



12.<sup>a</sup> Reunião do Grupo de Glúcidos

# Carboidratos em Portugal e potencial de diferenciação internacional

Programa e livro de resumos



Universidade de Aveiro, Portugal  
11 - 13 setembro 2017



## **12.<sup>a</sup> Reunião do Grupo de Glúcidos**

### **Carboidratos em Portugal e potencial de diferenciação internacional**

**Aveiro, 11-13 setembro 2017**



**SOCIEDADE PORTUGUESA DE QUÍMICA**



**universidade  
de aveiro**

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K14 - Role of Cellulosomes in the deconstruction of complex carbohydrates .....	40
K15 - Immunostimulatory polysaccharides from the hot water extracts of prickled broom ( <i>P. tridentatum</i> (L.) Willk) dried inflorescences.....	41
ORAIS .....	43
O01 - Bacterial Cellulose: a nature's made nanostructured material for drug delivery .....	45
O02 - Development of bacterial cellulose wound dressings with controlled delivery of vitamin D <sub>3</sub> .....	46
O03 - Deciphering ErbB2 Glycosylation Profile in Gastric Cancer Cells .....	47
O04 - Sialic acids as immune regulators of antigen presentation in dendritic cells .....	48
O05 - Apple pomace arabinan – phloridzin binding capacity .....	49
O06 - Reducing negative volatile phenols in red wine by chitosan: impact on wine quality .....	50
O07 - Dextrin-based hydrogel for the development of an injectable bone substitute.....	51
O08 - Supramolecular hydrogels based on the co-assembly of simple carbohydrates and peptide amphiphiles for biological applications.....	52
O09 - Cyclodextrins: impact on anthocyanins thermal and gastrointestinal stability .....	53
O10 - The glycosylic profile of edible flowers while alternative foods.....	54
O11 - Mimicking <i>Plusiotis Resplendens</i> Cuticule with a New Photonic Properties of Cellulose Nanocrystals Films .....	55
O12 - Designing of a laccase super-catalyst.....	56
O13 - The role of choline chloride-based Deep Eutectic Solvent (DES) and curcumin on chitosan films properties.....	57
O14 - "POTATOPLASTIC": Development of starch-based bioplastics using potato chips industry byproducts .....	58
O15 - Hemicellulose extraction using Deep Eutectic Solvents for Biorefinery purposes.....	59
O16 - Straw pentoses for the production of added-value products .....	60
O17 - Identification and structural-functional characterization of a new chitin-binding protein module from <i>Clostridium thermocellum</i> .....	61
O18 - Glycan recognition in the human gut – A combined approach to unravel microbiome strategies.....	62
O19 - Potential of thiol-amphiphile glycosaminoglycans as redox-sensitive nanoparticles .....	63
O20 - Modification of cyclo-oligosaccharides for drug encapsulation .....	64
O21 - Carcinoembryonic antigen carries $\alpha$ -2-3 linked sialic acid on type II chains and is implicated in the metastatic potential of gastric cancer cells.....	65
O22 - Hypoxia enhances the malignant nature of bladder cancer cells and concomitantly antagonizes protein O-glycosylation extension .....	66
O23 - Targeted O-glycoproteomics explored increased sialylation and identified MUC16 as a poor prognosis biomarker in advanced stage bladder tumours .....	67
O24 - Structural Basis for the Highly Selective Recognition of Di-Glycosylated N-glycans by Human Malectin in the Endoplasmic Reticulum .....	68
O25 - Magnetic and electrical conductive chitosan-based bionanocomposites .....	69
O26 - Cellulose nanocrystals coated with gold nanoparticles and folic acid-conjugated chitosan as candidates for nanotheranostic systems .....	70
O27 - <i>In vitro</i> digestions to predict the glycemic index of rice .....	71

O28 - The effect of immobilized Hyaluronic Acid on CD44-overexpressing MKN45 gastric cancer cell line .....	72
O29 - Influence of ionizing radiation on the free sugars content of several aromatic and medicinal plants.....	73
O30 - Composition in sugars of white and black garlic from different origins.....	74
O31 - Structural characterization of polysaccharides from <i>Nannochloropsis oculata</i> and their use in microarrays .....	75
O32 - Incorporation of an extract rich in rosmarinic acid into cupcakes: Influence on the sugars and total carbohydrates composition.....	76
O33 - Protein-Glycan driven quinary interactions under macromolecular crowding unveiled by NMR Spectroscopy.....	77
O34 - Non-enzymatic transglycosylation reactions and Maillard reaction: a competition with relevance for coffee melanoidins formation .....	78
O35 - Which arabinogalactans structural features can contribute to <i>in vitro</i> immunostimulatory activity of coffee?.....	79
O36 - Chemical synthesis of GalNAc mimetics aiming macrophage galactose C-type lectin and block viral infections .....	80
PÓSTERES .....	81

18h00	18h30	PL12 - Nuno Xavier (FCUL) <i>New D-glucuronamide-based N-glycosyl compounds displaying anticancer potential</i>
18h30	19h00	<b>Assembleia Geral do Grupo de Glúcidos da SPQ</b>
20h00		<b>Jantar – Restaurante Olaria-EFTA, Cais da Fonte Nova, Aveiro</b>

