

## EXTRACTION AND VALORISATION OF MELANOIDINS ANTIOXIDANT PIGMENT FROM SPENT COFFEE GROUNDS

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**Introduction.** High molecular weight compounds called melanoidins are produced when food undergoes thermal processing and the Maillard reaction starts. The most important process that results in the production of melanoidins, which give them their unique flavour, aroma, and colour, is this reaction [1]. Coffee melanoidins mostly contain proteins, phenolic compounds, and polysaccharides (especially arabinogalactans type II and galactomannans). It is expected that these will have characteristics that can help stabilize emulsions [2]. Melanoidins found in coffee have dual uses as natural food colouring and emulsion stabilizer. We'll concentrate on these characteristics and conduct further, thorough studies on pigmentation.

**Main part.** The overall aim of this research is to valorise green coffee by-products as melanoidins functional antioxidant pigment for effective application in food industry. Melanoidin efficiently separated from spent coffee grounds using a non-thermal and cost-effective method such as ultrasound in order to achieve the aim [3]. Before extraction of melanoidins we proceeded dehydration and defatting of our samples.

**Conclusion.** Turning spent coffee grounds into valuable antioxidant functional ingredients for food products can significantly reduce the environmental impact of coffee production and expand a circular economy in the food industry. This reduces waste, preserves resources, and opens up possibilities for the production of sustainably produced food [4]. Melanoidin is one of the most likely candidate that we can extract from spent coffee grounds. In this research the extraction, characterisation and quantification of melanoidins were studied as well as its antioxidant properties using different methods as Liquid chromatography–mass spectrometry (LC-MS) and Fourier-transform infrared spectroscopy (FTIR). The report will present the results of this work.

### References:

1. Iriondo-DeHond, A., Rodríguez Casas, A., & del Castillo, M. D. (2021, October 12). Interest of Coffee Melanoidins as Sustainable Healthier Food Ingredients. *Frontiers in Nutrition*, 8. <https://doi.org/10.3389/fnut.2021.730343>
2. Feng, J., Berton-Carabin, C. C., Guyot, S., Gacel, A., Fogliano, V., & Schroën, K. (2023, May). Coffee melanoidins as emulsion stabilizers. *Food Hydrocolloids*, 139, 108522. <https://doi.org/10.1016/j.foodhyd.2023.108522>
3. YU, J., HU, N., HOU, L., HANG, F., LI, K., & XIE, C. (2023). Extraction methods of melanoidins and its potential as a natural pigment. *Food Science and Technology*, 43. <https://doi.org/10.1590/fst.113322>
4. Mayson, S., & Williams, I. (2021, September). Applying a circular economy approach to valorize spent coffee grounds. *Resources, Conservation and Recycling*, 172, 105659. <https://doi.org/10.1016/j.resconrec.2021.105659>