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Frequent Consumption of Sugary drinks and Fruit Juices Is Associated with an Increased Risk of Metabolic Syndrome

O consumo frequente de refrigerantes e sumos de fruta está associado com um aumento do risco de síndrome metabólica

Cíntia Pêgo

CBiOS - Research center for Health Sciences & Technologies,
U. Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

Abstract

Longitudinal and cross-sectional epidemiological studies have suggested some negative associations between healthy diet, including a healthy beverage profile, and Metabolic Syndrome (MetS). However, the associations between intakes of sugar-sweetened beverages (SSBs), artificially sweetened beverages, and natural and bottled fruit juices and the incidence of MetS in elderly individuals at high risk of cardiovascular disease (CVD) and without MetS at baseline had never been investigated before.

It was prospectively examined 1868 participants, free of MetS at baseline from the PREDIMED (PREvención con Dieta MEDiterranea) study. MetS was defined by using the updated harmonized criteria of the International Diabetes Federation, the American Heart Association, and National Heart, Lung, and Blood Institute. Energy and nutrient intakes were evaluated at baseline and then yearly by using a validated 137-item food-frequency questionnaire. Multivariable adjusted HRs for MetS and its components were estimated from mean intakes during follow-up. We compared the 2 highest consumption categories (1–5 and >5 servings/week) with the lowest category (<1 serving/week).

A total of 930 incident cases of MetS were documented during a median follow-up of 3.24 y. When we compared consumption of >5 servings/week with consumption of <1 serving/week, multivariable HRs (95% CIs) for MetS incidence were 1.43 (1.00, 2.15), 1.74 (1.26, 2.41), 1.30 (1.00, 1.69), and 1.14 (1.04, 1.65) for SSBs, artificially sweetened beverages, natural fruit juices, and bottled fruit juices, respectively.

The occasional consumption of SSBs and artificially sweetened beverages (1–5 servings/wk) was not associated with the incidence of MetS in middle-aged and elderly individuals at high risk of CVD. The consumption of >5 servings/wk of all types of beverages analyzed was associated with an increased risk of MetS and some of its components.

Lecturer's resumé

She graduated in Human Nutrition and Dietetics in Universitat Rovira i Virgili, Spain 2010, and has a master degree in Training and Sports Nutrition by the Universidad Europea de Madrid, Spain 2012.

She obtained her PhD with International Mention in Nutrition and Metabolism from the Universitat Rovira i Virgili, Spain, and University of Arkansas, USA in 2016.

Her main epidemiological research interests are: Mediterranean Diet and mainly the effect of nuts supplementation, the consumption of dairy products and hydration or the consumption of different types of beverages and its relation with health and disease

Phenotypic and genotypic profiling of Salmonella 1,4,[5],12:i:- R-type ASSuT isolates from humans, animals and environment in Portugal

Perfil fenotípico e genotípico de Salmonella 1,4,(5),12i:- R-type ASSuT isolados de humanos, animais e ambiente em Portugal

Rui Seixas

Faculdade de Medicina Veterinária
U. Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

Abstract

The prevalence of Salmonella serovars is constantly changing [1]. Nowadays, Salmonella 1,4,[5],12:i:-, which was seldom isolated before the mid-1990s, is now considered among the top 3 most prevalent serovars isolated from humans in the European Union, surpassed only by serovar Enteritidis and Typhimurium [1]. Salmonella 1,4,[5],12:i:- is considered a monophasic variant of Salmonella Typhimurium due to genotypic similarities. Whereas most serovars are biphasic, serovar 1,4,[5],12:i:- is characterized by a lack of the *fljB* gene expression which encodes the second phase flagellar antigen [2]. The increase in prevalence of Salmonella 1,4,[5],12:i:- related infections over the last few years has been considered a public health issue in many European countries, especially as this serovar may be associated with tetrareistance to ampicillin, streptomycin, sulphonamides and tetracyclines (R-type ASSuT) [2].

Salmonella 1,4,[5],12:i:- isolates (n=187) from 15 districts were obtained from the Portuguese National

Laboratory. Sources included human clinical cases (n=170), veterinary (n=10), environmental (n=6) and food samples (n=1). All had been collected between 2006 and 2011 and submitted to the laboratory's under its passive monitoring system [3].

All isolates were serotyped using the slide agglutination method and results confirmed by PCR. R-type ASSuT isolates were selected from the confirmed Salmonella 1,4,[5],12:i:- by disc diffusion and MIC determination for further characterization by: PFGE restriction with *Xba*I, virulence genes determination by PCR, additional antimicrobial resistances profiling by disc diffusion and epidemiological distribution evaluation.

