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III CONFERENCIA INTERNACIONAL DEL GRUPO ValSe-Food NETWORK y VI Simposio Chia-Link 2021

Valiosas semillas ancestrales Iberoamericanas para la alimentación del futuro

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Valiosas semillas ancestrales Iberoamericanas para la alimentación del futuro

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Prólogo

Actualmente, la creciente conciencia entre los consumidores sobre la importancia de la dieta en la salud, unido al impacto económico para el cuidado de la salud, y al aumento en el número y la proporción de personas mayores en la mayoría de los países del mundo, conforman un contexto inédito, del cual se prevé que afecte positivamente a la demanda y productividad de la industria alimentaria mundial en los próximos años. Igualmente, los cambios de patrones dietéticos observados en las últimas décadas, junto con estilos de vida modernos (más sedentarios), están incidiendo sobre algunos factores de riesgo, observándose de forma paralela altas incidencias de enfermedades como la diabetes tipo 2, la enfermedad coronaria, el cáncer, la enfermedad periodontal y la obesidad entre otras.

En este sentido, los alimentos han dejado de ser meramente un vehículo para satisfacer el hambre, sino que juegan un papel fundamental en la prevención y reducción de estas enfermedades, donde la nutrición tiene un alto porcentaje de responsabilidad.

En este libro de resúmenes se recoge una colección de trabajos que tiene su origen en las conferencias plenarias y pósteres que se presentan en la III Conferencia Internacional del Grupo ValSe-Food Network y el VI Simposio Chía-Link 2021, que se celebra en la bella ciudad de Santiago de Chile, líder en sostenibilidad. Y lo hace en un momento de madurez del proyecto Cyted, que nació con la enorme ilusión, de fomentar la investigación, el desarrollo y la innovación asociativa multidisciplinar, enfocado en nuevos ingredientes de cultivos ancestrales iberoamericanos y con el objetivo de ser integrados en la dieta por sustitución parcial o total de ingredientes críticos, a través de la creación de productos innovadores, saludables, sostenibles, sabrosos y socialmente aceptados, tanto en América Latina como en Europa.

Los temas a tratar incluyen a la investigación básica y aplicada, con 29 trabajos orales y 12 pósteres que han sido aceptados y distribuidos en 6 sesiones: Agronomía, Tecnología, Composición Nutricional, Nutrición y Salud, Tendencias y Empresas, referidos a la versatilidad de los cultivos frente al cambio climático y al stress hídrico; a la microencapsulación de metabolitos funcionales y sus efectos nutraceúticos; al impacto de estos nuevos ingredientes en algunas enfermedades crónicas, en el índice glucémico, en la obesidad y en la neuroprotección; a la composición nutricional de diferentes semillas y granos ; y a estudios sobre trabajos de campo para los diferentes cultivos.

No sólo es abundante la variedad de temas a tratar sino también las disciplinas científicas desde las que los mismos han sido orientados. Dentro del mercado creciente de alimentos relacionados con la salud (funcionales, naturales, fortificados, better for you…), cada vez es más evidente el nuevo nicho del consumidor de Productos Vegetales, que lejos de estabilizarse, está acelerando la promoción de una mejor salud, asociada a un menor impacto medio medioambiental, si se compara con la dieta actual de los países desarrollados.

Las Jornadas de la ValSe-Food Network y Chía-Link están organizadas conjuntamente por el Grupo de la Facultad de Ingeniería de la Universidad de Chile y el Grupo de Cereales del Instituto de Agroquímica y Tecnología de Alimentos del Consejo Superior de Investigaciones Científicas (IATA-CSIC). Entidades públicas y privadas patrocinan dichas Jornadas, como el Fondo de Fomento al Desarrollo Científico y Tecnológico, (FONDEF), la Universidad Central de Chile (UCEN), el Consejo Superior de Investigaciones Científicas (CSIC) y el Programa Iberoamericano de Ciencia y Tecnología para el Desarrollo (CYTED). A todos estos programas e instituciones les estamos muy agradecidos. También deseamos expresar nuestro agradecimiento a los autores de ambos lados del "charco" que con sus contribuciones hacen posible la celebración de estas Jornadas.

Es tiempo del consumo de nuevos Productos Vegetales ¿te apuntas?

Dr. Francisco Millán Rodriguez
Grupo Proteínas Vegetales
Instituto de la Grasa – CSIC

RESÚMENES

PRESENTACIONES ORALES

MEDICINAL USES AND ANCESTRAL NUTRACEUTICAL KNOWLEDGE OF QUINOA *(Chenopodium quinoa Willd.)* AND WILD RELATIVES IN THE PERUVIAN HIGHLANDS

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ABSTRACT

Quinoa is medicine and basic food of Andean man, due to the ideal balance of essential amino acids, other nutrients it contains, having nutraceutical, orthomolecular, anti-aging and medicinal qualities. The objective was to know and systematize the medicinal uses and ancestral nutraceutical knowledge of quinoa and its wild relatives in indigenous communities of the Peruvian highlands. The objective was to know and systematize the medicinal uses and ancestral nutraceutical knowledge of quinoa and its wild relatives in indigenous communities of the Peruvian highlands. The methodology used was the accompaniment and exchange of knowledge with bilateral information flow and ethnographic approach (continuous ethnobotanical-anthropological exploration, with bilateral and multilateral exchange of knowledge) in Andean communities, during fifteen agricultural campaigns (2005/2020), the medicinal uses given to quinoa and wild relatives (C.carnosolum, C.petiolare, C.hircinum, C.ambrosioides, C.insisum and C.quinoa subsp. melanospermum) by the Andean man are: for treatments of bone fracture, twists, dislocations, blows and having strong bones, avoids melancholy and sadness due to the lithium content, are galactogenic increasing the milk secretion of mothers, prevents cancer to the uterus and menopause problems by containing phytoestrogens (daidzein and kinesesteine), preventing osteoporosis, organic and functional alterations produced by the lack of estrogen, contributes to the cure of TBC by protein of high biological value, ideal balance of essential amino acids and high lysine, regulates cholesterol levels by the content of dietary fiber, unsaturated fatty acids and squalene (6% of the total weight of the grain is fiber), making its intake favor intestinal transit, contains antioxidants: betalains, betazhantines, it is a source of energy for muscles, brain and nervous system, because it contains Alanine, it has Glycine that acts as a tranquilizing neurotransmitter of the brain, regulating motor functions and proline, an amino acid participating in the repair of joints and to heal injuries; anemia, altitude sickness due to its Faith content; saponin prevents polyglobulia due to its hemolytic action; grains are used in rituality to counteract telluric diseases and as biological indicators. It is concluded that quinoa and wild relatives are used as food and medicine in peasant communities of the Peruvian highlands, in addition to maintaining ancestral knowledge about its use and preparation.

Keywords | *Ancestral knowledge, quinoa, nutraceutical uses, wild relatives.*

UNRAVELLING THE MOLECULAR MECHANISMS UNDERLYING CHANGES IN THE NUTRITIONAL PROPERTIES OF QUINOA SEEDS UNDER DIFFERENT ENVIRONMENTAL CONDITIONS

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ABSTRACT

Chenopodium quinoa Willd, commonly known as quinoa, belongs to the Amaranthaceae family native to the Andean region. It is characterized by its high biodiversity, for being a very nutritious food and by its outstanding resistance to abiotic stress conditions. The remarkable nutritional traits of quinoa seeds rely on the high protein content and protein quality, which is higher than that of cereal crops, the balance of amino acids, minerals, and the presence of polyphenols which are linked to a large antioxidant capacity. These features have resulted in the expansion of its cultivation worldwide. Besides, quinoa can tolerate stress, making it an ideal crop to be exploited and introduced in marginal environments. Thus, several studies in quinoa have taken place aiming at studying its adaptability to different environments but still, very little is known about how the environmental factors influence on the nutritional parameters. To shed light on this, our works have centred on investigating the physiological, biochemical and genetic pathways responsible for the changes observed in the nutritional properties of seeds that may depend on the environmental conditions and on the genetic background. We present here the main recent studies we have performed on quinoa under Mediterranean field environments and under controlled greenhouse conditions. We show that environmental conditions determine the nutritional and physiological characteristics of quinoa seeds, affecting seed quality. Furthermore, we identify which nutritional properties are more susceptible of fluctuating when changing the environmental conditions. Our results highlight the importance of selecting a specific cultivar(s) for a particular location due to the distinctive response linked to the climatological conditions.

Acknowledgments. This work was supported by the Ministerio de Ciencia e Innovación (MICINN, Spain) (PID2019-105748RA-I00), the Comunidad de Madrid (CM)-Universidad Autónoma de Madrid (UAM) (SI1/PJI/2019-00124), the CYTED (Val-Se-Food 119RT0567), the FPI UAM Fellowship Programme 2019 (to S. G. R.), the CM research assistant fellowship (to I. M. G.) and the Ramón y Cajal Programme 2019 (to M. R.).

