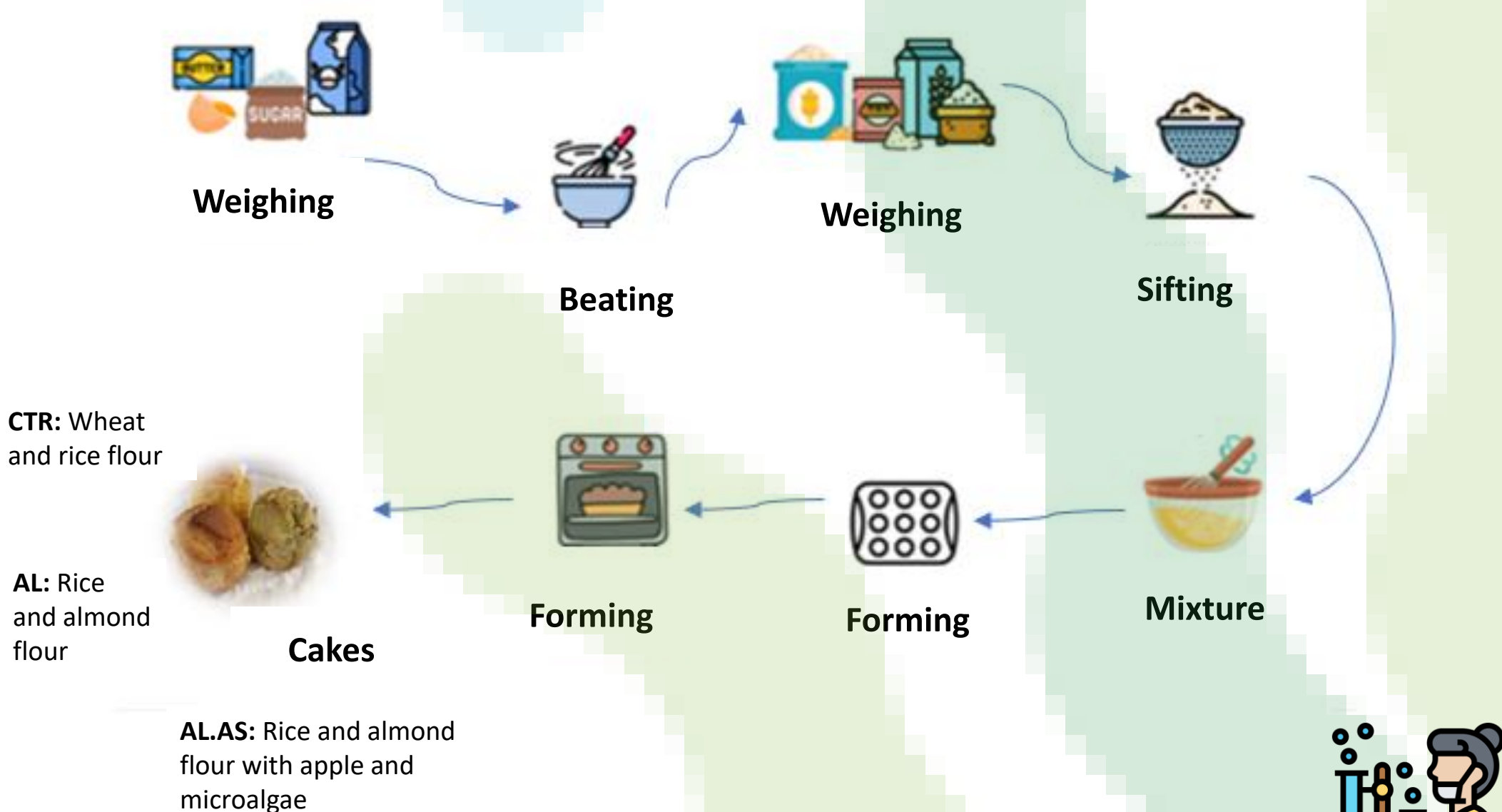
INTRODUCTION & AIM

Food innovation is vital for tackling consumer concerns about health, nutrition, and sustainability. This pioneering innovation drives in-depth research into a diverse range of raw materials and the development of food products that boast powerful ingredients. Take *Spirulina*, for instance—this remarkable microalgae is renowned for its high protein content, rich vitamins, and potent antioxidants. By leveraging such exceptional ingredients, we not only enhance nutritional value but also actively shape a healthier future. Innovative technologies and optimized processes have been strategically integrated to respond to evolving market demands, resulting in food solutions that are not only healthier but also more sustainable.

MAIN GOAL: To incorporate the *Alcobaça* apples, a regional product from the Western Region of Portugal, and *Spirulina* as a marine resource in the formulation of innovative food products inspired by the traditional Portuguese pastries, namely the rice cake (bolo de arroz).

METHOD

A. Preparation of rice Cakes



B. Methods

- **Colour**^[1] (CIE Lab parameters and total colour difference (TCD)),
- **Texture** (texture profile analysis, TPA)
- **Water activity** (a_w)

$$TCD = \sqrt{\Delta L^{*2} + \Delta a^{*2} + \Delta b^{*2}}$$
$$\Delta L^{*} = L^{*} - L^{*}_0 \quad \Delta a^{*} = a^{*} - a^{*}_0$$
$$\Delta b^{*} = b^{*} - b^{*}_0$$

Data analysis: Analysis of variance (one-way ANOVA) was performed to assess the significant effect ($P < 0.05$, Tukey test) of different rice cakes².

