



**5<sup>th</sup> Portuguese Young  
Chemists Meeting**  
*(5th PYChem)*  
&  
**1<sup>st</sup> European Young  
Chemists Meeting**  
*(1st EYChem)*

**Centro Cultural Vila Flor**  
**Guimarães, Portugal**  
**26<sup>th</sup> – 29<sup>th</sup> of April**



ICVS/BB's  
Laboratory



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			



### P3. Utilization of free and microencapsulated *Rosmarinus officinalis* L. extracts as bioactive ingredients for new functional foods development

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Currently, many consumers search for food with functional characteristics beyond their nutritional properties. Thus, the concept of functional food becomes a hot topic, allowing the obtaining of health benefits, including disease prevention. In this context, plants are recognized as sources of a wide range of bioactives, mainly phenolic compounds. In particular, the *Rosmarinus officinalis* L., commonly referred as rosemary, has several phenolic compounds with different bioactive properties such as antioxidant, anti-inflammatory and antimicrobial activities, among others [1]. Hence, this plant has great potential for incorporation into foods in order to confer bioactivity to the final products. However, it should be highlighted that the bioactive compounds if exposed to adverse environments, for example: light, moisture, extreme pH, storage, food processing conditions, can be degraded leading to the consequent loss of bioactivity [2]. The microencapsulation is an alternative to overcome this problematic of bioactive compounds, as also to ensure controlled release, or target deliver to a specific site [3].

In this work, lyophilized rosemary aqueous extract prepared by infusion was used as a functional ingredient for cottage cheeses, after proving that it possesses, both higher content in phenolic compounds and higher antioxidant activity, comparatively with the corresponding hydroethanolic extract. The rosemary aqueous extract revealed, for example, a DPPH scavenging activity with an EC<sub>50</sub> value of 73.44±0.54 µg/mL and presented as main phenolic compound the caffeic acid dimer, commonly named as rosmarinic acid.

For the functionalized cottage cheeses, a decrease of bioactivity was observed after seven days under storage in fridge, when the extracts were incorporated in its free form. Therefore, to preserve the antioxidant activity, the rosemary aqueous extract was efficiently microencapsulated by using an atomization/coagulation technique and alginate as the matrix material and thereafter incorporated into the cottage cheeses. The final microspheres showed a size, estimated by OM using a magnification of 100x, ranging between 51.1 and 122.6 µm and an encapsulation efficiency, estimated through an indirect method, approaching 100%.

Overall, the introduction of both free and microencapsulated extracts did not change the nutritional value of cottage cheeses, providing bioactivity that was more preserved with microencapsulated extracts putting in evidence the importance of using microencapsulation to develop effective functional foods.

#### References

- [1] Bellumori, M.; Michelozzi, M.; Innocenti, M.; Congiu, F.; Cencetti, G.; Mulinacci, N., *Talanta* 2015, 131, 81-87
- [2] Dias, M. I.; Ferreira, I.C.F.R.; Barreiro, M.F., *Food & Function* 2015, 6, 1035–1052
- [3] Kwak, H., *Nano- and Microencapsulation for foods 2014*, UK, Wiley Blackwell.

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