5th Portuguese Young Chemists Meeting

(5th PYCheM)

&

1st European Young Chemists Meeting

(1st EYCheM)

Centro Cultural Vila Flor

Guimarães, Portugal

26th – 29th of April

ICVS/3B's

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			

P18. Ultrasound and microwave assisted extraction of ergosterol from *Agaricus bisporus* L.: Optimization through response surface methodology

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There is scientific evidence demonstrating the benefits of mushrooms ingestion due to their richness in bioactive compounds such as mycosterols, in particular ergosterol [1]. *Agaricus bisporus* L. is the most consumed mushroom worldwide presenting 90% of ergosterol in its sterol fraction [2]. Thus, it is an interesting matrix to obtain ergosterol, a molecule with a high commercial value. According to literature, ergosterol concentration can vary between 3 to 9 mg per g of dried mushroom. Nowadays, traditional methods such as maceration and Soxhlet extraction are being replaced by emerging methodologies such as ultrasound (UAE) and microwave assisted extraction (MAE) in order to decrease the used solvent amount, extraction time and, of course, increasing the extraction yield [2]. In the present work, *A. bisporus* was extracted varying several parameters relevant to UAE and MAE: UAE: solvent type (hexane and ethanol), ultrasound amplitude (50 - 100 %) and sonication time (5 min-15 min); MAE: solvent was fixed as ethanol, time (0-20 min), temperature (60-210 °C) and solid-liquid ratio (1-20 g/L). Moreover, in order to decrease the process complexity, the pertinence to apply a saponification step was evaluated. Response surface methodology was applied to generate mathematical models which allow maximizing and optimizing the response variables that influence the extraction of ergosterol. Concerning the UAE, ethanol proved to be the best solvent to achieve higher levels of ergosterol (671.5 ± 0.5 mg/100 g dw, at 75% amplitude for 15 min), once hexane was only able to extract 152.2 ± 0.2 mg/100 g dw, in the same conditions. Nevertheless, the hexane extract showed higher purity (11%) when compared with the ethanol counterpart (4%). Furthermore, in the case of the ethanolic extract, the saponification step increased its purity to 21%, while for the hexane extract the purity was similar; in fact, hexane presents higher selectivity for the lipophilic compounds comparatively with ethanol. Regarding the MAE technique, the results showed that the optimal conditions (19 ± 3 min, 133 ± 12 °C and 1.6 ± 0.5 g/L) allowed higher ergosterol extraction levels (556 ± 26 mg/100 g dw). The values obtained with MAE are close to the ones obtained with conventional Soxhlet extraction (676 ± 3 mg/100 g dw) and UAE. Overall, UAE and MAE proved to be efficient technologies to maximize ergosterol extraction yields.

References

[1] Barreira, J.C.M., Oliveira, M.B.P.P., Ferreira, I.C.F.R. Food Analytical Methods, 2014, 7, 217-223.
[2] Heleno, S.A.; Diz, P.; Prieto, M.A., Barros, L.; Rodrigues, A.; Barreiro, M.F.; Ferreira, I.C.F.R. Food Chemistry, 197, 1054-1063.

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