AMARANTO: UN CULTIVO VERSÁTIL Y RESILIENTE AL CAMBIO CLIMÁTICO

AMARANTH: A VERSATILE CROP AND CLIMATE CHANGE RESILIENT

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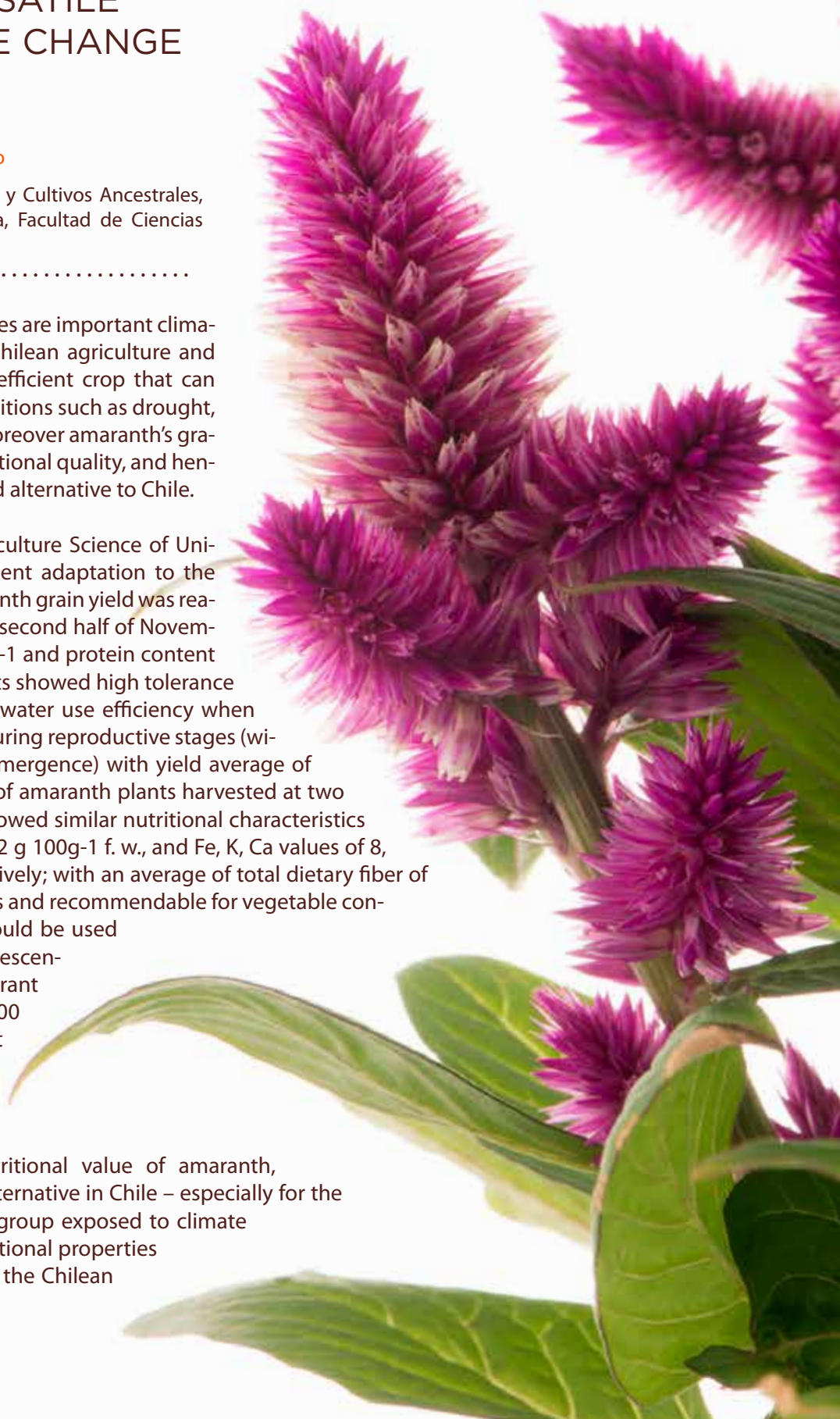

Water shortage and rising temperatures are important climate change consequences, affecting Chilean agriculture and food security. Amaranth is a highly efficient crop that can prosper in adverse agro-climatic conditions such as drought, high temperatures and saline soils. Moreover amaranth's grains, leaves and flowers have high nutritional quality, and hence this crop could be a promising food alternative to Chile.

Studies conducted at Faculty of Agriculture Science of Universidad de Chile, determined excellent adaptation to the crop in central Chile. The higher amaranth grain yield was reached when the crop was sown in the second half of November, with yield average of 3,500 kg ha-1 and protein content between 14 and 18%. The experiments showed high tolerance of amaranth to drought maximizing water use efficiency when plants have severe water restriction during reproductive stages (without irrigation since inflorescence emergence) with yield average of 1,9 kg grain m-3 water. Foliage yield of amaranth plants harvested at two different heights (15 cm or 30 cm) showed similar nutritional characteristics with protein values between 3 and 4.2 g 100g-1 f. w., and Fe, K, Ca values of 8, 724 and 758 mg 100 g-1 w. f., respectively; with an average of total dietary fiber of 10,200 g 100 g-1 f. w., highly nutritious and recommendable for vegetable consumption. Amaranth inflorescence could be used as a natural food coloring due to inflorescence contain betalains, the powder colorant contained between 76 and 199 mg 100 g-1 d.w. betalains and an antioxidant capacity of 17,300 EqTrolox 100 g-1 d.w.

Therefore, the exceptional adaptability to climate change and nutritional value of amaranth, made this crop a viable productive alternative in Chile – especially for the family farming, the most vulnerable group exposed to climate change-, as well as the excellent nutritional properties create a new healthy food option for the Chilean population.

CONVERSION OF THE CUL TIVE OF CHÍA (*SALVIA HISPANICA, L*) FROM CONVENTIONAL TO NATURAL

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ABSTRACT

Native to central Mexico and northern Guatemala.

The state of Jalisco, Mexico is the area with the highest production in the country (97%), along with the Mixtec Region of the state of Puebla (3%). Chia, is derived from the Nahua term chian or chien: "seed from which oil is obtained."
No adverse or allergenic effects have been found. Renewable resource.
Actions to be implemented for the conversion of chia cultivation from conventional to natural.
Reduction of machinery steps for soil preparation (reduced tillage).
Incorporation of harvest residues to recycle nutrients and crop rotation.
Use of compost and rock flour and agricultural lime.
Use of entomopathogenic fungi, biological control, and plant extracts to control pests and diseases.
Use of cultivators for weed control.
Application of Bioles (to complement the fertilization in foliar applications).
Genetic Improvement, generating more productive varieties.
Care and management of pollinating insects and beneficial animals.

A FEW AGRONOMIC MANAGEMENT CHANGES PRODUCED HIGHER GRAIN YIELDS OF CHICKPEA (*Cicer Arietinum L.*) GROWN IN CENTRAL CHILE

AJUSTES AGRONÓMICOS ACOTADOS ASOCIADOS A INCREMENTOS DE RENDIMIENTOS DE GRANO DE GARBANZO (*Cicer Arietinum L.*) PRODUCIDOS EN LA ZONAN CENTRAL DE CHILE)

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ABSTRACT

Chickpea is traditionally cultivated in the coastal drylands of Central Chile on
marginal soils and with a low technological level. The main objective of this study was to evaluate the impact on chickpea yields cultivated under field conditions of four varieties, two contrasting watering conditions (rain-fed versus irrigation treatments), and different fertilization treatments (urea, bio-stimulant, rhizobia, control) in two production seasons (2018-2019 and 2020-2021) in Central Chile. In the first season 2018-2019, four varieties and three fertilization strategies were assessed. The higher yield was obtained with the landrace "Local Navidad" Subsequently, in the second season (2020-2021), the effects of irrigation at the pod filling stage and N addition and rhizobia seed inoculation using "Local Navidad" were studied. The application of a water sheet of 45 mm at the beginning of flowering and the addition of 23 kg N ha-1 along with the inoculation with rhizobia attained 2.67 tons of grains being 24% higher than the control without N addition and seed inoculation. Our work highlights the positive effects of adopting specific technological changes, namely by choosing the proper variety, by implementing rhizobia seed inoculation and by incorporating one supplemental irrigation, which eventually will benefit small chickpea farmers in the coastal rainfed area of Central Chile.