Out of the 187 serotyped isolates, 133 were confirmed as Salmonella 1,4,[5],12:i:- with a R-type ASSuT

occurrence of 61.7%. Distribution among Portuguese districts showed a higher percentage of reported cases in coastal areas, in particular in Porto (24.8%), Setúbal (13.5%) and Aveiro (12.8%), probably due to the higher population density. Clonality analysis identified 48 different PFGE profiles with the majority of human salmonellosis cases being attributed to sporadic events. All isolates harbored 14 out of the 18 virulence genes evaluated and 87.8% of the isolates showed all the resistance genes frequently associated with the European clone, *bla*TEM+*su*l2+*stra*A-*stra*B+*tet*B+. This study shows that Salmonella 1,4,[5],12:i:- resistant isolates are widely disseminated in Portugal, which may be related to a selective advantage offered by the R-type ASSuT profile, the presence of multiple virulent features and a high diversity of pulsotypes. Phenotypic and genotypic profiling of Salmonella, and in particular of Salmonella 1,4,[5],12:i:- strains may contribute towards the implementation of a national strategy to prevent outbreaks and provide useful information to avoid unnecessary regulatory measures.

References

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- [2] A Switt, et al., Foodborne Pathogens and Disease 6 (2009) 407-415.
- [3] Rui Seixas, et al., Current Microbiology 68 (2014) 670-677.

Lecturer's resumé

Holds an Integrated Master Degree in Veterinary Medicine by the Faculty of Veterinary Medicine of University of Lisbon, in 2011. PhD in Veterinary Sciences with a strong focus on human and veterinary clinical microbiology.

Main research interests: Gram-negative infections, antimicrobial resistance and biofilm formation.

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Design and implementation of Health solutions - Lessons from Community Pharmacy and Healthcare Acquired Infections' Management

Desenvolvimento e implementação de soluções eHealth – exemplos da Farmácia Comunitária e da Gestão das Infecções Adquiridas em Cuidados de Saúde.

João Gregório

CBiOS - Research center for Health Sciences & Technologies,
U. Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

Abstract

Os sistemas de saúde globais enfrentam diversos desafios, que ameaçam a sua sustentabilidade. Com vista a gerir estes desafios, o recurso às Tecnologias de Informação (TI) tem sido uma das abordagens mais experimentada. A prestação de serviços de saúde suportados por TI – eHealth – promete tornar a prestação de serviços mais eficiente, aumentando o nível de interação com os doentes, o que proporciona uma melhor gestão da doença e melhores resultados em saúde. Além disso, o recurso às TI permite também uma melhor tomada de decisão, quer para clínicos como para os gestores dos serviços e Sistemas de Saúde.

Contudo, a implementação de soluções e serviços suportados por TI no contexto de cuidados de saúde carece de mais investigação. O potencial disruptivo destas tecnologias pode afectar o papel dos diferentes utilizadores (profissionais e pacientes) na gestão da doença. Assim, torna-se necessário recorrer a uma metodologia que tenha em consideração os inputs dos utilizadores finais. A Design Science Research Methodology (DSRM) é uma metodologia já consolidada no desenho de sistemas de informação que começa a ser utilizada também para o desenho e implementação de novos serviços de saúde. Esta metodologia decorre em ciclos sucessivos (iterações) de um conjunto de actividades com vista ao desenvolvimento contínuo de um artefacto o mais ajustado possível às necessidades dos utilizadores finais.

Nesta sessão, serão apresentados alguns resultados de 3 projectos diferentes que recorreram à metodologia DSRM para o seu desenvolvimento.

Lecturer's resumé

João Gregório tem um percurso profissional dividido entre a Farmácia e a Investigação. É especialista em Farmácia Comunitária desde 2009, acumulando mais de 10 anos de experiência nesta carreira divididos em 2 períodos. Entretanto, concluiu um Mestrado em Saúde e Desenvolvimento e o Doutoramento em Saúde Internacional com Especialização em Políticas de Saúde, pelo Instituto de Higiene e Medicina Tropical da Universidade Nova de Lisboa. É actualmente Investigador Auxiliar do CBiOS - Research Center for Biosciences & Health Technologies da Universidade Lusófona.

O foco principal dos trabalhos de investigação desenvolvidos durante o percurso como investigador tem sido a utilização de Tecnologias de Informação para prestação de serviços farmacêuticos, para desenvolver sistemas de apoio à prescrição antibiótica e utilização de jogos (Gamificação) e para promover mudança de comportamentos sobre a higiene das mãos.

.....Platform.....

