

Extending poultry meat shelf life through the application of *Cynara cardunculus* L. leaf extracts

Cássia H. Barbosa^{1,2,*}, **Mariana A. Andrade**^{1,3,4}, **Fernanda Vilarinho**¹, **Ana Sanches Silva**^{3,5,6}, **Ana Luísa Fernando**²

¹ Department of Food and Nutrition, National Institute of Health Doutor Ricardo Jorge, Av. Padre Cruz, 1649-016 Lisbon, Portugal

² METRICS, Department of Chemistry, NOVA School of Science and Technology, NOVA University Lisbon, Campus de Caparica, 2829-516 Caparica, Portugal

³ University of Coimbra, Faculty of Pharmacy, Coimbra, Azinhaga de Santa Comba, 3000-548 Coimbra, Portugal

⁴ REQUIMTE/LAQV, Rua D. Manuel II, Apartado 55142, Porto, Portugal

⁵ National Institute for Agrarian and Veterinary Research (INIAV), I.P., Rua dos Lagidos, Lugar da Madalena, 4485-655, Vairão, Vila do Conde, Portugal

⁶ Center for Study in Animal Science (CECA), ICETA, University of Porto, Porto, Portugal

*cassia.barbosa@insa.min-saude.pt

Cynara cardunculus L. (Asteraceae), commonly named cardoon, is a multipurpose crop that includes three varieties, the globe artichoke (var. *scolymus* (L.) Fiori), the cultivated cardoon (var. *altilis* DC.), and the wild cardoon (var. *sylvestris* (Lamk) Fiori). Its flower is normally used as vegetal rennet in the production of some cheeses and its leaves, the main by-product generated, are known for its excellent antioxidant and antimicrobial activities¹. These properties may be an asset in the food industry as cardoons' leaves may be used to delay lipid oxidation and microbial growth, thus prolonging foods' shelf life.

Therefore, this study aims to evaluate the effectiveness of cultivated cardoon leaves and the globe artichoke leaves ethanolic extracts, on poultry meat preservation. Poultry meat was mixed with the different extracts at a concentration of 1% (w/w) and stored under refrigeration (5°C ± 2°C) for 15 days. The microbiological growth was evaluated through the assessment of the total mesophilic aerobic microorganisms, total psychrotrophic aerobic microorganisms, and *Enterobacteriaceae*. The physicochemical characterization was evaluated through moisture, pH, acidity, colour and Total Volatile Basic Nitrogen (TVBN), and the lipid oxidation by Thiobarbituric Acid Reactive Substances (TBARS).

Both extracts were effective in retarding microbial growth by maintaining constant pH and level of acidity. After 15 days, poultry meat with both extracts showed a difference up to 11 log CFU/g to control samples (without extract). Also, both extracts were able to reduce the lipid oxidation of the poultry meat when compared to the control samples, at the end of the assay. The colour of extracts can be a limitation due to the greenish-yellow colour that is seen in the meat, although it was more evident in the sample with the cardoon extract. Overall, cardoon extract was the most effective in extending poultry meat shelf life.

Acknowledgments: Cássia H. Barbosa thanks the Fundação para a Ciência e Tecnologia (FCT), Portugal for the Ph.D. Grant 2021.08154.BD. The authors would like to thank the company NINA, Lda, for kindly supplying the cardoon leaves. **Funding:** This work was financially supported by the Mechanical Engineering and Resource Sustainability Center—MEtRICs, which is financed by national funds from the FCT/MCTES (UIDB/04077/2020 and UIDP/04077/2020).

References:

- [1] C.H. Barbosa, M.A. Andrade, F. Vilarinho, I. Castanheira, A.L. Fernando, M.R. Loizzo, A. S. Silva, *Foods*, 9 (2020) 564.