PRODUCTION OF POROUS STARCH MICROPARTICLES AS A VEHICLE FOR CHIA OIL FOR POTENTIAL FOOD APPLICATIONS

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ABSTRACT

In the present work, corn starch was used for the production of porous microparticles by enzymatic treatments for its subsequent impregnation with chia oil. A predetermined amount of alpha-amylase (AM, 500 FAU/g), glucoamylase (GAM, 3300 U/g) and a mixture of both (AM/GAM) were evaluated, adding them to 5 g of starch and 25 mL of buffer at pH 6, 4 and 5.5 respectively. The treatments were carried out at 50 °C for 24 h with continuous agitation. Then, the mixture was centrifuged and washed twice with distilled water. The supernatant was discarded and the porous starch was dried at 45 °C for 24 h. The porous microparticles were characterized by the following determinations: water and oil adsorption capacity and SEM. With these results, the best starches were selected for the impregnation assays with chia oil under vacuum conditions. Therefore 2 g of starch were mixed with increasing percentages of oil (from 10 to 55 %), homogenized and submitted to vacuum (> 0.1 mm Hg) during 15 min. After impregnation, chia oil oxidative stability was determined by Rancimat method (impregnated starch: 0.5 g, temperature: 100 °C, air flow: 20 L/h). According to the characterization results, starches treated with AM/GAM were selected for impregnation tests due they presented elevated oil and water absorption capacities (2.46-2.63 and 2.01-2.22 g impregnated starch/g dry starch, respectively) and they showed through SEM a conserved granular structure and large amount and diversity of pores. The oxidation test demonstrated that the starch structure exerts a protective effect on impregnated chia oil oxidative stability.

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DEVELOPMENT OF JAMS WITH ANCESTRAL SEED AGGREGATES

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ABSTRACT

Small scale food producers have been negatively impacted by the present pandemic and have been forced to innovate with low risk products as a means to increase sales. The object was to determine variations in the nutrient profile of peach jam with the introduction of amaranth or quinoa seeds, the latter having been rinsed beforehand to reduce its saponin content. Three varieties of jam were made and these were subjected to a sensory evaluation by a panel of 30 untrained judges (consumers) and analyzed to determine the variation in their composition as a result of the addition of the seeds. To the basic preparation consisting of peaches and sugar (MB) 20% of quinoa seeds were added (MQ) at the bottling stage. To the third jam preparation amaranth seeds were added in the same proportion (MA). Official analytical techniques were used to determine their nutrient profile. The protein content increased from 0.23 g% (MB) to 2.52 g% (MQ) and 3.38 g% (MA). Total fat increased from 0.35 g% (MB) to 0.74 g% (MQ) and 1.72 g% (MA). Fibre increased from 2.13 g% (MB) to 4.24 g% (MQ) and 2.86 g% (MA). The incorporation of amaranth and quinoa improved the protein, fibre and total fat intake and resulted in a jam with a better nutrient profile, although there was only a slight reduction in carbohydrates, from 68 g% to 66 g%, after the seeds were added. Plum and apricot jam were also tested and in all instances the results were similar.

Acknowledgments. This work was supported by a grant from La Val-Se-Food-CYTED (119RT0567) and Universidad Juan Agustin Maza

Keywords | *quinoa, amaranth, jams, nutrient profile.*

PRESERVING AND DELIVERY SYSTEMS OF BIOACTIVES AND FUNCTIONAL COMPOUNDS OF CHIA SEED *(Salvia hispanica L.)*

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ABSTRACT

There is growing interest in the development of edible delivery systems to enrich, protect and release bioactive compounds within foods. Emulsion-based systems are a good strategy for this purpose. Considering that chia oil (high level of omega-3 fatty acids) is very susceptible to lipid oxidation, conventional and bilayer O/W emulsions were studied as a function of refrigerated storage.

Monolayer emulsions were stabilized with deoiled sunflower lecithin while, in the case of bilayer ones, chitosan was also added by applying the electrostatic deposition technique. Bilayer emulsions presented a monomodal droplet size distribution while a shoulder towards larger particle sizes appeared for the conventional systems. Some signs of destabilization by the creaming process were recorded for monolayer emulsions, instead of the high stability associated with the other ones. The presence of chitosan significantly affected the rheological characteristics of emulsions by increasing their viscosity and modifying their flow behavior. In terms of oxidative stability, bilayer emulsions recorded the lowest PV values during the refrigerated storage and represent a higher contribution as a protective system than other ones included the bulk oil. Thus, bilayer emulsions constituting a suitable option for the delivery of chia omega-3 and other PUFAs with potential application in the food industry.

Acknowledgments. This work was supported by grant Ia ValSe-Food-CYTED (119RT0567) Spain, Universidad Nacional de La Plata (UNLP) (11/X907), and the Agencia Nacional de Promoción Científica y Tecnológica (PICT 2016-0323), Argentina.

Keywords | *Chia by-products; Electrostatic layer-by-layer deposition; Modified sunflower lecithin; Mono and bilayer O/W emulsions; Omega-3 fatty acids*

Formulation of a drink based on quinoa and other vegetable protein sources, with good palatability

Authors → Federico G. Quattrocchio, Julieta A. Morales, Patricia Montoya, Agustín González; María G. Bordón; Marcela L. Martínez, Edgardo L. Calandri.

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ABSTRACT

Current preferences for healthy consumption involve foods that exclude those of animal origin, so vegetable drinks that mimic those of dairy origin are a growing need. In the present work a vegetable drink based on quinoa and chia, two well considered ancestral seeds nowadays, was developed. The target was a liquid food that contains the high-quality proteins and fatty acids from quinoa and chia, respectively. Therefore, the product main ingredients were quinoa flour and chia expeller. After a two-level screening test, quantities of 17.5 % and 2.5% of whole quinoa flour and chia expeller were selected, respectively. Both raw materials were dispersed in water, ground in a colloid mill and finally enzymatically treated. The effect on viscosity and sedimentation of the drink, due to concentration and time of application of three enzymes (fungal and thermostable α-amylases and a glucoamylase) was evaluated using a Box-Behnken response surface design with three levels. The statistical analysis showed that the fungal α amylase and glucoamylase did not exerted a significant effect on the two parameters evaluated; however the thermostable amylase did. The optimal formulation was obtained under the next conditions: 1.7% thermo amylase and 0.6% glucoamylase for 45 min at 60 ° C. The developed vegetable drink presented a viscosity similar to a commercial drinkable yogurt and negligible sedimentation, a mean particle size of 30.18 µm (ϕ: 1.4) and an average color (Cie Lab) L: 80.69, a: 1.87 and b: 10.83. The product presented the following composition. 16.2% carbohydrates, 2.90% proteins, 1.61% lipids and 0.97% ashes.

Acknowledgments. This research was financed with grants from CONICET and SeCyT-UNC from Argentina and the Iberoamerican Project IaValSe-Food-CYTED (119RT0567).

EFECTO DE LA GERMINACIÓN EN LAS CARACTERÍSTICAS FISICOQUÍMICAS Y NUTRICIONALES DE DOS ESPECIES DE AMARANTO

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ABSTRACT

La germinación es un proceso que incrementa el valor nutricional de las semillas Sin embargo, el impacto de diferentes especies aún no se ha considerado. Esta investigación evalúa los cambios fisicoquímicos y nutricionales de dos especies de amaranto (A. quitensis, especie negra y A. caudatus, especie blanca) después de la germinación. Se evaluaron las propiedades térmicas y reológicas y de hidratación. Además, también se evaluó la digestibilidad de almidón y proteínas, compuesto fenólico, la actividad antioxidante y la fibra dietética. Los resultados demostraron una reducción significativa (P <.05) en las propiedades viscoelásticas, el contenido de almidón total y resistente en A. quitensis, luego de ser sometido a 24 h de germinación en comparación con la A. caudatus. Estos resultados revelaron que durante la germinación la degradación enzimática del almidón es mayor en A. quitensis que en A. caudatus. Además, A. quitensis mostró un índice glucémico significativamente más bajo y una mayor digestibilidad de proteínas que A. caudatus (p <0,05). Los datos de este estudio demuestran el impacto de las especies en la aplicación de la germinación.

Acknowledgments. This work was supported by grant Ia ValSe-Food-CYTED (119RT0567)

PRECISION NUTRITION AND OMIC SCIENCES IN OBESITY

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ABSTRACT

Non-Communicable chronic diseases, including obesity, are major causes of morbidity and mortality in most countries with important public health costs. The adverse impacts of obesity and associated clinical complications on health remain a major burden due to the lack of long-lasting effective interventions for disease prevention and individualized management. Precision nutrition is an emerging therapeutic approach that considers an individual's genetic and epigenetic information, as well as age, gender, or own physiopathological status. Advances in genomic sciences are contributing to a better understanding of the role of genetic variants and epigenetic signatures as well as gene expression patterns in the development of diverse chronic conditions, and the mode they may modify therapeutic responses. This knowledge has led to the search for genetic and epigenetic biomarkers to predict the risk of developing chronic diseases and personalizing prevention and treatment.