Medição não-invasiva de funcionalidade, saúde e incapacidade – desafios e abordagens diferentes

Gabriela Postolache

CBiOS - Research center for Health Sciences & Technologies,
U. Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

Abstract

São cada vez mais as pessoas que não se surpreendem quando veem não só jovens mas também idosos a usar o telemóvel para medir os parâmetros de actividade física, ou para procurar, nos sites e nas redes sociais da internet, mais informação sobre como realizar a gestão de saúde. Sabemos que os avanços científicos e tecnológicos das últimas duas décadas são muitos, e com graus de complexidade diferentes. Serão apresentados nesta sessão CBiOS alguns desafios e as soluções desenvolvidas de tecnologias portáteis, móveis, não-invasivas para monitorização das funções cardíacas e respiratórias, para avaliação de sistema nervoso autónomo ou para avaliação e monitorização remota dos movimentos durante a actividade diária ou durante os exercícios físicos de reabilitação motora. Quais os factores que podem influenciar a aquisição não-invasiva de sinais vitais ou dos movimentos do corpo? Quais os algoritmos através dos quais podemos ter mais informação sobre as funções de corpo usando um ou alguns sinais de corpo, adquiridos electronicamente e de modo não-invasivo? Quais os factores que influenciam a adoção de tecnologias não-invasivas para monitorização das sessões de treino de movimentos em fisioterapia? São questões para as quais a actividade de investigação que será apresentada, deu algumas respostas.

Lecturer's resumé

Gabriela Postolache é doutorada em ciências da vida, domínio de fisiologia. No seu trabalho final de licenciatura investigou a relação entre o hipotálamo e o sistema imunitário. Realizou especialização/mestrado com dissertação sobre os suportes sólidos para imobilização de enzimas envolvidas no metabolismo glicídico. No doutoramento investigou os efeitos agudos e crónicos da administração do etanol e dos opiáceos sobre o sistema nervoso autónomo, sistema cardiovascular e respiratório. Realizou também trabalhos de investigação sobre fibrilhação auricular, dispositivos não-invasivos e não-intrusivos para monitorização remota de estado de saúde e das terapias (fisioterapia) das pessoas, sistemas de informação para fisioterapia, e jogos sérios para fisioterapia. Desenvolveu vários modelos para estudos fisiológicos e fisiopatológicos e algoritmos para avaliação não-invasiva de sistema nervoso autónomo. Tem mais de 90 publicações em livros, jornais e proceedings de conferências nacionais e internacionais.

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Anticancer effects of erucin on human renal cancer cells

Propriedades antitumorais da erucina em células humanas de cancro renal

Bojana Vidović¹, João G. Costa², Nuno Saraiva², Ana S. Fernandes²

¹Department of Bromatology, Faculty of Pharmacy, University of Belgrade, Belgrade, Serbia

²CBiOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

Abstract

Epidemiological studies suggest that increased consumption of cruciferous vegetables may reduce the risk of several types of cancer, including renal cell carcinoma. Erucin (ER), 4-(methylthio) butyl isothiocyanate is a structurally-related analog of the most extensively studied sulforaphane. ER can be formed both by in vivo reduction of sulforaphane, and by enzymatic hydrolysis of glucorucin (a glucosinolate found at high levels in rocket species). ER has recently received considerable attention for its anticancer potential. In addition to chemopreventive effects, previous in vitro studies have demonstrated the ability of this compound to modulate proliferation and migration of cancer cells. However, to our knowledge, no previous studies are addressing this issue in renal malignancies. Therefore, the objectives of this research were to evaluate the cytotoxic effects of ER and its impact on the migration and invasion of renal cell carcinoma cells. The cytotoxicity of ER (by the MTT assay) and its influence on intracellular reactive oxygen species levels (by fluorimetry) were measured in renal cancer (O-786) and the normal (Vero-E6) cells. Exposure to ER (10-100 µM) induced a concentration-dependent decrease in cell viability. Observed inhibitory effects of ER against the O-786 renal cancer cells proliferation were more potent than those against Vero-E6 cells. Effects of a non-cytotoxic concentration of ER on chemotactic migration, cell invasion, and collective cell motility were evaluated by the transwell and the wound-healing assays. In conclusion, obtained results for the first time suggest that ER may have favorable effects against human renal carcinoma that require further investigation.

Acknowledgment

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Lecturer's resumé

Bojana Vidović is an assistant professor at the Department of Bromatology, Faculty of Pharmacy University of Belgrade. She graduated at the Faculty of Pharmacy, University of Belgrade in 2005 and defended her PhD in 2014 at the same faculty. Her research interests are in areas of food chemistry and dietary products, physiological, biochemical, health effects of ingredients, especially redox active compounds. She is a co-author more than 100 scientific papers in international journals indexed in SCI list, national journals and conference proceedings. Co-author is of several textbooks for students and professional publication "Dietary Supplements on Serbian Market". She is an editorial board member of the national journal Food and Nutrition. She is an active member of the Pharmaceutical Association of Serbia and Serbian Nutrition Society.

