

Sensory evaluation of a wheat flour biscuit (*Triticum aestivum*), added with cuajilote flour (*Parmentiera edulis*).

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Compound wheat flours are an alternative to improve the functional or nutritional profile of bakery and biscuit products. [1] In this work, wheat cookies added with cuajilote (*Parmentiera edulis*) flour were made to generate a proposal for use. The influence of cuajilote flour and the amount of sugar were evaluated by 2 untrained panel members using an ordering test as to 3 sensory parameters (overall appearance, sweetness and texture). 8 formulations were evaluated including 2 controls. 4 formulations contain 50, 35, 20 and 0% of cuajilote flour over the total flour with 10 g of sugar and the other 4 formulations contain the same percentages with an amount of 20 g of sugar. The 2 controls refer to the formulations with 0% cuajilote flour. The results were treated in a frequency table in Excel Microsoft Office®16. It was found that the addition of cuajilote at 50% was not very pleasant in all the attributes evaluated. In the general appearance, the best evaluated formulation was the one with 20% cuajilote and 20 g of sugar, even above the controls. For sweetness, the control with 20 g of sugar had a higher acceptance followed by the formulations with 20 % cuajilote with 10 and 20 g of sugar, respectively. Finally, in terms of texture, the formulation with 20% cuajilote and 10 g of sugar was the most accepted, followed by the control with 20 g of sugar and by the formulation with 35% cuajilote and 10 g of sugar. The formulations with 20% cuajilote seem to be well accepted, the amount of sugar has an influence on the texture, but it does not seem to have a greater effect on the sweetness and the general appearance. The use of cuajilote in flours composed of wheat represents an alternative for this undervalued native fruit.

Keywords: *Parmentiera edulis, biscuits, compound flours, sensory evaluation.*

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Effects of COVID-19 on sensory and cognitive perception of mild and severe diagnosed and recovered patients versus healthy consumers

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The objective of this research was to analyze the effects of the SARS-CoV-2 virus on the sensory and cognitive perception of mild and severe COVID-19 diagnosed and recovered consumers versus healthy consumers. Three groups of 50 consumers each (healthy versus mild and severe COVID-19 diagnosed with 30 days after recovery) were used for the evaluation of coffee stimuli in concentrations: 4.40, 2.93, 2.20, 1.76 and 1.47% w/v and determine their discriminating power, emotions, and memories. Sensory tests were performed remotely. The results indicated that consumers with mild and severe COVID-19 diagnosis discriminated five sensory attributes (smell, basic tastes, and flavor) while healthy consumers discriminated two sensory attributes (basic tastes). Consumers with mild and severe COVID-19 diagnosis elicited the highest number of emotions ($p < 0.05$) and negative memories such as bored, disgusted, worried, guilty, wild, aggressive, disease, pain, death, hurt, obesity, conflict personal, addiction, stench poverty and accident [1].

Keywords: *COVID-19, Consumers, discrimination, emotion, heat maps, memories.*

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Sensory evaluation of a soud cake added with mojú flour (*Brosimum alicastrum*)

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In the present work, a pound cake was elaborated with wheat flour and mojú seed flour (*Brosimum alicastrum*) with the aim of generating a proposal for the use of the fruit and to obtain a bakery product with a better nutritional profile than the conventional one, thanks to the nutritional characteristics of the mojú [1]. Three different formulations and a control were elaborated (50%, 25% 15% and 0% of mojú flour with respect to the total flour used in the formulation). The sensory evaluation applied was of an affective type through a hedonic test, where a five-point scale was used and the responses of thirty-six untrained judges were measured to seven sensory attributes that were: color, general appearance, quality of the crumb, aroma, flavor, fluffiness and hardness. After sensory evaluation, bread with a 15% formulation with mojú flour is equally accepted as control bread. Of all the formulations with mojú, the most accepted was 15%, while the attributes best evaluated in these formulations were: aroma, general appearance, flavor, fluffiness, and those with the least acceptance were color, crumb quality and hardness. The use of mojú to reduce the proportions of wheat flour in the preparation of breads is viable in quantities that are around 15% so as not to alter the sensory qualities of these products. The use of mojú flours in this and other wheat flour-based products can favor their nutritional profiles, promote sustainability, contribute to food security and reduce costs in their preparation since unconventional flours of endemic fruits are not affected by the inflationary effects of basic grains such as wheat. [2]

Keywords: *Brosimum alicastrum, unconventional flours, pound cake, sensory evaluation.*