Moreover, either targeted and untargeted metabolomic approaches are being used to identify new molecules and biological functions allowing dietary adherence monitoring and discovery of new targets and tools for personalized therapies involving non-communicable diseases Diverse evidence suggests that the gut microbiota is involved in the development of obesity and associated comorbidities. The composition of the gut microbiota differs in obese and lean subjects, suggesting that microbiota dysbiosis can be involved in changes in body weight. However, the mechanisms by which the gut microbiota participates in energy homeostasis are unclear. Gut microbiota can be modulated positively or negatively by different lifestyle and dietary factors. Interestingly, complex interactions between genetic background, gut microbiota, and diet have also been reported concerning the risk of developing obesity and metabolic syndrome features. Moreover, microbial metabolites from intestinal microbiota can induce biological modifications with potential implications for health status. Among novel approaches, prebiotics, probiotics, postbiotics, and fecal microbiome transplantation could be useful to restore gut dysbiosis and participate in health maintenance. The webinar presentation provides a few omic examples concerning the huge potential of understanding nutrigenetic, nutrigenomic, metabolomic and metagenomic roles in precision nutrition and body weight regulation. Although caution must be paid, these scientific insights are paving the way for the design of innovative personalized strategies for individualized metabolic control and therapy implementation of somechronic diseases accompanying obesity.

PHYSICOCHEMICAL PROPERTIES OF *Moringa Oleifera* LEAVES GROWN IN VALENCIAN COMMUNITY (SPAIN)

Authors → Ortolá M.D., Castelló M.L., Etchevers M.C., García-Mares F.J., Soriano D.

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ABSTRACT

Moringa oleifera is a foliated tree widely cultivated in tropical latitudes, which is highly adaptable to climatic conditions and dry soils. Every part of the plant, from the leaves to the roots, has nutritional, therapeutic or industrial benefits. This is due to its content in phytochemicals such as glucosinolates, phenolic compounds, alkaloids, terpenoids and tannins, high values of crude protein, carbohydrates, starch and lipids. In addition, the use of the leaves has increased considerably by the agro-food and biochemical industries, since they are a valuable source of dietary proteins and essential amino acids.

This work aimed to characterize three types of leaf from Moringa oleifera seeds with different origins (Thai (C1), Ghanaian (C2) and Hindu (C3)), grown in the same plot, but with different cultural practices (intended for leaf production (C1 and C2) or sheath production (C3). For this, the water content and optical properties were determined in the fresh leaves. Later the leaves were dried (50ºC for 8 hours) and pulverized analyzing their water content, antioxidant capacity, color and amino acid content.

No significant differences were observed in fresh leaves in terms of humidity and color. In dry powder, a higher antioxidant capacity was registered in moringa type C2, with a % DPPH inhibition of 83.7%, although in all cases it exceeded 60%, showing the high persistence of antioxidants after the drying. Serine, glutamic acid and alanine were the major amino acids with values of 373±78, 301±51 and 248±9 mg / 100 g of powder, respectively, without influencing the applied field treatment or origin.

Keywords | *Moringa oleifera, color, texture, antioxidant capacity, amino acid content*

OIL CHARACTERIZATION AND SEEDS COMPOSITION OF SICANA ODORIFERA, AN ANCESTRAL CUCURBITA FROM PARAGUAY

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ABSTRACT

The Sicana odorifera seeds, an ancestral cucurbita growing in Paraguay, are important biowaste after fruit pulp use, however, there are reports of its infusions can reduce and cure the symptoms of viral diseases such as hepatitis, denoting its medicinal properties. The recovery of nutrients and bioactive molecules from the bio-residues has potential uses in the industrial sector with high added value as functional food ingredients. In S. odorifera species, although it is not a fruit for mass consumption, it is precisely the lack of a market for its biowaste that has limited its integral use. Based on this, the centesimal composition, oil characterization and fatty acids profile of the kurugua seeds from two accessions; atropurpurea (black) and reddish was studied. Kurugua seeds have been subjected to a cold extraction with a hydraulic press, from dried whole seeds, ISO and AOCS standard methods were used for analytical determinations. The major components in the centesimal composition of kurugua seeds were lipids (greater than 34%), dietary fiber (greater than 34%), and proteins (greater than 17%). The oils presented iodine, saponification and refractive indices characteristic of preferentially polyunsaturated oils. The major component in the fatty acid profile was linolenic acid (greater than 32%), an important essential fatty acid in the diet. Although the characteristics of kurugua oil, demonstrate its potential application in the food industry as a polyunsaturated oil, source of essential fatty acids, future studies on stability and sensory analysis for food applications are suggested, with great possibilities on the Food Safety framework.

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ANDEAN ANCIENT GRAINS: NUTRITIONAL VALUE AND NOVEL USES

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ABSTRACT

Quinoa, kañiwa, kiwicha and tarwi are ancient native crops from the Andes highlands of South America. Due to their remarkably high nutritional value, they offer major promise as ingredients in various food products. The aims of this study were to determine the nutritional value of certain varieties of quinoa, kañiwa, kiwicha and tarwi and to use these grains to develop novel, nutritious prototypes of products such as a malted beverage, extruded porridge, gluten-free bread and culinary dishes. Proximate, mineral and phenolic compound content were evaluated in Andean grains and final products. Two gluten-free breads were prepared, one made with quinoa and another made with kañiwa. Kañiwa bread could be prepared without addition of starch, resulting in a bread with high protein and dietary fiber content. An instant porridge prototype for child nutrition was developed. It had a protein content of 16% and it therefore could be considered as a source of protein. The protein had a high in vitro digestibility (96.3%) and chemical score was 0.92. The malted beverage prepared with quinoa and kiwicha had a protein content of 7.7% which represents a value of 1.5 to 2 times more protein than dairy milk. The quinoa-amaranth beverage developed in this study is an excellent locally-grown alternative to the commercially available plant-based beverages usually made with soy, almond or oat, all of which are imported to Peru. Quinoa, kañiwa, kiwicha and tarwi are innovative, nutritious and tasty alternatives for restaurants seeking new ingredients for their recipes.

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SOME STRATEGIES TO EXTENDING THE USE OF MALANGA

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ABSTRACT

The use of Colocasia esculenta (L.) Schott and Xanthosoma sagittifolium (L.) Schott as a raw material in form of starch or flour is a nutritious and sustainable alternative to wheat and other grains. This alternative allows farmers to minimize losses after harvest and guarantee food safety since its nutritional, digestive and healthy properties are recognized by the scientific community. Nevertheless, there is still scarce information about these rhizomes that limit their application. This work illuminates the functional and technological characterization of the starches obtained from corms and cormels of Xanthosoma sagittifolium (L.) Schott. Likewise, the effect of the combination of enzymes, hydrocolloids, potato starch, pre-gelatinized flour on Colocasia esculenta (L.) Schott cormels flour toward the development of a gluten-free bread was technologically evaluated.

Furthermore, the technological and digestive properties of a basic formula for pastes developed from cormels flour of Xanthosoma sagittifolium (L.) Schott and Colocasia esculenta (L.) Schott was evaluated.

It was shown that there are significant differences between the starch of corms and cormels of the same species. It was concluded that the flour from Colocasia esculenta (L.) Schott cormels is a good option to increase the nutritional value of gluten-free breads. Among the strategies tested, the bread made from mixtures with potato starch was the least desirable, but all strategies tested gave breads with lower glycemic index than gluten-free counterparts reported in other studies. For the first time, this works recommends the use of cormels flour from malanga to develop pastes to nutritional value to gluten-free products.

Acknowledgments. This work was supported by grant Ia ValSe-Food-CYTED (119RT0567), the Spanish Ministry of Science, Innovation and Universities (RTI2018-095919-B-C21), and the European Regional Development Fund and Generalitat Valenciana (Project Prometeo 2017/189).

A PHOSPHOLIPID-ENRICHED CHIA OIL WITH POTENTIAL HEALTH BENEFITS

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ABSTRACT

In addition to triacylglycerols (TAGs), chia oil has a minor lipid fraction of phospholipids (PL) whose amphiphilic character and excellent biocompatibility make them suitable for numerous applications with technological and nutritional importance and potential health benefits. Their isolation entails certain difficulties, so we evaluated the efficiency of the extraction of these compounds by means of a sequential process involving the combination of two environmentally friendly techniques, supercritical fluid extraction (SFE) and pressurized liquid extraction (PLE). As a result, two fractions with markedly different compositions were obtained. An oil rich in PUFAs (including most of the TAGs) was extracted during the first stage using pure SC-CO2. On the other hand, the re-extraction by PLE (using food grade ethanol) of the chia cake, previously defatted by SFE (second step), allowed to obtain an oil extract highly enriched in PLs, whose content exceeded 16% and which still retained considerable amounts of omega-3 fatty acids. Moreover, up to 5 different individual PL species were observed in this extract (traces of PC, PE, PI, PS, PA and even sphingolipids (SLs), In addition, the large variety of individual PL species identified in PLE oil makes it interesting as a potential ingredient for multiple purposes in both the pharmaceutical and food industries. However, it should be noted the importance of controlling the extraction parameters to limit the presence of phospholipase D activity (PLD), and thus, avoid the formation of phosphatidic acid (PA).