Microencapsulation of food ingredients

Microencapsulação de ingredientes alimentares

Joyce Costa

CBiOS - Research center for Health Sciences & Technologies,
U. Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

Abstract

Ingredientes alimentares são ricos em compostos bioativos tais como antocianinas, flavonóides, carotenóides, pigmentos naturais, compostos estes que, devido à extensa funcionalidade, promovem melhorias à saúde. Por outro lado, a suscetibilidade de tais compostos quanto às mudanças ambientais (por exemplo, oxigênio, pH, temperatura, umidade e luz), têm sido objeto de estudo de muitas pesquisas que buscam cada vez mais aprimorar as diferentes técnicas de microencapsulamento com a finalidade de fornecer proteção eficaz, estabilidade durante o armazenamento, maior vida de prateleira, liberação controlada, bem como sabor e textura otimizados aos produtos finais. O objetivo deste estudo foi avaliar a eficiência e características física e morfológica de micropartículas de óleo essencial de orégano, óleo de Castanha-do-Brasil e óleo de Buriti produzidas por diferentes métodos físicos (spray-dryer e freeze-dryer) na combinação de materiais encapsulantes funcionais para futura aplicação em formulações alimentares. Foram analisadas eficiência da encapsulação, atividade de água (Aw), umidade, solubilidade, distribuição de tamanho e estrutura morfológica (MEV e Confocal) das diferentes partículas produzidas. Para todos os tratamentos a eficiência da microencapsulação alcançou valores médios maiores que 80 %. A atividade de água, umidade, solubilidade e distribuição de tamanho alcançaram, respectivamente, valores mínimos e máximos iguais a (0,13-0,64); (2,20-2,71%); (68 a 71%) e (3,56 16,30 µm). As microfotografias obtidas por MEV mostraram que as micropartículas produzidas por spray dryer apresentaram formato esférico, ocas e com superfície côncava-rugosa, e estruturas irregulares, e porosas foram observadas nas partículas produzidas por freeze-dryer. A microscopia confocal permitiu avaliar a estrutura sem fragmentação do material e confirmaram os resultados obtidos através da MEV. Em todas as imagens campo claro, fluorescência e sobreposição foi observado distribuição homogênea do composto bioativo na estrutura da partícula que confirma o encapsulamento eficaz de acordo com os biopolímeros e método aplicado. Conclui-se que uma estratégia adequada de microencapsulação de ingredientes alimentares irá, portanto, expandir suas mais variadas aplicações e oportunidades para indústria alimentar.

Lecturer's resumé

Professora adjunta do Instituto de Ciência e Tecnologia (ICT) da Universidade Federal dos Vales do Jequitinhonha e Mucuri (UFVJM), com atuação nos Cursos de Graduação em Engenharia de Alimentos, Bacharelado Interdisciplinar em Ciência e Tecnologia (BC&T), e no Programa de Pós-Graduação em Ciência e Tecnologia de Alimentos (PPGCTA). Atualmente encontra-se em estágio Pós-Doutoral na Universidade Lusófona (Portugal) integrado ao Centro de Investigação em Biotecnologias e Tecnologias da Saúde (CBiOS). Doutora em Ciência dos Alimentos pela Universidade Federal de Lavras (2013), com período sândiche no Instituto Superior de Ciências da Saúde Norte - Gandra, Portugal (2011), mestre em Ciência dos Alimentos pela Universidade Federal de Lavras (2008), graduada em Engenharia de Alimentos pelo Centro Universitário de Belo Horizonte (2006), e técnica em Química pelo CENTEC. Possui experiência nas áreas acadêmica e laboratorial em Engenharia, Ciência e Tecnologia de Alimentos com principal atuação nos temas relacionados a secagem e microencapsulação por atomização de produtos alimentícios; propriedades termofísicas e químicas de alimentos; fenômenos de transportes e otimização de secadores ciclônicos; secagem de resíduos agroindustriais para geração de energia, e fritura por imersão.

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Insect consumption - food safety and future perspectives

Consumo de insetos - Segurança alimentar e perspetivas futuras

Daniel Murta

Faculdade de Medicina Veterinária

U. Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

Abstract

"Quando se aborda a agricultura sustentável, é importante referir que o que está verdadeiramente em causa, neste século XXI em que se assiste a uma intensa e rápida mutação tecnológica, é saber como podem as sociedades modernas adaptar e gerir os sistemas de produção agrícola de forma sustentável, utilizando os recursos de forma eficiente, preservando os recursos naturais para as futuras gerações, por forma a garantir o acesso a alimentos suficientes, seguros e nutricionalmente adequados, que para além de satisfazer as necessidades nutricionais de uma população mundial em crescimento, tenham igualmente como referência as suas preferências alimentares para uma vida ativa e saudável."