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Effect of temperature on water activity, color properties and carotenoid content of Krill oil microcapsules produced by spray drying

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Krill oil (KO) is extracted from a small crustacean (*Euphausia superba*) that can be found in the Antarctic Ocean [1], lately it has been gaining attention due its fatty acids profile and antioxidants which together promote health benefits to humans [2]. Raw KO undergoes detrimental reactions due the environment conditions, one way to overcome them is through microencapsulation. The aim of this work was to evaluate the effect of drying temperature on water activity, color properties and total carotenoid content in KO microcapsules produced by spray drying. Water in oil emulsions with a ratio of KO/arabic gum of 1:4 (w/w) were prepared and then spray dried using inlet and outlet air temperatures of 180/160 and 90/80 °C. In all different KO microcapsules water activity was around 0.1 which indicates a good product stability, in a similar work an a_w of 0.26 was reported for microcapsules of fish oil mixed with carotenoids and produced by spray drying [3]. CIELab values were homogeneous and close to 80, 9 and 15 for L, a^* and b^* respectively, similar parameters were reported for shrimp waste byproduct microcapsules produced by freeze drying [4]. Total carotenoid content was between 13 and 17 $\mu\text{g/g}$ in the different treatments. KO microcapsules can be produced by spray drying using arabic gum as wall material and the particles can be used for further food applications specially in water-based food products.

Keywords: *Krill oil, Microencapsulation, Spray Drying, Carotenoids*

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Obtention of menthol and luteolin powders using Spray-Drying for the formulation of instant aromatic beverages

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Aromatic plants represent about 0.7% of all medicinal plants. The most common are spearmint (main active ingredient: menthol) and chamomile (main active ingredient: flavonoids such as luteolin), which are usually consumed in "tea bags" to make infusions or herbal teas [1]. However, the use of these bags means that their preparation time is relatively long, waste is generated and there is a high probability of ingesting microplastics and nanoplastics [2]. In this study, powders that encapsulate menthol and luteolin were obtained as instant aromatic beverages with the potential to replace the conventional preparation of these beverages. Encapsulation was carried out by feeding an infusion of spearmint and chamomile into a Spray Dryer (180°C-4 mL/min). This infusion was composed of 83% aqueous phase (75% water + 8% herbs in equal parts) and 17% dissolved solids (wall material in a 2:1 ratio). A factorial experimental design was carried out to evaluate the effect of the wall material on the morphology (circularity and Feret diameter) and texture properties of the powders using micrographs obtained by scanning electron microscopy (SEM) and image analysis. Four formulations were evaluated: maltodextrin (MD) + sodium caseinate (CS) at 10% (w/w) (F1), MD + soy protein (PS) at 10% (w/w) (F2), MD + CS at 15% (w/w) (F3) and MD + PS at 15% (w/w) (F4). The moisture, solubility, bulk density, and bioavailability of menthol in the powders were determined. Results showed that F1 and F2 were the formulations with higher circularity, lower moisture, adequate solubility and the best texture image properties. Results suggest the potential of these powders not only as an easy-to-consume and eco-friendly instant aromatic beverage, but also as a functional one.

Keywords: *Encapsulation, SEM, Image Analysis, Controlled Release.*

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A modified version of the sensory pivot® technique as a tool for the analysis of food adulteration: case of coffee

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The objective of this study was to validate the Pivot® sensory technique for sensory analysis of adulterated coffees. The Pivot® technique was modified (instructions and determination of the values of the unadulterated sample considered Pivot). A total of 130 consumers evaluated five pairs of samples (Pivot vs five coffee samples adulterated with black bean coffee). A sensory vocabulary was generated for the construction of confidence ellipses and the calculation of sample classification percentage and the values for Mahalanobis Distance (MD) between the pivot sample and the adulterated samples. A total of 52 sensory attributes were generated (28 aromas, five basic tastes and 19 flavors). As adulteration increased, a decrease in the number of aromas, high discrimination, a classification percentage of 68% and MD were found in a range of 6.01 and 7.62, between the pivot sample and the adulterated samples. The Pivot® technique can be a tool to study the effect of adulteration in coffees [1,2].