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CHIA SEED OIL INTAKE: IS IT BENEFICIAL FOR PREVENTING CARDIOVASCULAR RISK FACTORS?

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ABSTRACT

Cold pressed chia seed oils (ChO) are known for health-promoting characteristics due to the high content of omega-3 α-linolenic acid (ω-3 ALA). We investigated the influence of ChO supplementation as functional food on animal models of cardiovascular risk factors: hypercholesterolemia and metabolic syndrome (MS). Dietary intervention with ChO (equivalent to 4.8 g ALA per day) was found to improve the vascular dysfunction and mitigate the rise in plasma triglyceride (TG) levels under hypercholesterolemic conditions. However, impaired glucose tolerance was found in control ChO treated animals. In order to verify whether the effects of chia seed are the same as that of ChO, we replaced the ChO for an equivalent amount of seed. Glucose intolerance was found once again. For this reason, we carried out a new study in which the ChO intake was reduced to 3 g ALA per day, and no alterations were observed in such conditions. Thus, dietary intervention with ChO equivalent to 3 g ALA intake per day was choose to analyze the effects on the alterations that characterize the high fat diet induced-MS. ChO supplementation lowered ω-6 / ω-3 ratio, TG, blood pressure and improved endothelial function. Nevertheless, ChO worsened the high fat diet deleterious effects on visceral abdominal fat, fasting glucose and glucose tolerance. Our results support the view that dietary guidelines for treating patients with hypercholesterolemia or MS must be carefully planned, in such a way that the incorporation of ChO into the diet should be controlled and nutritional background considered.

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EVALUATION OF FUNCTIONAL AND NUTRITIONAL PROPERTIES OF HYDROLYZED BROAD BEAN AND QUINOA FLOURS

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ABSTRACT

In sports nutrition, protein intake is essential to stimulate protein synthesis and repair muscle damage caused by exercise. The search for non-traditional protein sources has increased in recent years. Due to their properties, quinoa (Chenopodium quinoa Wild.) and broad beans (Vicia faba L.) grains could be used in the production of protein products. Broad beans are an introduced and widely expanded crop in South America; it is part of the Argentine Northwest Andean population diet. The aim of this work was to evaluate the functional and nutritional properties of hydrolyzed quinoa (HQF) and broad bean (HBF) flours for their use in the elaboration of protein foods for athletes. Both hydrolyzed flours were obtained using Flavourzyme at 50°C and pH 8 for 3 and 1 hour, respectively. HQF presented a higher degree of hydrolysis (21.79%) while HBF had higher protein content (57.31%), yield (32.14%), and protein recovery (71.31%). In HBF and HQF, Na and K were the most abundant minerals, both necessary for the replacement of electrolytes lost during physical training. HBF and HQF presented 5909.63 and 2708.91 mg/100g of contents branched amino acids respectively, essential in sports nutrition. Regarding technological properties, HQF presented higher emulsifying activity, stability indexes, and foaming capacity (61.30 m2/g and 158.6 min, 131%) respectively while the range of solubility in function of pH of HBF was wider and showed good foaming stability (68-92%). These results indicate that HQF and HBF could be a new source of dietary protein for food product manufacture, as well as a potential ingredient for athletes protein supplements formulation.

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SALVIA HISPANICA: PRO-HEALTH ALTERNATIVE FOR THE MANAGEMENT OF CHRONIC DISEASE

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ABSTRACT

Chronic non-communicable diseases (NCDs) are the main cause of mortality in Mexico and the world since they are attributable to such up to 70% of deaths per year, thus representing a challenge in Public Health. The World Health Organization (WHO) establishes that the main types of NCDs are: cardiovascular diseases, cancer, chronic respiratory diseases and diabetes mellitus. Nutritional and pharmacological treatment is essential for the management of the disease. In this context, the side effects and high costs of pharmacological treatment have led health efforts in the search for dietary alternatives, such as functional foods and nutraceuticals for health and social well-being. Therefore, this conference aims to present scientific evidence of the potential of S. hispanica for the management of chronic disease. Thus, based on scientific evidence, said seed is proposed as an adjunct in the planning of strategies for the prevention and treatment of the disease, as it is suggested as a functional food and a source of potential nutraceuticals, such as biopeptides. S. hispanica is a promising resource not only for its functionality but also as a source of biopeptides and therefore of new functional ingredients aimed at the prevention and treatment of chronic metabolic diseases.

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DEVELOPMENT OF FUNCTIONAL GUMMIES WITH MICROCAPSULES OF SACHA INCHI *(Plukenetia Huayllabambana)* OIL

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ABSTRACT

Sacha inchi (P. huayllabambana) oil was co-microencapsulated by spray drying with gum arabic and antioxidant extracts of skin fruits by UMAE. Two functional gummies were formulated with a high content of ω-3, total phenolic content and other properties.

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BACK TO THE FUTURE: PART-PROTEINS

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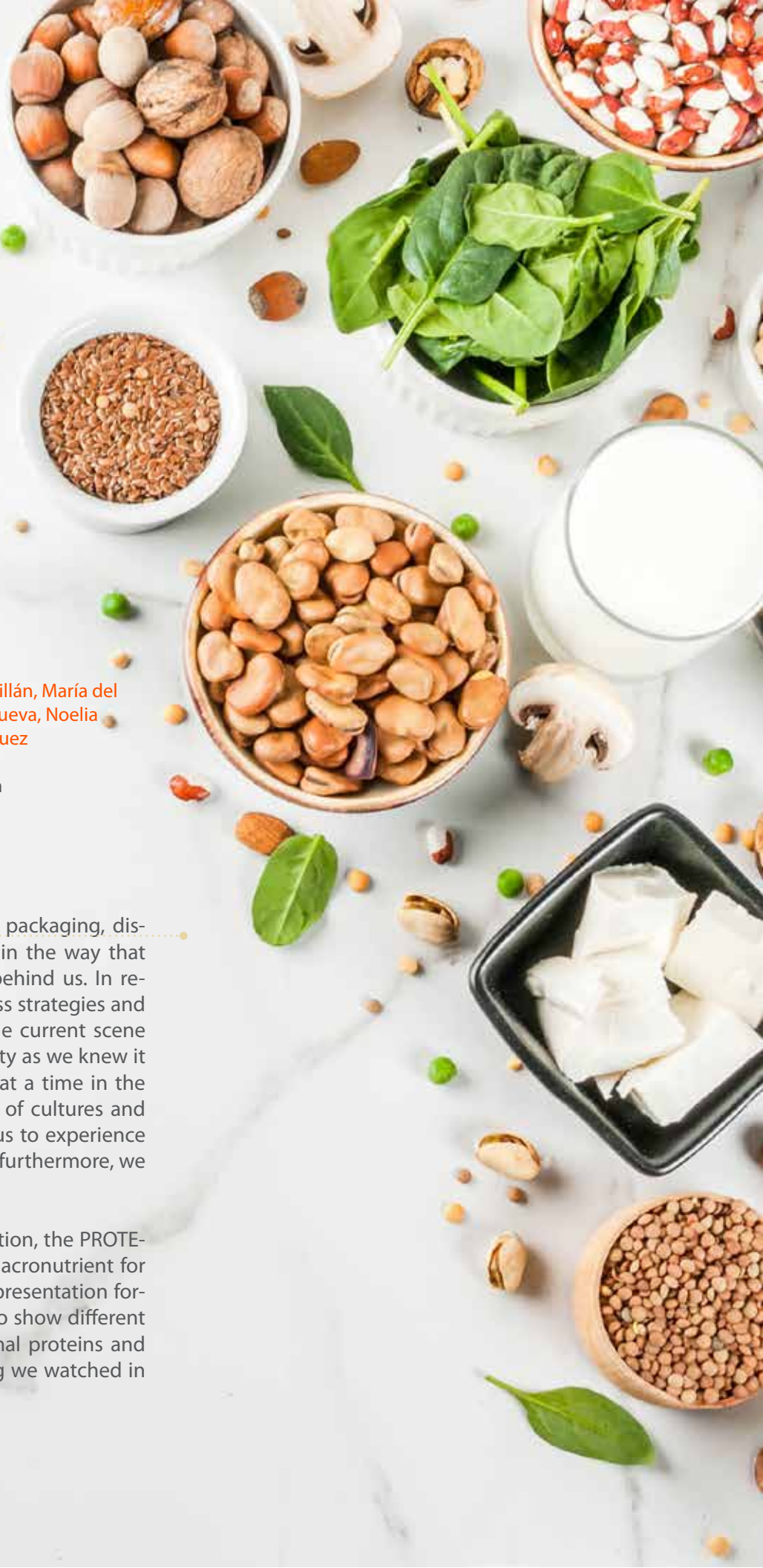

ABSTRACT

How the world has been transforming, packaging, distributing, selling and eating the foods in the way that we know for the past five decades is behind us. In recent years, new consumers, new business strategies and global challenges have appeared on the current scene that has changed dramatically our society as we knew it and the way we decide to eat. We are at a time in the history of humanity where the mixture of cultures and the current state of technology allows us to experience and know each food on this planet and, furthermore, we want it immediately available.