Foi com este mote que o Exm. Sr. Secretário de Estado da Agricultura e Alimentação, Luís Medeiros Vieira, iniciou o seu discurso a propósito da Sessão de Encerramento da Conferência Green Project Awards, que teve lugar a 7 de junho de 2018 e foi com o intuito de responder a estes desafios que no início da presente década a Food and Agriculture Organization of the United Nations (FAO) lançou uma possível solução, consumir insetos, quer diretamente como fonte nutricional para humanos quer como solução nutricional para os animais.

Os insetos apresentam-se como uma excelente solução para estes desafios, pois são nutricionalmente equilibrados, ricos em proteína e minerais, e podem ser produzidos com recurso a subprodutos de baixo valor. Na verdade, as suas principais vantagens prendem-se com o seu papel na economia circular, pois permitem transformar subprodutos, muitas vezes ricos em nutrientes mas que seriam desperdiçados, em produtos finais de valor acrescentado e que são excelentes fontes nutricionais. Além disso, a produção de insetos pode ser feita em larga escala de forma eficiente, com pouco recurso a terra arável, com emissões de CO₂ muito baixas e apresentam eficiências de conversão de alimento muito melhores que as espécies atualmente produzidas como fonte alimentar, devendo ser considerados como uma fonte nutricional alternativa às tradicionalmente utilizadas no mundo ocidental.

No entanto, e apesar de se apresentarem neste final de década como um sector emergente e com enorme potencial de crescimento a nível mundial, existem vários desafios pela frente, sendo um dos principais o desafio legal. Não é permitido o consumo de insetos e de produtos derivados de insetos em Portugal, pois são considerados novos alimentos e como tal carecem de submissão e aprovação de dossiers que demonstrem a sua segurança junto das autoridades europeias. Contudo, esta situação não é transversal a toda a Europa, criando uma desigualdade dentro da comunidade e favorecendo países que têm aplicações diferentes da mesma lei.

Por seu lado, a utilização de insetos na alimentação animal também não tem o mercado completamente aberto. Tratando-se de um ingrediente novo para alimentos compostos e tendo em conta o panorama legal gerado pelo Feed Ban, a utilização de proteínas animais transformadas derivadas de insetos não pode ser utilizada na alimentação de animais produtores de géneros alimentícios, sendo a única exceção os animais aquáticos. Apesar do panorama legal atual, este novo "sector" produtivo nacional tem colaborado com as entidades de segurança alimentar nacionais, tendo sido possível criar documentos que contribuem para esclarecer a presente situação, no sentido de converter esta solução numa verdadeira oportunidade económica para o país.

Lecturer's resumé

Médico Veterinário, formado pela Faculdade de Medicina Veterinária da Universidade Técnica de Lisboa em 2009, completou o seu Doutoramento em 2014 pela mesma instituição tendo ingressado no mesmo ano como Professor Auxiliar da Faculdade de Medicina Veterinária da Universidade Lusófona de Humanidades e Tecnologias, onde leciona Fisiologia. É investigador do CIISA-FMV-ULisboa.

Foi membro da Direção da Sociedade Portuguesa de Ciências Veterinárias entre 2013 e 2019 e Editor da Revista Portuguesa de Ciências Veterinárias entre 2016 e 2019.

Em 2014 fundou a EntoGreen, empresa dedicada à produção de Mosca Soldado Negro (*Hermetia illucens*) para a alimentação animal. É fundador da Portugal Insect, a recentemente criada Associação de Produtores de Insetos para a alimentação animal e humana.

Adherence to the Mediterranean Diet in the Autonomous Region of Madeira - preliminary data

Adesão à Dieta Mediterrânica na Região Autónoma da Madeira - dados preliminares

Bruno Sousa

²CBiOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

Abstract

The mediterranean diet (MD) is considered one of the healthiest dietary patterns and is associated with cardiovascular diseases protection. However, it is not known if the Portuguese population has implemented this practice in their eating habits.

The main objective of this study is evaluate the adherence to the MD in adult population of the Autonomous Region of Madeira.

Until now, the random sample consisted of 346 individuals between the ages of 18 and 65, residing in the Autonomous Region of Madeira. Adherence to MD was evaluated through the application of the PREDIMED instrument (PREvención with DIeta MEDiterránea). Weight (kg), height (cm) and waist circumference (cm) were also evaluated, and the body mass index (kg/m²) calculated.

