



5th Portuguese Young Chemists Meeting

(5th PYCheM)

&

1st European Young Chemists Meeting

(1st EYCheM)

Centro Cultural Vila Flor

Guimarães, Portugal

26th – 29th of April



Associação de Jovens Químicos de Guimarães

Câmara Municipal de Guimarães





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General Programme

	26 April	27 April	28 April	29 April
9:00-13:20	Registration and Workshop of Open Science and European Open Access Policies in H2020	Organic Chemistry and Medicinal Chemistry	Inorganic, Physical, Analytical and Electrochemistry	Materials Chemistry and Nanomaterials and Surface Chemistry
13:30	Opening Ceremony	Lunch	Lunch	Lunch
14:00 - 18:00	Green Chemistry + Chemistry of Natural Products	Biochemistry and Medicinal Chemistry	CHEM2NATURE Symposium Chemical strategies for modification of natural origin materials Assembleia GQJ (17h)	Materials Chemistry and Nanomaterials and Surface Chemistry
18:00		Walking Tour		Closing Ceremony
19:00	Welcome Cocktail		Gala Dinner	
21:30	Get-together night			



P111- Flowers of *Gomphrena globosa* L. as an alternative source of betacyanins: Optimization of the extraction using response surface methodology

Lobo Roriz, C.^{1,2}; Prieto, M. A.^{1,3}; Carvalho, A.M.¹; Morales, P.²; Barros, L.^{1,4}; & Ferreira, I. C.F.R.¹

¹Mountain Research Centre (CIMO), ESA, Polytechnic Institute of Bragança, Portugal

²Dpto. Nutrición y Bromatología II. Facultad de Farmacia. Universidad Complutense de Madrid, Spain

³Grupo de Nutrición e Bromatología, Faculdade de Ciências e Tecnologia dos Alimentos, Universidade de Vigo, Campus de Ourense, Spain

⁴Laboratory of Separation and Reaction Engineering (LSRE), Associate Laboratory LSRE/LCM, Polytechnic Institute of Bragança, Portugal

Betacyanins are betalain pigments that display a red-violet colour which have been reported to be three times stronger than the red-violet dye produced by anthocyanins [1]. The applications of betacyanins cover a wide range of matrices, mainly as additives or ingredients in the food industry, cosmetics, pharmaceuticals and livestock feed. Although, being less commonly used than anthocyanins and carotenoids, betacyanins are stable between pH 3 to 7 and suitable for colouring in low acid matrices. In addition, betacyanins have been reported to display interesting medicinal character as powerful antioxidant and chemopreventive compounds either *in vitro* or *in vivo* models [2]. Betacyanins are obtained mainly from the red beet of *Beta vulgaris* plant (between 10 to 20 mg per 100 g pulp) but alternative primary sources are needed [3]. In addition, independently of the source used, the effect of the variables that affect the extraction of betacyanins have not been properly described and quantified. Therefore, the aim of this study was to identify and optimize the conditions that maximize betacyanins extraction using the tepals of *Gomphrena globosa* L. flowers as an alternative source. Assisted by the statistical technique of response surface methodology, an experimental design was developed for testing the significant explanatory variables of the extraction (time, temperature, solid-liquid ratio and ethanol-water ratio). The identification was performed using high-performance liquid chromatography coupled with a photodiode array detector and mass spectrometry with electron spray ionization (HPLC-PDA-MS/ESI) and the response was measured by the quantification of these compounds using HPLC-PDA. Afterwards, a response surface analysis was performed to evaluate the results. The major betacyanin compounds identified were gomphrenin II and III and isogomphrenin II and III. The highest total betacyanins content was obtained by using the following conditions: 45 min of extraction time, 35°C, 35 g/L of solid-liquid ratio and 25% of ethanol. These values would not be found without optimizing the conditions of the betacyanins extraction, which moreover showed contrary trends to what it has been described in the scientific bibliography. More specifically, concerning the time and temperature variables, an increase of both values (from the common ones used in the bibliography) showed a considerable improvement on the betacyanins extraction yield without displaying any type of degradation patterns.

References

- [1] Carocho, M., Morales, P., & Ferreira, I.C.F.R. (2015). Trends in Food Science and Technology, 45, 284-295.
- [2] Wybraniec, S. (2008). Chromatographic investigation on acyl migration in betacyanins and their decarboxylated derivatives. Journal of Chromatography B, 861, 40-47.
- [3] Sepúlveda-Jiménez, G., Rueda-Benitez, P., Porta, H., & Rocha-Sosa, M. (2004). Betacyanin synthesis in red beet (*Beta vulgaris*) leaves induced by wounding and bacterial infiltration is preceded by an oxidative burst. Physiological and Molecular Plant Pathology, 64, 125-133.

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