Within this new changing stage of nutrition, the PROTEINS that we consume, as an essential macronutrient for life, are and must change their current presentation format. During this speech, we are going to show different alternative resources of protein to animal proteins and how we are getting closer to everything we watched in science fiction movies.

It's protein time, you sign up?

Chenopodium Quinoa TO MODULATE INNATE MYELOID CELLS IN THE INDUCTION OF OBESITY

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ABSTRACT

Research efforts have shown that Chenopodium quinoa seeds constitute a good source of immunonutritional bioactives such as serine-type protease inhibitors (SETIs). The latter have been shown able to ameliorate the innate immune alterations and metabolic effects derived from a high fat diet (HFD) in hyperglycaemic and obesogenic mice models. Cells of both the innate and adaptive immune system residing in adipose tissues, as well as in the intestine, participate in this process by coordinating interactions between host genes that regulate metabolism. Various metabolic syndromes, including type 2 diabetes, which arise from complex interactions between genetic and environmental factors, are associated with obesity. HFD-induced activation of the innate immune 'Toll-like' receptor (TLR)-4/MyD88 pathway inhibits myeloid cells (i.e., macrophage) proliferation, leading to greater infiltration of those into hepatic and adipose tissue to mediate chronic 'sterile' inflammation. Conversely, intestinal epithelial TLR4 prevents metabolic syndrome. Over the past decade, there has been an improvement in the understanding of the genetic pathogenesis of obesity and associated metabolic syndromes; however, only moderate advances other than calorie intake have been attained in food design. Here, it is shown that using C. quinoa flour for immunonutritional improvement of bread formulation preserves small intestine and hepatic innate immunity to prevent HFD-induced insulin resistance. Immunonutritional TLR4 activation was important for this process. Indeed, obesogenic mice administered with C. quinoa-based bread displayed normalized insulin production and abolished insulin resistance, together with countered myeloid proliferation.

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INNOVACIÓN ALIMENTARIA SOSTENIBLE Y CIRCULAR - LA EXPERIENCIA DE CeTA

FOOD INNOVATION SUSTAINABLE AND CIRCULAR - THE EXPERIENCE OF CeTA

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ABSTRACT

Worldwide, around a third of losses and wastes are generated in different stages of food transformation chain, generating relevant economic, social and environmental impacts, and increases in the water footprint, emission of greenhouse gases, pressure on the use of arable land, production costs, and decrease in the availability of food for the population. These reasosns make imperative the implementation of strategies that minimize the generation of these losses. The Centro Tecnológico para la Innovación Alimentaria (CeTA), aware of this problem, is contributing to the development of innovative products where materials that are considered wastes or by-products from processes in the food, agriculture, cattle raising and aquaculture industry are reused; or raw materials that do not meet with commercial standards, taking advantage of their properties and bioactive compounds, turning them into value propositions that have circular economy components: examples of these products developed in CeTA include soups, preserves, snacks, baked products, food ingredients and breakfast cereals where are being valued raw materials such as grape pomace, barley bagasse, defatted coconut flour, discarded meats, quinoa grown in lagging areas of Chile; as well as stems, leaves, and fruit and vegetable peels, thus generating an environmental, economic, and social impact.

OBLIGATIONS OF USERS OF GENETIC RESOURCES: THE CONVENTION OF BIOLOGICAL DIVERSITY (CBD) AND THE INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE *(ITPGRFA)*

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ABSTRACT

As stated in the Convention on Biological Diversity (CBD), the States have the sovereign rights to exploit their own natural resources and may regulate access to genetic resources, including the procedure to apply for and grant the Prior Informed Consent (PIC) as well as the conditions on which this access and the subsequent utilization of genetic resources are granted (Mutually Agreed Terms, MAT).

The Nagoya Protocol (NP) is a supplementary agreement to the CBD aiming to create greater legal certainty, as it establishes a set of conditions to be considered for Parties regulating access to their genetic resources, as well as the necessary provisions for all Parties concerning Compliance, ensuring the fair and equitable sharing of benefits arising from the utilization of genetic resources. In parallel, the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) regulate the Access and Benefit Sharing mechanisms that apply specifically to genetic resources for food and agriculture. Users of plant genetic resources shall therefore understand the relationship between these instruments and the legal framework governing them, in order to fulfil their obligations when accessing and utilizing such resources. The Microbial Resource Research Infrastructure (MIRRI) is the pan-European distributed Research Infrastructure for the preservation, systematic investigation, provision and valorisation of microbial resources and biodiversity. MIRRI will launch soon a forum to exchange knowledge in different issues, including those related with the compliant use of genetic resources, aiming at raising awareness and help the scientific community on these topics.

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RESÚMENES

PRESENTACIONES PÓSTER

THE EFFECTS OF STORAGE CONDITIONS ON THE PRESERVATION OF THE NUTRITIONAL PROPERTIES OF QUINOA SEEDS

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ABSTRACT

Chenopodium quinoa Willd. (quinoa) is an underutilized crop that has gained worldwide recognition in the last few decades due to the remarkable nutritional properties of its seeds (1). A proper storage of quinoa seeds is important to ensure preservation till the following cultivation season and to allow the distribution of seeds to different cultivation areas. Furthermore, the preservation of quinoa seeds might affect their nutritional properties which might end up impacting diets. Storage conditions (considering temperature and relative humidity as environmental factors) have been reported to impact seed viability (2, 3). However, limited research has been performed analyzing their impact on the nutritional quality of quinoa seeds over time. To evaluate this, in the present study we have stored two quinoa cultivars´ seeds (Duquesa and F16) at five different temperatures (-20ºC, 4ºC, 12ºC, 25ºC, and 37ºC), controlling the environmental relative humidity, and we have tested the effects at different storage times. Besides evaluating seed viability and germinative potential of the seeds, we have characterized different nutritional-related traits including the antioxidant capacity or the protein content. We observed changes in the seed nutritional characteristics over time which were both genotype- and temperature-dependent. For instance, we found that the protein content increased at low and moderate storage temperatures in both cultivars, but not at 37ºC. Here, we present the main results of the analysis performed, and we discuss the importance of proper seed conservation for quinoa to ensure the preservation of the nutritional properties of the seeds.

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ANALYSIS OF THE PHYSIOLOGICAL RESPONSES TO WATER STRESS OF DIFFERENT CULTIVARS OF *Chenopodium Quinoa* AND ITS IMPACT ON PRODUCTIVITY AND SEED NUTRITIONAL QUALITY

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ABSTRACT

Chenopodium quinoa Willd (quinoa) has gained popularity in the last decade, therefore achieving a fast-global expansion. This crop is intended to be one of the main nutrient sources ensuring food security worldwide due to its excellent nutritional and agronomical properties (>) together with the excellent adaptation to a wide diversity of agroclimatic conditions and stresses, including drought (2). In this study, four quinoa cultivars (F14, F15, F16 and Titicaca) were grown under controlled conditions (greenhouse) and were subjected to two different treatments, control (with normal levels of irrigation), and water stress (with decreased water supply). Different physiological measurements were taken throughout plant growth and development, such as plant height or stem width, photosynthetic activity, membrane integrity, stomatal conductance and other physiological and morphological parameters. Besides, seed quality-related traits were also evaluated. The results here presented show the differential response to water stress of the four varieties analysed as well as the differences presented in seed-quality related traits (including the antioxidant level) among them. The variations observed in the parameters studied associated with the genotype (G), the environment (E) and its interaction (GXE) will be discussed.