Quarta-feira, 13 de setembro de 2017		
09h30	10h30	<b>Chairperson: Victor Freitas</b> Anfiteatro 30A.1.14
09h30	10h00	PL13 – Paula Pinto (RAIZ) <i>New applications of wood polysaccharides from a pulp-and-paper based biorefinery</i>
10h00	10h30	PL14 - Lisete Machado e Silva (Imperial College UK) <i>Glycan microarrays in biological and medical research</i>
10h30	11h30	<b>Café + Pósteres</b>
<b>Sessões Paralelas</b>		
11h30	12h20	<b>Carbohydrates for the Future</b> <b>Chairperson: Ana Maria Gomes</b> Anfiteatro 30A.1.14
11h30	11h50	K13 - Miguel Cerqueira (INL) <i>Edible films and coatings: opportunities and challenges</i>
11h50	12h05	O31 - Carolina Pandeirada (UA) <i>Structural characterization of polysaccharides from <u>Nannochloropsis oculata</u> and their use in microarrays</i>
12h05	12h20	O32 - Cristina Caleja (IPB) <i>Incorporation of an extract rich in rosmarinic acid into cupcakes: Influence on the sugars and total carbohydrates composition</i>
11h30	12h20	<b>Structure of Carbohydrates</b> <b>Chairperson: Fernando Nunes</b> Anfiteatro 30A.2.05
11h30	11h50	K14 - Carlos Fontes (FMVUL) <i>Role of Cellulosomes in the deconstruction of complex carbohydrates</i>
11h50	12h05	O33 - Ana Catarina Diniz (UNL) <i>Protein-Glycan driven quinary interactions under macromolecular crowding unveiled by NMR Spectroscopy</i>
12h05	12h20	O34 - Ana Moreira (UA) <i>Non-enzymatic transglycosylation reactions and Maillard reaction: a competition with relevance for coffee melanoidins formation</i>
11h30	12h20	<b>Immune Active Carbohydrates</b> <b>Chairperson: Leticia Estevinho</b> sala 30B.2.18
11h30	11h50	K15 - Vitor Martins (IPB) <i>Immunostimulatory polysaccharides from the hot water extracts of prickled broom (<u>P. tridentatum</u> (L.) Willk) dried inflorescences</i>
11h50	12h05	O35 - Cláudia Passos (UA) <i>Which arabinogalactans structural features can contribute to in vitro immunostimulatory activity of coffee?</i>
12h05	12h20	O36 - João Barros (UL) <i>Chemical synthesis of GalNAc mimetics aiming macrophage galactose C-type lectin and block viral infections</i>
12h20	13h00	<b>Sessão de Encerramento</b> Anfiteatro 30A.1.14
13h00		<b>Almoço</b>

## O32 - Incorporation of an extract rich in rosmarinic acid into cupcakes: Influence on the sugars and total carbohydrates composition

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Currently, the food industry is focused on replacing synthetic additives with natural ingredients. Natural extracts obtained from plants have emerged as possible alternatives to synthetic preservatives, namely antioxidants [1]. Some dairy, meat and bakery products have been developed incorporating extracts of aromatic plants, spices or fruits, which have antioxidant properties [2-4].

In this work, we intend to prove the efficacy of an extract rich in rosmarinic acid as a natural preservative in cupcakes and compare these results to a synthetic additive (potassium sorbate, E202), which is normally used in pastry products. The extract of *Melissa officinalis* L. (lemon balm) was obtained by performing an ultrasound-assisted extraction with ethanol. After evaluation of its antioxidant (free radical scavenging activity,  $EC_{50} = 79 \pm 2 \mu\text{g} / \text{mL}$ ; reducing power  $EC_{50} = 49 \pm 1 \mu\text{g} / \text{mL}$ ) and antimicrobial (against 8 bacteria and 8 fungi contaminants) properties, and confirmation of toxicity absence (in a non-tumor cell line), the extract enriched in rosmarinic acid was incorporated into the cupcakes. Its effect was compared to E202 and to a control sample (cupcakes without additives) immediately after incorporation and in the 3rd and 5th day of storage, protected from light at room temperature.

The results showed that both natural (extract enriched in rosmarinic acid) and synthetic (E202) additives, did not cause significant changes in the nutritional composition of cupcakes (fat, protein and carbohydrate contents), when compared with the control sample. Free sugars were also determined by high performance liquid chromatography coupled to a refractive index detector (HPLC-RI), which indicated sucrose and glucose as the most abundant sugars in all samples. These molecules did not undergo any changes with the addition of the additives as compared to the control sample.

The results obtained demonstrate that the presence of rosmarinic acid does not influence sugars and total carbohydrates content of cupcakes and may be used in the development of new pastry and bakery products, replacing synthetic preservatives and improving the functional properties of the food.

*Acknowledgments:* To the Foundation for Science and Technology (FCT, Portugal), FEDER - Program PT2020 for financial support to CIMO (UID/AGR/00690/2013), REQUIMTE (UID/QUI/50006/2013 - POCI/01/0145/FERDER/007265), C. Caleja (SFRH/BD/93007/2013) and F. Reis (SFRH/BD/111753/2015) grants and L. Barros' contract. This work was also financially supported by: Project POCI-01-0145-FEDER-006984 - LSRE-LCM Associated Laboratory financed by the FEDER through COMPETE2020 - Operational Program for Competitiveness and Internationalization (POCI).

### References

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3. C. Caleja et. al., Food chem, **2017**, *216*, 342-346;
4. M.A. Shah et al., Meat sci, **2014**, *98*, 32-33.