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Abstracts

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Annals of Nutrition & Metabolism

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Immunomodulatory Effect of Hesperidin in Immunized Rats

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Hesperidin is a flavonoid found in fruits of the genus Citrus [1]. It is reported its role in the decrease of Th2-cytokines in murine asthma models [2, 3]. However, the influence of hesperidin on lymphoid tissues and on specific antibody synthesis has not been studied in depth. The aim of this study was to establish the influence of hesperidin on immunized rats. For this, Lewis rats were either orally sensitized with ovalbumin (OVA) and cholera toxin (CT) and fed 0.5% hesperidin diet, or intraperitoneally (ip) immunized with OVA, Bordetella pertussis toxin and Alum and administered by oral gavage 100 or 200 mg of hesperidin per kg of body weight.

In the first experimental design, hesperidin diet modified the effector lymphoid tissue compartments increasing the proportion of TCRγδ cells among intraepithelial lymphocytes (IEL) and decreasing that one from lamina propia lymphocytes (LPL). Hesperidin diet did not produced modifications on the lymphocyte composition of the inductive sites. In the second experimental design, hesperidin increased the proportion of TCRαβ+ cells and decreased those of CD45RA+ and CD8+CD25+ lymphocytes from mesenteric lymph nodes lymphocytes (MLNL). Moreover, hesperidin induced higher production of IFN-γ in stimulated MLNL. Nevertheless, in both designs, the hesperidin did not modify serum specific antibody production neither intestinal IgA content.

In conclusion, hesperidin possesses immunoregulatory properties in the intestinal immune response although the synthesis of systemic antibodies is not affected.

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Authorship: M.C., A.F. and F.J.P.C. designed the study; M.C-B. carried out the experiments, analyzed the data and wrote the abstract; M.C. reviewed the abstract.

Keywords: antibody; flavonoids; hesperidin; immunoregulatory; polyphenol.

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Probiotic Properties and Stress Response of Lactic Acid Bacteria Isolated from Cooked Meat Products

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The aim of this work was to evaluate, for further application in functional food development, some probiotic properties and the response to acidic and heat shock stresses of six lactic acid bacteria (LAB) isolated from Mexican cooked meat products, namely, one Enterococcus faecium UAM1 strain and five Pediococcus pentosaceus strains.

This study, revealed that under simulated human gastric conditions, the Enterococcus strain had a high resistance pattern, superior to that of the Pediococcus strains. Exposure to a simulated intestinal stress environment did not greatly affect the survival of any of the LAB strains investigated. In addition, high levels of co-aggregation of the potentially probiotic LAB with Gram-positive and Gram-negative bacterial pathogens were detected. The adherence of E. faecium UAM1 to human Caco-2 cell line (around 20%) was significantly higher to that obtained with the five P. pentosaceus strains (2%–4%) and Lactobacillus acidophilus LA-5 (6%), a commercial probiotic strain.

Thermotolerance, above 65ºC, of all of the tested strains was corroborated by DT values. Additionally, a differential proteomic stress response of enterococcal and pediococcal strain was detected by LC-M, upon exposure to heat and acidic stresses. The overall results indicate that E. faecium UAM1 has thermo-tolerant properties for survival during the preparation of mexican cooked meat. Moreover, it has probiotic properties that predict its capability to colonize in competition with pathogen the intestinal tract. Thus, this bacterium deserves further investigation for its potential as a component of functional food.

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Authorship: A.M. Hernández-Alcántara performed most of the experimental work and wrote the paper. M.L. Mohedano contributed to the design and performance of the proteomic study. P. López contributed to the design and analysis of the data from the interactomic studies. M.L. Pérez-Chabela contributed to the general design and interpretation of the paper.

Keywords: Lactic acid bacteria, probiotics, interactomic studies, Pediococcus pentosaceus, Enterococcus faecium.

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Effect of Chronic Sweetener Consumption on BMI, Glucose and Adipokines in Peripheral Blood

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The objective of the present study was to evaluate the effect of chronic sweetener consumption on BMI, glucose and adipokines in peripheral blood. The ingestion of non-caloric sweeteners increases exponentially, since in many commercial products they use as a strategy to reduce calorie consumption [1], control body weight [2] and sometimes glycemia; however its use today is still controversial, as well as the effects of its long-term use [3]. Thirty-two CD1 male mice 21-day old were divided into 4 groups: Control (CL), Sucrose (Suc), Sucralose (Sucl) and Stevia (St). BMI, Glucose (mg/dl), TNF-α (pg/mL) and Resistin (pg/mL) were determined. The sweetener was given daily diluted in ultrapure water with the following concentration: Sucrose (41.6 mg/ml), Sucralose and Stevia (4.1 mg/ml), 8–13 h for 84 days. Food and water without sweetener was given ad libitum. BMI and glycemia were recorded weekly, serum TNF-α and Resistin levels were obtained. The BMI ($F = 1,297$, $p = 0.293$) and glucose ($F = 0.923$, $p = 0.443$) remained unchanged at the end of the 84 days of treatment. There was no statistically significant difference in blood levels of TNF-α ($F = 0.571$, $p = 0.639$) and resistin ($F = 1,918$, $p = 0.150$) in any of the study groups. In this study the administration of the sweetener was intermittent (alternating periods with/without exposure), which may explain that there are no significant changes in adipokine blood levels.

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Authorship: Project planning was done by BEMC, the laboratory work was carried out by BEMC, RGC, EHJA, GPLE and abstract writing, reviewing and approval was done by BEMC, GRA, RVR.

Keywords: Non-caloric sweeteners, Body Mass Index, Adipokines.

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Effect of Microalgae Fatty Acids Consumption on the Interferon Gamma Concentrations in Diabetic Mice

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Aim: The aim of the study was to analyze the effect of Omega-3 fatty acids extracted from microalgae on the IFN-γ concentrations. Diabetes Mellitus is considered a chronic disease characterized for an inflammatory state in which many cytokines are continuously released including Interferon gamma (IFN-γ) [1]. Omega-3 fatty acids are well known for reducing inflammatory states such as in diabetes and contribute to stop the development of complications.

Method: 30 db/db male mice 8 weeks old were randomly assigned either to a control group (CL); a supplemented with Lyophilized microalgae EPA+DHA fatty group (LY); a supplemented with saturated fatty acids (pure coconut oil) group (SAT) or a group fed with a microalgae EPA+DHA modified diet (MD). Experimental study was conducted from the 8th to the 16th week of life. After treatment, blood lymphocytes where isolated and flow cytometry was conducted.

Results: One-way ANOVA was performed and showed significant differences between treatments ($F = 1009.208$, $p < 0.001$). LY and MD group showed significantly lower concentrations when compared to Control group (Bonferroni, $p < 0.001$) and SAT group was significantly higher also when compared to Control group (Bonferroni, $p < 0.001$).

Conclusions: The consumption of microalgae Omega-3 fatty acids whether from diet or supplemented decreases IFN-γ concentrations which may reduce the risk of complications in Diabetes Mellitus.