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EFFECT OF CHIA FLOUR AND MODIFIED SUNFLOWER LECITHIN ON DOUGH RHEOLOGY OF WHEAT

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ABSTRACT

Chia seeds (Salvia hispanica L.) is especially recognized as a healthy functional food ingredient. On the other side, sunflower lecithin is an anti-staling agent used in bread formulas to improve dough handling and the product's overall quality. Farinograph tests are used to predict the functional properties and quality of flour. In the present study, the effect of the addition of chia flour (5 and 10% wt/wt) and modified sunflower lecithin (0.50, 0.75,1.00% wt/wt) to wheat flour on the hydration and viscoelastic properties of dough was investigated. Farinograph rheological properties such as water absorption (WA), dough development time (DDT), dough stability (DS), and mixing tolerance index (MTI), were used to evaluate the effects of the added ingredients on mixing properties. Results revealed that the incorporation of chia in wheat flour increased significantly ($p \leq 0.05$) the WA and DDT of dough as a function of the level of substitution, which could be attributed to the increase of dietary fiber content. Increasing the chia flour level, the DS value decreased significantly ($p < 0.05$). Chia flour substituted doughs presented significantly ($p < 0.05$) higher MTI than control wheat doughs, while the differences in MTI at both substitution levels were non-significant ($p > 0.05$). The changes in DS and MTI due to presence of chia flour in the wheat flour may be attributed to the dilution of gluten forming proteins causing weakening of the dough. On the other hand, the different levels of modified sunflower lecithin added to the flour blends did not produce significant differences ($p > 0.05$) on the parameters studied.

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Keywords | *Chia flour, modified sunflower lecithin, dough rheology*

CHIA O/W EMULSIONS WITH CHIA HYDROLYSATES AND MUCILAGE

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ABSTRACT

Chia seed has ~33% of oil rich in essential omega-3 polyunsaturated fatty acids as their main by-product. Chia mucilage (CM) and proteins with high biological and nutritional values can be recovered from the wastes of industrial oil extraction. Different chia proteins hydrolysates (CPH) were obtained through enzymatic treatments with pepsin, pancreatin, or the sequential action of pepsin-pancreatin using a chia protein concentrate (CP) as starting material. CM was also obtained and characterized. Then, chia oil-in-water emulsions stabilized either with CPC or the CPHs were prepared at pH 7 or 10 in the presence or absence of CM. The three type of CPH studied recorded better emulsifying properties than CPC. At both pH assayed, systems with the CPHs led to droplets with smaller sizes and more negatively charged than those with CPC. This fact could be due to the higher solubility and surface hydrophobicity of CPH than the CPC. In terms of pH, emulsions recorded creaming and coalescence destabilization at neutral pH while at pH 10 were more stable. The CM addition increased emulsions apparent viscosity and changed their fluid behaviours, improving thus their global stability by slowing down the oil droplets movement. From these results, CPHs proved to be potential emulsifying agents while CM exhibited interesting role as a thickening agent. Both CPHs and CM chia by-products, could be considered high-added value ingredients and potentially included in functional foods development.

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Keywords | *Chia protein hydrolysates, mucilage, O/W emulsions*

CHIA OIL MICROCAPSULES OBTAINED BY DIFFERENT DRYING METHODS

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ABSTRACT

Microencapsulation is a technology used to protect chia oil from lipid oxidation during processing and storage. Thus, microcapsules containing chia oil could be applied as an ingredient to develop enriched foods with ω-3 fatty acids. The objective of this technique is to achieve high microencapsulation efficiency and provide greater oxidative stability to the core. This work compares microcapsules obtained by different methods like spray-drying and freeze-drying. To establish relationships between the microencapsulated chia oil using both methodologies and some of the characterization parameters studied, a multivariate analysis was carried out considering the microcapsules obtained from the parental emulsions with 10 or 15% w/w of chia oil, 10% w/w of lactose, and 10% w/w of sodium caseinate, whose aqueous phases were or not heat-treated at 60 or 100 °C, 30 min. The results show that the main components 1 (CP1) and 2 (CP2) explain 46.7 and 38.1% of the observed variability, respectively, totaling around 85%. The CP1 allowed to separate the microcapsules obtained by spray-drying from the freeze-drying ones, while the CP2 was permitted to discriminate within the chia oil microencapsulated by freeze-drying, the systems whose aqueous phases were treated or not at 100 ° C, 30 min from the rest of the microcapsules.

The multivariate analysis made it possible to differentiate the microcapsules obtained by spray-drying and the freeze-drying ones. The former being associated with greater luminosity and microencapsulation efficiency, as well as a lower level of moisture content, water activity, and b* (blue-yellow component of the CIELab system) values.

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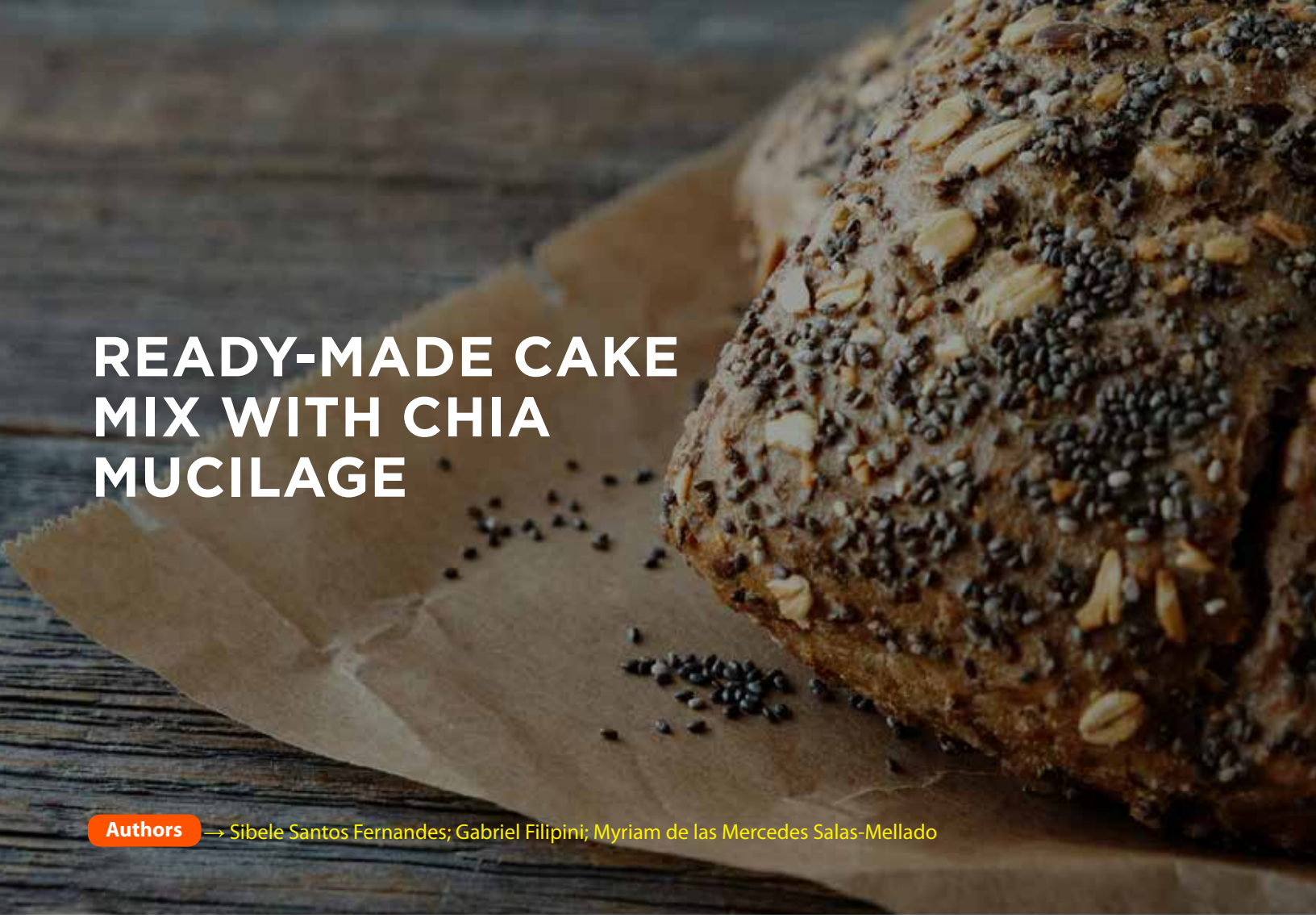
Keywords | *Chia oil, Freeze-dryer, Microcapsules, Spray-dryer*



READY-MADE CAKE MIX WITH CHIA MUCILAGE

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ABSTRACT

The modern and busy life of the present-day drives industries to develop products that are easier to prepare and that are nutritionally favorable. In this sense, one of the products that is highly used is pre-ready cake mixes, which during its preparation still needs the addition of other ingredients. Therefore, the aim of this study was to develop a ready-made cake mix with added chia mucilage. The ready-made mix was developed with wheat flour, sugar, powder milk, dehydrated whole egg, baking powder, and dry chia mucilage. Besides, these formulations were compared with a commercial cake mix through proximal composition and technological and physical characteristics. Due not the necessary addition of others ingredients, the ready-made cake mix developed with chia mucilage was easier and faster to prepare than the other formulations. The formulations of the new mix had a lower lipid content than the commercial one, with emphasis on the pre-ready mix added with chia mucilage which showed a 60.4% reduction in the lipid content about the same pre-ready mix but added with margarine. Besides, this formulation showed cakes with higher protein content, and higher carbohydrate content since chia mucilage is mainly composed of fibers. Although the ready-made cake mix new was firmer than the others, the total score was acceptable. Thus, the cake mix produced showed improved nutritional properties, in addition to being very easy to prepare.

