

from Group III, presented the lowest values (<1.9 µg/100). The ratio between Group I and Group III was used to estimate the effectiveness of the program. The highest difference was found in fish while the lowest was determined in soup. The difference between iodine content in Group I and Group II was used to monitor the use of iodized salt in the schools from the Lisbon metropolitan area. This study demonstrates that the determination of iodine content, in foods cooked with and without iodized salt, is an appropriate approach to evaluate fortification programs and risks of both inadequate and excess iodine intake.

P65: BRAZIL NUT CONSUMPTION REDUCES DNA DAMAGE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS PROBABLY THROUGH CHANGES IN OXIDATIVE STATUS

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INTRODUCTION: Type 2 diabetes *mellitus* (T2DM) is a metabolic disease, occurring largely due to lifestyle changes. There is a strong link between T2DM and oxidative stress, that leads to damage to lipids, proteins and DNA. Dietary interventions are essential for the treatment and prevention of T2DM-related complications. Brazil nuts (*Bertholletia excelsa*, H.B.K.) are the richest source of selenium in nature. This mineral presents health benefits, including improve of antioxidant system and maintenance of genomic stability.

OBJECTIVES: To assess the effects of Brazil nut consumption on biochemical and oxidative stress parameters, as well as genomic instability in T2DM patients.

METHODOLOGY: Seventy-four T2DM patients (registered in the Integrated Clinics, University of Southern Santa Catarina) consumed one Brazil nut a day (210 µg of selenium) for six months. Blood and exfoliated buccal cells samples were collected at the beginning and at the end of treatment. Were evaluated the glycemic, lipid, renal and hepatic profiles; levels of DCF, MDA, nitrites, total thiols, protein carbonylation, GSH and selenium; GPx and CAT activity; and DNA damage.

RESULTS: The data presents an increase in fasting glucose levels, HDL- and LDL-cholesterol, and GGT levels. The insulin levels and triglycerides/HDL-cholesterol ratio were decreased. Six-month Brazil nut consumption proved to be enough to significantly increase selenium and GSH levels, and GPx and CAT activity, improving the antioxidant system of patients. Relative to oxidant production, DCF and nitrites levels were decreased. A reduction of proteins and lipids oxidized were observed by increase in total thiols, and a decrease in protein carbonyl and MDA levels. Relative to genomic instability, basal and oxidative DNA damage, and micronuclei frequency were significantly decreased after Brazil nut consumption.

CONCLUSIONS: Taken together, the results indicate that Brazil nut consumption could be an ally to module the genomic instability in T2DM patients, probably through changes in redox balance.

P66: LIPID PROFILE MODULATION BY MINERAL-RICH WATERS INTAKE

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INTRODUCTION: An impaired lipid profile represents both a global public health issue and a risk factor for incident coronary heart disease as well as stroke, what makes it an important preventable cause of death.

OBJECTIVES: To review the contribution of mineral-rich waters consumption upon lipid profile and associated regulatory mechanisms.

METHODOLOGY: The literature review was performed on Pubmed, Scopus and Google Scholar databases, up to 18th January 2019. A filter for English and Spanish languages was applied. The following keywords were used: cholesterol, triglycerides, apolipoprotein, chylomicron, VLDL, LDL, HDL and mineral(-rich) water.

RESULTS: Thirteen experimental articles were selected: 11 studies were carried out in humans and 2 in rodent models. Mineral-rich waters were used in distinct protocols in terms of diet, type of water and amount consumed, study type and/or duration of intervention. Human studies included populations with different characteristics and sizes (the same for rat strains). Lipid profile(-related) parameters were evaluated in different groupings: circulating cholesterol and triglycerides (total, chylomicron, VLDL, LDL and/or HDL), circulating oxidized LDL, circulating lipoprotein(a), circulating apolipoproteins (Apo) AI and B, cardiovascular risk indexes [LDL-cholesterol/ApoB, HDL-cholesterol/ApoAI, HDL-cholesterol/total-cholesterol (or total-cholesterol/HDL-cholesterol), total-cholesterol/LDL-cholesterol and HDL-cholesterol/LDL-cholesterol (or LDL-cholesterol/HDL-cholesterol)], circulating and fecal total bile acids, intestinal propulsion and bowel movements, biliary elimination curve and total bile acids and cholesterol in bile, gallbladder volume and ejection fraction and circulating cholecystokinin and cortisol. Seven studies presented positive effects upon the lipid profile while no negative impact was found. Additionally, 3 studies revealed no effect and 3 studies disclosed no difference in the effects when comparing control and test waters. Modulation of circulating cholecystokinin and gallbladder/bile acids/intestine-related parameters was observed.

