



**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

Associação
Laboratorial



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				Closing Ceremony
19:00	Welcome Cocktail	Walking Tour	Gala Dinner	
21:30	Get-together night			



P5. Microencapsulation of bioactive plant extracts: a tool to functionalize cottage cheeses

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Foeniculum vulgare Mill. (fennel) and *Matricaria recutita* L. (chamomile) are two examples of plants with reported antioxidant and antimicrobial properties, which can be related with their composition in phenolic compounds [1,2]. Furthermore, according to previous results of our research group, the direct incorporation of the aqueous extracts showed capacity to maintain the nutritional properties of the cottage cheeses, up to 7 days of storage, while improving the antioxidant potential. However, after 14 days, a decrease in the antioxidant properties was observed [1,2], which can be related with factors such as light, moisture, temperature and pH, that can cause bioactive compounds degradation. Therefore, the aim of the present study was to prepare microcapsules with the aqueous extracts of fennel and chamomile for incorporation in cottage cheese samples, in order to protect the bioactive molecules present in the extracts, such as phenolic compounds, and prevent the decrease of the antioxidant activity observed after the 14 days period. The microspheres were prepared using an atomization/coagulation technique. Sodium alginate was used as the matrix material to produce the microspheres that were characterized through optical microscopy (OM), during and after atomization, for inspecting morphology. The encapsulation efficiency (EE) was determined by HPLC-DAD by an indirect method by analysing the coagulation solution. FTIR was also used to attest the presence of the extract inside of the alginate matrix. These microencapsulated extracts were incorporated in cottage cheese samples that were further characterized in terms of nutritional properties and antioxidant potential right after incorporation, and after 7 and 14 days of storage at 4°C. The EE was estimated as ~100% and the FTIR analysis confirmed the presence of the extracts inside the microspheres. The results showed that the incorporation of the microencapsulated extracts did not cause changes in the nutritional value of cottage cheeses (through a comparison with control samples without extracts). The predominant fatty acids were palmitic (C16:0) and oleic (C18:0) acids. The order of abundance of fatty acids was as follows: saturated fatty acids (SFA) > monounsaturated fatty acids (MUFA) > polyunsaturated fatty acids (PUFA). Regarding free sugars, lactose was the only sugar identified and quantified in all samples. Regarding the antioxidant activity, the samples functionalized with the microencapsulated extracts showed a higher preservation of this property even after the 7th day of storage. Overall, the incorporation of the protected plant extracts in dairy foods can be a strategy to provide health benefits to consumers.

References

- [1] Caleja, C. Barros, L., Antonio, A. L., Ciric, A., Soković, M., Oliveira, M.B.P.P., Santos-Buelga, C., Ferreira, I.C.F.R., *Journal of Functional Foods*, 2015, 12, 428-438.
[2] Caleja, C., Barros, L., Antonio, A.L., Ciric, A., Barreira, J.C.M., Soković, M., Oliveira, M.B.P.P. Santos-Buelga, C., Ferreira, I.C.F.R. *Journal of Functional Foods*, 2015, 16, 114-124.

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