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HEMPSEED PEPTIDES EXERT NEUROPROTECTIVE EFFECT IN MICROGLIAL CELLS VIA NLRP3

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ABSTRACT

An inflammatory response triggered by a stimulus and prolonged over time can lead to the development of neurodegenerative diseases such as Parkinson's disease, Alzheimer's disease, and multiple sclerosis. Industrial hemp (Cannabis sativa L.) seeds can be consumed whole or peeled, as can the products obtained from them: oil, flour, and protein isolates. They are known for their potential use as a source of nutrients, fiber, and bioactive compounds, demonstrating an important role in human health. In the present study, the LPS-induced neuroinflammation model was used in murine BV-2 microglial cells that were subsequently treated with 100 µg/mL of hemp protein hydrolysates (HPH) obtained via enzymatic hydrolysis with the Alcalase and Flavourzyme enzymes, to evaluate the bioactive properties of hemp peptides regarding inflammatory and oxidative stress mediators (TNFα, IL-1β, IL-6, and IL-10), microglial polarization markers (CCR7, iNOS, ARG-1, and YM-1), and genes related to inflammasome activation (NLRP3, ASC, CASP-1, and IL-18). Our results show that HPHs (H20A and H60A + 15F) present potential neuroprotective activity in microglial cells via the inflammasome.

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NUTRITIONAL CONTRIBUTION OF AN UNDERVALUED ANCESTRAL CUCURBITA, STUDY OF *Sicana spp*. ENDOCARP, EPICARP AND SEEDS COMPOSITION

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ABSTRACT

The Sicana spp fruits, known in Paraguay as "kurugua", native to South America, it belongs to the Cucurbit family and is almost extinct in the region. The aims were to determine the physicochemical characters, composition and antioxidants on "kurugua" reddish peel color. The determinations were made by official and regional standardized methodologies on fresh weight (FW). The pulp has an alkaline pH (7.41 ± 0.11), its main component is carbohydrates (9.44 ± 0.45 g. 100 g-1), followed by dietary fiber (1.74 ± 0, 04 g. 100 g-1), as minor proteins (0.53 ± 0.05 g. 100g-1) and lipids (0.08 ± 0.01 g. 100g-1). On the evaluated antioxidants compounds, they were higher in peel than in pulp as; total phenols (279.2 ± 12.1, 55.7 ± 10.3 mg of GAE.100g-1), Vitamin C (9.67 ± 0.09, 7.84 ± 1.71 mg 100g-1) and beta-carotene (0.37 ± 0.03, 0.19 ± 0.01 mg 100g-1), respectively. Fresh seeds have a high moisture content (38.8%), dietary fiber (40.2%) and lipids (11.74%), they mineral composition showed a high content of K, Mg and Ca and a high content of micronutrients such as Cu, Mn, Fe and Zn, which can represent a great contribution to the daily requirements of the diet. The red kurugua fruits are a natural source of nutritious and bioactive compounds beneficial to health, with multiple potential applications in foodstuff, which should be promoted in healthy dietary guidelines for the benefit of the populations.

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NUTRACEUTICAL POTENTIAL OF PEPTIDES FROM ANCIENT AND COMMERCIAL CHIA SEEDS

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ABSTRACT

Salvia genus has around 900 species and belongs to the Plantae Kingdom, and Lamiaceae family. Chia (Salvia hispanica L.) is an annual herb that can grow up to 1 m tall and has leaves with small white or purple flowers, and oval black, gray, and black spotted to white color seeds. Chia is native to central Mexico up to northern Guatemala and began to be used as food in 3,500 BC. Aztecs, Mayas, and Incas (1,500 – 900 BC) used it as medicine, food, painting, and energetic; Aztecs used it as tribute and as offering to gods. In 2009, chia was approved as novel food by the European Parliament and the European Council. Nowadays, chia has shown several health benefits, i.e., antihypertensive, antioxidant and antidiabetic potential, between others.

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DEVELOPMENT OF A LATIN AMERICAN NATIVE FOOD COMPOSITION DATABASE

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ABSTRACT

Food composition data have a fundamental function in studies on nutrition, health, and agriculture, among others. Many factors affect the nutrient content of food, for this reason, it is essential to have updated and reliable data on the composition of the main foods consumed. The objective of this work was to develop a Food Composition Database (FCDB) that compiles the composition of native foods of Latin American, mainly grains/seeds, tubers and derivatives. An interdisciplinary work-group of compilers was formed. A search of various sources was carried out (scientific publications, laboratory or technical reports, theses), and 80 total publications were collected. For compilation, a form composed of eight worksheets was prepared. The Initial sheet contains general data and food identification; the remaining ones contain information on the proximal composition, amino acids, fatty acids, vitamins and minerals. Each section has an evaluation of data quality, which determines whether it will be included in the FCDB or not. After an exhaustive analysis based on compliance with the minimum requirements previously established, 52 publications and laboratories reports were selected. The main reason for rejection was the lack of the moisture information (50%), followed by low data quality (30%). Information is available on the composition of at least 7 grains and derived products (i.e.: quinoa, amaranth, kañiwa); 18 tubers and roots (Andean potatoes and ocas), which are currently being uploaded to the website (http://insibio.org.ar) for user availability. This database will provide information on the composition of regional foods generated and compiled using international standards.

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GLUTEN-FREE BREADMAKING WITH EXTRUDED WHOLE-GRAIN FLOURS ANDEAN CORN

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ABSTRACT

Andean corn can be safely used in gluten-free breads formulation. Extrusion is a technology capable of promoting changes in the techno-functional properties of gluten-free flours, modifying their breadmaking properties. The objective was to evaluate the effect of extrusion on the physical and physicochemical properties of whole-grain flours Andean corn (bolita variety), and to determine the relationship between the changes on the textural properties of gluten-free doughs and breads with the addition of extruded flours. The whole-grain corn flours ware extruded in a single screw extruder. The humidity, temperature and screw speed were varied through an incomplete orthogonal design. The degree of expansion of extruded products, the total soluble sugars and the degree of gelatinization of the flours varied mainly with humidity and temperature extrusion. Flours with high, medium and low degree of gelatinization treatments were added at 20 % to native flours to make gluten-free doughs and breads. The doughs made with the addition of extruded flours increased their firmness and adhesiveness in relation to the control made only with native flour. Breads made with extruded flours generally increased their hardness, gumminess, chewiness and cohesiveness Springiness increased only under conditions of high and low degree of gelatinization. The dough made with the extruded flour at the extruded condition of 100 ° C-25% H-120rpm, with the lowest degree of gelatinization, were the least firm and adhesive, which could lead to better dough machinability. Also, the bread made with this flour presented high cohesiveness and springiness.

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BASIL SEED BY-PRODUCTS AS NEW SOURCE OF FUNCTIONAL INGREDIENTS

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ABSTRACT

Basil (Ocimum basilicum L.) is an annual spicy herb, cultivated worldwide due to their different uses in food, pharmaceutical and cosmetic industries. The principal products obtained from basil are essential oils that has powerful antioxidant capacity. On the other hand, basil seeds are less known as food, but have been present in countries such as Iran, India, and Turkey for many centuries. These seeds have a variety of nutritional profiles depending on the land where they are grown, but in general basil seed has a range of oil content of 9.7-33 g/100g of seeds, which is mainly polyunsaturated; high protein content ranged from 10-22.5 g/100g of seeds and high levels of dietetic fibre (26.2 g/100g of seeds). In this work the whole flour obtained from defatted basil seed pellets, was characterized from nutritional and functional point of view. These flours have interesting characteristics such as a high amount of dietary fiber that gives a greater absorption capacity for water and oil; proteins with a good amino acid profile (with all essential amino acids, except S-containing types and tryptophan) and lipids which contain high amounts of polyunsaturated fatty acids (0.3-66 % of alfa linolenic acid, 12-85.6 % of linoleic acid and 8.5-13.3 % of oleic acid). This new raw material could be used in many food preparations, such as gluten-free bakery products, pasta and others food products improving their functional and nutritional properties.

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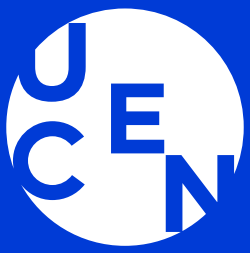

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