CONCLUSIONS: The consumption of mineral-rich waters may exert a positive modulation upon lipid profile. Further studies are needed to completely clarify the underlying mechanisms involved in mineral-rich water effects.

P67: CARACTERIZAÇÃO DOS TEORES DE GORDURA DOS LEITES DE OVELHA E DE CABRA NA SUB-REGIÃO DAS BEIRAS E SERRA DA ESTRELA: ANÁLISE ESPACIAL E TEMPORAL

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INTRODUÇÃO: O leite e seus derivados são alimentos versáteis, facilmente consumidos e com recomendações de ingestão na Roda dos Alimentos, variando a sua composição nutricional de acordo com a espécie. No contexto dos leites de ovelha e de cabra, os teores de gordura revestem-se de primordial importância principalmente na produção de derivados, gerando a sua produção e transformação uma vantagem competitiva no território das Beiras e Serra da Estrela.

OBJETIVOS: Analisar as diferenças dos teores de gordura dos leites de ovelha e de cabra, para os municípios do território das Beiras e Serra da Estrela, com aplicação de técnicas de estatística espacial e temporal.

METODOLOGIA: Foram utilizados dados do INE relativos aos indicadores de teor de gordura dos leites de ovelha e de cabra recolhidos por município de 2003-2017 e a Carta oficial Administrativa oficial da DGT (CAOP, versão 2018). Os SIG foram utilizados como ferramenta de análise e geovisualização com integração da análise das diferenças de indicadores de teor de gordura dos leites de ovelha e de cabra entre municípios, através dos testes Wilcoxon e Kruskal-Wallis ($\alpha=5\%$) e análise de *clusters*.

RESULTADOS: Foram recolhidos, em média, 603,99±527,049 e 101,99±157,370 mil litros de leite de ovelha e de cabra, respetivamente. No que se refere ao teor de gordura dos leites de ovelha e de cabra existem diferenças significativas

entre municípios, assim como relativamente aos valores 6,2% (ovelha) e 4,0% (cabra). Por análise espacial e temporal os teores de gordura anuais dos leites de ovelha e de cabra associados aos municípios foram utilizados na deteção dos *clusters* mais prováveis.

CONCLUSÕES: Conclui-se que as técnicas de análise espacial permitiram segmentar a região de acordo com os teores de gordura, contribuindo assim para a apresentação de propostas de valor neste setor.

P68: ALIMENTAÇÃO VIVA E SEGURANÇA ALIMENTAR: IMPACTO DA TEMPERATURA NA QUALIDADE MICROBIOLÓGICA DE BOLACHAS ARTESANAS

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INTRODUÇÃO: A Alimentação Viva (AV) baseia-se no consumo de alimentos vegetais que podem ser consumidos crus, demolidos e/ou germinados ou desidratados a temperaturas não superiores a 42-46 °C, preservando-se enzimas e nutrientes.

OBJETIVOS: Avaliar o impacto de temperaturas moderadas (41 °C, 52 °C, 63 °C) e elevadas (120 °C) na qualidade microbiológica de bolachas artesanais.

METODOLOGIA: Elaboraram-se bolachas com ingredientes biológicos adquiridos no mercado: tâmaras, farinhas de coco e amêndoa, óleo de coco, sementes de chia e de trigo-sarraceno germinado. Adicionalmente, a farinha de grão-de-bico germinado (FGBG) foi obtida a partir da demolha (24h/5 °C), germinação (3 dias/21 °C), desidratação (41 °C/29h), moagem e peneiração das sementes. Submeteram-se as bolachas cruas a diferentes temperaturas/tempos de secagem: 41 °C, 52 °C, 63 °C/24h no desidratador e 120 °C/20min no forno. Realizaram-se análises microbiológicas à FGBG, bolachas cruas e confeccionadas: contagem de bactérias mesófilas totais, enterococos, enterobactérias, bolores e leveduras, bactérias lácticas, *Bacillus cereus*, estafilococos totais e *Staphylococcus aureus*. Determinou-se a humidade e a atividade da água das bolachas.