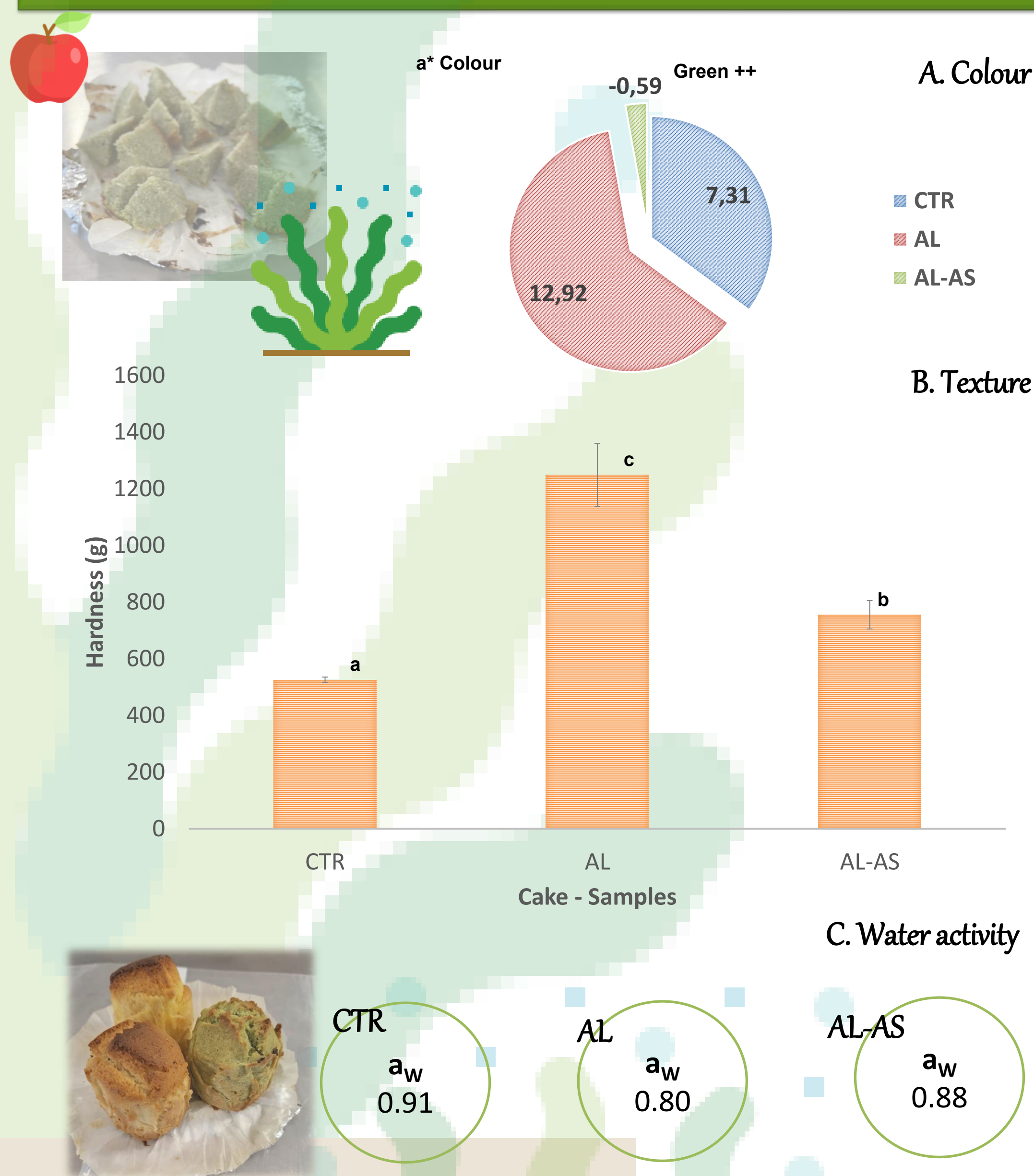
ACKNOWLEDGEMENT

This study was funded by national funds through FCT—Fundação para a Ciência e a Tecnologia, I.P., under the project MARE (UIDB/04292/2020, <https://doi.org/10.54499/UIDB/04292/2020> and UIDP/04292/2020, <https://doi.org/10.54499/UIDP/04292/2020>) and the project LA/P/0069/2020 granted to the Associate Laboratory ARNET (<https://doi.org/10.54499/LA/P/0069/2020>).

REFERENCES

[1] Pinheiro, J., Gonçalves, E. M., & Ganhão, R. (2021). Potential use of aqueous extracts of kombu seaweed in cream cracker formulation. In *Sustainable Innovation in Food Product Design* (pp. 171–186). Cham: Springer International Publishing

RESULTS & DISCUSSION



CONCLUSION

Rice cake presents a superior nutritional profile with reduced calories and sugar compared to the standard formulation. These enhancements can encourage healthier eating habits and contribute to overall consumer well-being. Additionally, the product supports sustainability and aligns with the zero-waste concept, corresponding to Sustainable Development Goals.