This sample consisted of 64.5% (n=223) of females and had a mean age of 44.2 (±13.8) years. In this sample, 9.5% showed good adherence to MD, and the mean adherence index was 6.7 (± 2.1). However, 94.8% used olive oil as their main cooking fat and 79.8% preferred white to red meat consumption. On the other hand, an insufficient intake of 90.8%, 72.5% and 65.6% of nuts, legumes and fish was respectively detected. In this sample, we also found levels of pre-obesity of 41.3%, obesity I of 14.2%, obesity II of 3.8% and obesity III of 1.2%. Regarding the metabolic risk associated with the waist circumference, 23.1% presented increased risk and 40.2% a substantially increased risk.

We can conclude that, in this sample, the rates of adherence to MD are low, so there seems to be a need for greater dissemination of the importance of implementing this food practice, in order to prevent several diseases such as cardiovascular diseases.

Lecturer's resumé

Graduated in Nutritional Sciences by Faculty of Nutrition and Food Sciences of University of Porto, in 2001, Master Degree in Clinical Nutrition by Faculty of Nutrition and Food Sciences of University of Porto, in 2006, and PhD in Food Consumption and Nutrition Sciences by University of Porto, in 2011.

Main research interests: Nutritional Assessment, Child Growth and Mediterranean Diet.

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Effect of formulation on the percutaneous absorption of quercetin

Efeito da Formulação na absorção percutânea da quercetina

Ana Macedo

CBIOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

Abstract

For many years, formulation scientists have attempted to use a rational approach to the formulations that might be efficacious. One possible approach to study the physicochemical properties of the materials is the estimation of the solubility parameters, also known as the cohesive energy densities. In the pharmaceutical field, the cohesive energy can be used to predict the likelihood of two systems, e.g. drugs and excipients, to dissolve each other. The most common approach to determine the cohesive energies is the solubility parameters (HSP). For decades, the world of science has been fascinated with nanosized materials due to their outstanding properties and many uses. It is particularly challenging to characterise and predict the behaviour of particles in such a small size because of the changes in their optical, magnetic, catalytic, and electrical properties. Quercetin was selected due to being a flavonoid present in plants with antioxidant and anticancer properties. Evidence suggests that quercetin induced the apoptosis of B16-BL6 melanoma cells and reduced DNA damage induced by UVB irradiation. The topical delivery of quercetin is, therefore, highly desirable to prevent and treat cancer and to prevent photo-ageing caused by UVA and UVB radiations. However, quercetin's molecular weight (MW) is within the range of solutes with transdermal permeability (302 Da), its low solubility in water (60 µg/mL) makes its topical delivery particularly challenging.

In this work, three microemulsions encapsulating quercetin were prepared to test the suitability of the solubility parameters as a tool for the pre-screening of formulations. The ingredients were selected based on their HSP to develop the formulations and were tested with skin and a synthetic membrane. Different solubility models were applied to determine the solubility parameters of the formulations and describe their behaviour in the delivery of quercetin. The hydrophilic-lipophilic-balance (HLB) was also used to calculate the final HLB of formulations and compare with the permeation profiles found. Imaging was carried out to confirm the distribution of quercetin within full thickness skin.

Lecturer's resumé

Holds an Integrated Masters in Pharmaceutical Sciences by University Fernando Pessoa, Porto 2010. PhD in Pharmacy by School of Pharmacy and Medical Sciences, in 2017, University of South Australia, Australia.

Main research interests: formulation design and optimization for transdermal drug delivery, in vitro-in vivo correlations, in vitro permeation tests, pharmacokinetics

Lead Cytotoxic Royleanones and derivatives from *Plectranthus* spp.

*Roileanonas e derivados como compostos protótipo do género *Plectranthus**

Vera Isca

CBIOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

Abstract

Plectranthus genus is an important source of bioactive royleanones [1, 2]. 6,7-dehydroroyleanone (DeRoy) and 7 α -acetoxy-6 β -hydroxyroyleanone (Roy) are examples of lead molecules isolated in high amounts from *P. madagascariensis* and *P. grandidentatus*, respectively [3, 4]. Both diterpenes have hydroxyl groups suitable for derivatization, which have drawn attention to the possibility of exploring its reactivity, with the aim of improving the cytotoxicity of the lead compounds.

In this work, several hemi-synthetic reactions were performed in the lead compounds to prepare a small library of new compounds. The general toxicity of the synthesized products was evaluated through an *Artemia salina* model. Results showed that the correspondent benzoylated derivatives improved toxicity when compared to Roy and DeRoy. Furthermore, the most promising compounds were tested in multidrug resistant NCI-H460/R cells overexpressed with P-gp. Molecular docking studies were also performed in a murine P-gP structure. The benzoylated and dibenzoylated products showed promising results in both molecular docking and biological studies.