RESULTADOS: Detetaram-se números elevados (5,80-9,70 UFC's/g) de células viáveis de mesófilos, enterobactérias, bolores e leveduras na FGBG e desidratada. As bolachas cruas apresentavam contaminação por bolores e leveduras, enterobactérias, estafilococos totais e bactérias lácticas. A densidade microbiana diminuiu com o aumento da temperatura: a 41 °C e 52 °C/24h registaram-se elevadas densidades microbianas [todos os grupos de microrganismos, com exceção de *B. cereus* (4,50-9,70 UFC's/g)]; a 63 °C/24h ocorreu uma diminuição substancial (4,70-5,70 UFC's/g) e a 120°C/20min todos os valores abaixo dos limites de deteção (<2,5 ou 3,5 UFC's/g). O teor de humidade e a atividade da água das bolachas cruas e confeccionadas diminuíram com o aumento da temperatura: 44,5±1,0% e 0,565±0,021 para 13,1±0,6% e 0,529±0,031, respetivamente.

CONCLUSÕES: A temperatura é um fator determinante no controlo da contaminação microbiológica, devendo os apologistas da AV estarem alerta para os perigos associados ao consumo de alimentos desidratados a baixas temperaturas.

P69: CHLORELLA VULGARIS: CHARACTERIZATION OF THE LIPID FRACTION BASED ON THE LIPID CLASSES AND FATTY ACID PROFILE

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INTRODUCTION: Microalgae are already widely used by the food industry. Because they grow under very diverse environmental conditions, these organisms often have a unique lipid profile. Glycolipids are one of the most important lipid classes. They play an important role in microalgae physiology but also bring beneficial health effects to humans. Their antifungal, antiviral, and antitumoral properties are some examples.

OBJECTIVES: Considering *Chlorella vulgaris* is one of the algae most used by the food industry and its nutritional potential, this work aimed to characterize its lipid composition based on the lipid classes and fatty acid profile.

METHODOLOGY: The lipid fraction of *C. vulgaris* was extracted and the lipid classes determined by means of High Performance Thin Layer Chromatography (HPTLC) and the fatty acid profile by Gas Chromatography (GC-FID).

RESULTS: The lipid fraction accounted for 12.0 ± 0.1% w/dw of the *C. vulgaris* biomass. Non polar lipids were the most abundant (49.4 ± 2.1%), wherein an important fraction of these lipids were found as free fatty acids (35.5 ± 1.7%). Polar lipids, in turn, corresponded to 30.5 ± 2.3% of the total lipids, representing the glycolipid fraction 22.8 ± 1.5%.

On the other hand, in what concerns the fatty acid profile, MUFA stood out with 35.2 ± 0.1%, followed by the SFA (26.7 ± 0.1%) and the PUFA (21.9 ± 0.2%). The oleic acid (18:1 n9) accounted 11.7 ± 0.1%, the equivalent to one-third of all MUFA. Among the PUFA, linoleic (18:2 n6) and α -linolenic (18:3 n3) fatty acids were the most important with 11.2 ± 0.0% and 10.1 ± 0.2%, respectively.

CONCLUSIONS: Based on the results, it is important to highlight the important contribution of the glycolipids, as well as the MUFA for the total lipid fraction. Further studies are needed in order to know more specifically the glycolipid composition in *C. vulgaris*.

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P70: FATTY ACIDS AND RELATED NUTRITIONAL/ HEALTHY INDEXES REGARDING SERRA DA ESTRELA CHEESE: GEOGRAPHICAL ORIGIN AND PRODUCTION DATE EFFECTS

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INTRODUCTION: Serra da Estrela (SE) is a traditional Portuguese cheese with a Protected Designation of Origin (PDO) certification. Although worldwide