

11^o CONGRESSO
NACIONAL
DE CROMATOGRAFIA

20 anos
CROMATOGRAFIA

11th NATIONAL MEETING ON CHROMATOGRAPHY

9 | 11 Dezembro 2019
Caparica | Portugal



Faculdade de Ciências e Tecnologia,
Universidade NOVA de Lisboa



Title

11th National Chromatography Meeting

Título

11^o Encontro Nacional de Cromatografia

Authors

Eduardo Mateus (Universidade Nova de Lisboa)

José Manuel F. Nogueira (Universidade de Lisboa)

Marco Gomes da Silva (Universidade Nova de Lisboa)

Maria João Cabrita (Universidade de Évora)

Edition

Faculdade de Ciências e Tecnologia

Universidade Nova de Lisboa

Campus de Caparica, Portugal

<https://www.fct.unl.pt/>

Imaging services

Camy (FCT, Universidade Nova de Lisboa)

URL

<http://11enc.eventos.chemistry.pt/>

e-mail: 11enc@chemistry.pt

ISBN: 978-989-8124-29-6

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O17 Natural colorants in cookies: evaluation of the incorporation effects on the physico-chemical composition

Custódio L. Roriz^{1,2}, Eliana Pereira¹, Sandrina Heleno¹, Márcio Carocho¹, Patricia Morales²

Lillian Barros¹, Isabel C.F.R. Ferreira^{1*}

¹Centro de Investigação de Montanha (CIMO), Instituto Politécnico de Bragança, Campus de Santa Apolónia, 5300-253 Bragança, Portugal;

²Dpto. Nutrición y Ciencia de los Alimentos. Facultad de Farmacia. Universidad Complutense de Madrid (UCM), Madrid, Spain

Email: iferreira@ipb.pt

In order to respond to the industry's need for additives of natural origin, the exploration of new natural sources for different compounds has increased. Compounds with dyeing capacity are of great interest because, throughout the industrial processing of foods, they eventually see their initial color compromised.¹ Thus, it is necessary to add coloring compounds, preferably of natural origin, to meet the demands of consumers, who are aware of the harmful effects that are attributed to some food additives of artificial origin. The addition of a natural colorant to a particular food has several advantages, besides imparting color, it also enriches the food, due to its intrinsic biological benefits. Betacyanins, for instance, are pigmented compounds that have a powerful pink color, being quite abundant in *Gomphrena globosa* L. flowers, which have strong coloring ability, in addition to their high antioxidant and chemopreventive effects². In the present work, betacyanins were obtained from purple-colored flowers of *G. globosa* by ultrasound assisted extraction (UAE) and were further submitted to stabilization processes. The obtained coloring formulations were incorporated in cookies and the influence of this incorporation in the chemical profile regarding fatty acids (GC-FID), sugars (HPLC-RI) and tocopherols (HPLC-fluorescence) of the cookies were evaluated along a shelf-life of 30 days. Furthermore, the cookies were also analyzed for their physical characteristics through the evaluation of the color using a colorimeter (D65 illuminant), analyzing the L*, a* and b* coordinates, where L* represents lightness, a* represents the redness and b* the yellowness. Texture was analyzed with a TA.XT texturometer, evaluating the effects on the hardness, adhesiveness, springness, cohesiveness, chewiness and resilience over the 30 days. Cookies with a commercial colorant and ones with no colorant were used as control samples. As expected, the natural colorants incorporation caused no significant differences among the chemical analyses of the cookies, as the definition of colorants implies that beyond the color imparting no other parameter of the food should be altered. In terms of the cookie profiles, the most abundant individual fatty acid was palmitic acid (C16:0), followed by oleic (C18:1) and linoleic acid (C18:2) contributing to the major prevalence of the saturated fatty acids (SFA), followed by the monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids. Sucrose was the only detected sugar and corresponded to $\approx 48.5 \pm 2.0$ g/100 g dw. Regarding the tocopherols, only three of the four isoforms were detected, namely α -, β -, and δ -tocopherol, being α -tocopherol the most abundant ($\approx 29.2 \pm 0.8$ mg/100 g dw), followed by δ -tocopherol ($\approx 8.0 \pm 0.8$ mg/100 g dw), and β -tocopherol ($\approx 2.0 \pm 0.2$ mg/100 g dw). Regarding the physical parameters, among the prepared formulations, the one stabilized by lyophilization presented a loss of the original color. Comparing the developed formulations with the pink commercial colorant, the natural ones showed a better pink color, since this commercial colorant displays a more reddish color, highlight the potential of the developed formulations as real pink colorants. Concerning the texture profile, no significant differences were verified between the samples over the shelf-life of 30 days, although hardness decreased due to retrogradation. The results demonstrated the strong potential of *G. globosa* as a promising source of betacyanins with a stable pink colour with high applicability in the food industry.

Acknowledgements: The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) and FEDER under Programme PT2020 for financial support to CIMO (UID/AGR/00690/2019); C. L. Roriz PhD grant (SFRH/BD/117995/2016), L. Barros, FCT, P.I., through the institutional scientific employment program-contract for her contract. The authors are also grateful to the Interreg España-Portugal for financial support through the projects 0377_iberphenol_6_E and TRANSCoLAB 0612_TRANS_CO_LAB_2_P; European Regional Development Fund (ERDF) through the Regional Operational Program North 2020, within the scope of project Mobilizador Norte- 01-0247-FEDER-024479: ValorNatural®. M. Carocho also acknowledges ValorNatural® for his contract.

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