Another study with the patented diterpene 6 β -benzoyloxy-12-O-benzoylroyleanone (RoyBz) obtained by semi-synthesis of Roy [5], also demonstrated to enhance the cytotoxic properties, with selective activation of PKC- δ [6]. Considering this, several theoretical derivatives of Roy were designed through modification of the C-12 and C-6 hydroxyl groups. Molecular docking simulations of these theoretical derivatives were carried out against the 3D structure of PKC- δ . These results allowed the identification of the most promising compounds for PKC- δ modulation. Based on the docking achievements further derivatives are currently been prepared for structure-activity relationships and new drug development based on the royleanone scaffold.

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Lecturer's resumé

Currently a PhD student at the PhD Program in Pharmacy in Faculdade de Farmácia da Universidade de Lisboa and hosted in the CBIOS - Universidade Lusófona de Humanidades e Tecnologias, financed by FCT. BSc in Biochemistry from the University of Beira Interior, in 2010 and MSc in Organic Chemistry and Natural Products from University of Aveiro in 2013.

Laboratorial skills in Organic Chemistry, Phytochemistry, Spectroscopic and Separation Technics acquired in investigation projects from July 2017 to December 2018 financed from three FCT investigation grants. Know-how in molecular docking acquired in a training school in Tenerife, Spain, in December 2018 and consolidated in a STSM in Siena, Italy, in February-March 2019 financed by COST action CM 1407.

Co-author of 5 international journal articles, reviews and papers with referees. Co-author of a book chapter in the book: *Natural Products: Research Reviews*. (2012). Five oral communications and ten poster presentation in national and international meetings.

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Plectranthus mutabilis Codd: Phytochemistry and Biological activity study

Plectranthus mutabilis Codd: estudo fitoquímico e da actividade biológica

Ntungwe Epole

CBIOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

Abstract

The Lamiaceae family is widely used in traditional medicine, and it is known as a source of bioactive natural products. *P. mutabilis* Codd. chemical constituents have been cited on its HPLC analysis that revealed the presence of Nepetoidins A and Nepetoidins B. We therefore aimed to study the composition and biological activity of this plant to reinforce the low phytochemical information.

In this study, the air-dried *P. mutabilis* whole plant was extracted in acetone using the ultra-sound assisted extraction method. Furthermore, a bio-guided fractionation was performed followed by an *Artemia salina* general toxicity assay, DPPH-antioxidant activity and antimicrobial activity. The extract was subjected to different column chromatographies using silica or polyamide with increasing polarity to afford the metabolite coleon U quinone (1) and 8 α ,9 α -Epoxycoleon U quinone (2). The fully structure characterization was done mainly by 1D- and 2D-NMR and comparison with literature data. Compound 1 was tested against two Gram positive (Minimum Inhibitory Concentration - MIC values: *Staphylococcus aureus* = 1.56 μ g/mL, *Enterococcus faecalis* = 25 μ g/mL) and two Gram negative bacteria (*Klebsiella pneumoniae* = >100 μ g/mL, *Escherichia coli* = >100 μ g/mL). Additionally, compound 1 showed moderate cytotoxicity in Human cancer and normal cell lines (Colo 205, multidrug resistant overexpressing ABCB1 Colo 320 and MRC-5) showing slight selectivity to resistant cancer cells. Further phytochemical studies are ongoing.

Lecturer's resumé

Currently, Epole Ntungwe is a PhD student in the Health Sciences at Research Center for Biosciences and Health Technologies (CBIOS), Escola de Ciências e Tecnologias da Saúde - Universidade Lusófona in partnership with the University of Alcalá de Henares. BSc. in Biochemistry and master degree in molecular Diagnostic Science all at the University of Buea-Cameroon, Department of Biochemistry and Molecular Biology in 2014.

Through a six months training fellowship at the Food and phytochemistry laboratory and her PhD project from August 2016 till present. She has developed laboratorial skills in natural product chemistry, Organic Chemistry, Phytochemistry, Spectroscopic and Separation Techniques. These skills were enhanced at a Training School on "Synthesis, isolation and structural elucidation of bioactive compounds" in 2017 at Universidade Lusófona, Lisbon, Portugal financed by COST ACTION CM1407; and Short-term Scientific Mission (STSM), at the Institute of Pharmacognosy, University of Szeged, Hungary from March-April financed by COST ACTION: CA17104.

Epole is the author/Co-author of international journal articles

2017 Biomed Biopharm Res; (14) 1, 95-108;

2018 ACS Omega, 3, 16191-16202;

With three oral communications and ten poster presentation in national and international conferences.

Effects of Persistent Organic Pollutants on Health

O efeito de Poluentes Orgânicos Persistentes na Saúde

Carla Sá^{1,2,3}, Diogo Pestana^{1,4}, Conceição Calhau^{1,4}, Ana Faria^{1,4,5}

¹CINTESIS, Center for Research in Health Technologies and Information Systems, Porto, Portugal

²CBIOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

³CIDESD, Research Center in Sports Sciences, Health Sciences and Human Development, Vila Real, Portugal

⁴Nutrition & Metabolism, NOVA Medical School|FCM Universidade Nova de Lisboa

⁵Comprehensive Health Research Centre NOVA Medical School|FCM Universidade Nova de Lisboa, Lisboa, Portugal

Abstract

While many chemicals can enhance and even save lives by ensuring food security and protecting health, others aren't so beneficial. More specifically, some chemical compounds have been identified by the United Nations Environment Programme as powerful threats to human and wildlife health on a global basis. These organic chemical substances belong to a class known as persistent organic pollutants (POPs)(1).

This extensive contamination of environmental media and living organisms includes many foodstuffs and has resulted in the sustained exposure of many species, including humans, for periods of time that span generations, resulting both in acute and chronic toxic effects. POPs are known to be particularly toxic and have been associated with carcinogenic and endocrine-disrupting effects, obesity, insulin resistance, allergies and hypersensitivity, damage to the central and peripheral nervous systems and reproductive disorders effects in several animals, including humans (2-7). Hence, there is a growing concern over the presence of a broad spectrum of POPs in human tissues, including blood, adipose tissue, and breast milk(8, 9). Their ubiquity in the environment and lipophilic properties, resulting in the contamination of virtually all individuals, might have a substantial overall effect on the population.

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Lecturer's resumé

Carla Correia de Sá is currently a lecturer at Universidade Lusófona.

She holds a first degree in Nutritional Sciences from Egas Moniz Institute of Health Sciences, MSc in Clinical Nutrition in Faculty of Nutrition and Food Science of Porto University and PhD in Faculty of Medicine, Porto University.

She is effective member at the Portuguese Association of Nutrition and Ordem dos Nutricionistas.

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Universidade Lusófona, Campo Grande 376, 1749-024 Lisboa, Portugal

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Food supplements - Leucine metabolites, Whey, Zinc and phytotherapies

Suplementos alimentares- metabolitos da leucina, soro do leite, zinco e fitoterápicos

Filipe Teixeira

CBiOS, Universidade Lusófona Research Center for Biosciences & Health Technologies, Lisbon, Portugal

Abstract

Dietary supplements have been widely studied to improve body composition, performance and several blood markers. Leucine metabolites β -hydroxy- β -methylbutyrate (calcium, HMB-Ca and free acid, HMB-FA) and α -hydroxyisocaproic acid (α -HICA) have been proposed to enhance performance (muscle power and strength), body composition (muscle thickness, fat-free mass, fat mass and bone mineral content) and to modulate training induced hormonal (testosterone, cortisol, insulin-like growth factor-1 and growth hormone), inflammatory (tumor necrosis factor, interleukin 6 and high-sensitivity C-reactive protein) and muscle damage responses (creatinine kinase), in healthy young resistance trained individuals. Additionally, some leucine metabolites have also been proposed to improve functionality and body composition in elderly populations and/or under clinical settings. Experimental research will be presented pertaining these leucine metabolites in trained human subjects and a type 1 diabetes case-study. Furthermore, review articles concerning: zinc in male hypogonadism; phytotherapies on testosterone, sperm and prostate parameters; Whey protein in cancer therapy and body composition, will also be presented.

Lecturer's resumé

Filipe Teixeira RD, Ph. D.

Filipe Teixeira é Nutricionista e Doutor (com Distinção e Louvor) em Motricidade Humana - Fisiologia do Exercício pela Faculdade de Motricidade Humana da Universidade de Lisboa e já conta com uma vasta experiência profissional, tendo sido Director de Nutrição do Tudor Bompa Institute International (Noruega).

Recentemente colaborou com a Universidade de McMaster tendo publicado diversos artigos científicos com o Professor Stuart M. Phillips (líder mundial na investigação do metabolismo proteico e Nutrição Desportiva). Possui diversas publicações, como primeiro autor, em revistas científicas internacionais de renome, entre as quais se destacam a Medicine & Science in Sports & Exercise (revista oficial do American College of Sports Medicine), Journal of Sport Sciences, European Journal of Sport Science e a Pharmacological Research.

É actualmente investigador e docente universitário em várias faculdades.