Keywords: *Pivot profile, adulteration, Sensory adulteration map*

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Development of hamburgers made of extruded legumes and pseudocereal

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At present time, the consumer is looking for products that are accessible and healthy. Legumes contain high levels of protein, fiber, vitamins and minerals [1]. Likewise, pseudocereals improve the quality of the protein [2]. Therefore, the aim of this work was the development of high protein hamburgers. Firstly, a survey was applied to 187 consumers (16-78 years-old) to know the consumer favorite color and flavor. A mixture design experiment was performed with a proportion of 10-70% (3-legume, 1-pseudocereal) to obtain fifty hamburgers (named as F1-F15), which were extruded in a Vorwerk-Thermomix®. Moisture, thickness, weight, pH and color were measured for raw and cooked hamburgers, as well as TPA. The consumer preferred flavor and color of legume (yellow brown) instead of meat. Raw hamburgers characteristics were thickness, 10 - 20 cm, weight, 81 to 108 g. F1 and F2 gave the minimum moisture value, 24% while F4, F8, F10, F14 had 60%. These formulations had >30% and 10% of amaranth, respectively. The pH was 5.9 for F3 and 6.8 for the others. L value was 36 for F8 and F10, they had >40% chickpea, and 57 for the others. F3, F4, F5, F6 presented a value of 2.1 since they had <20% of lentil whereas the other formulations had 3.1. The b value was 12.6 for 8, 10, 11 and 15 with >30% of lentil while the others had 17.1. Also, cooked hamburgers had 23 to 49% moisture, 60 to 90% of weight. F14 hardness was 743 g as it had the same proportion of legumes and <15% of amaranth. All the hamburgers were less chewy, F2 had the maximum value (0.20), it had 70% of amaranth. Cooked loss was 46% for F12, it had 70% of lentil. A sensory analysis will be performed to select the favorite cooked hamburger.

Keywords: *extrusion, hamburgers, legumes, amaranth*

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Characterization and Functionality of Hot-Press Wheat Tortillas Produced with Soybean Oil-Based Oleogels Structured with Candelilla Wax, Monoglycerides And Hardfat

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Nowadays, consumer rejection to products containing trans and high contents of saturated fatty acids is driving the food industry to look for alternatives to meet consumer demands. One alternative is the use of oleogels based on oil structuring technology. The present research focuses on the use of an array of oleogels based on soybean oil structured with candelilla wax, monoglycerides and palm hard fat as a substitute of partially hydrogenated plastic shortenings commonly used to manufacture wheat flour tortillas. To achieve the objectives, an experimental Central Composite Rotatable Design was devised in which hot-press wheat tortillas were produced in a pilot plant with 17 oleogel combinations and compared to counterparts produced with shortening or soybean oil. Tortillas were assessed in terms of moisture, diameter, thickness, one dimensional extension rupture force, and cold and reheated rollability at days 0 and 8. An additional optimized oleogel was produced as a result of the response surface methodology and employed for comparison with shortening or soybean oil in terms of dough rheology and sensory evaluations of tortillas with an untrained panel. Tortillas produced with oleogels were practically free of trans fatty acids and contained between 57 to 66% less saturated fatty acids compared to the ones produced with shortening. From the functionality viewpoint, several experimental oleogels and the optimized oleogel performed better than vegetable shortening especially in terms of tortilla texture indicators such as extension rupture force and rollability. Results herein clearly indicate that oleogels structured with candelilla wax, monoglycerides and hard fat can substitute commercial shortenings without detrimental effects on quality of wheat flour tortillas.

Keywords: *candelilla wax, hard fat, monoglycerides, oleogels, soybean oil, trans fatty acids.*

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Physicochemical and sensory characterization of prehispanic Corn-Cocoa Based Beverages Traditionally Consumed in Mexico

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Mexico has a wide tradition in the consumption of corn and cocoa-based beverages, this is inherited from the pre-Hispanic cultures that prepared drinks for celebration and religion. These drinks are very diverse, and they have a great sensory richness, due to the use of regional ingredients such as: spices, flowers, other grains, and legumes. Likewise, also due to processes such as nixtamalization, toasting, boiling, or fermentation. These drinks are mainly consumed in the southern states of Mexico such as; Guerrero, Oaxaca, Chiapas, Tabasco [1]. There are few published data on the bromatological composition and aromatic profile of these beverages. This study aimed to characterize the components of five traditional Mexican beverages (tascalate, pozol, chilate, cacahuatole and tejate). The proximal composition was analyzed according to the AOAC methods. The profile of volatile compounds was analyzed using gas chromatography-mass spectrophotometry (GC-MS) analysis. The volatile compound profiles of the traditional Mexican beverages studied were compared by Venn diagram, correspondence, and cluster analysis. As a result, 301 different compounds were detected and identified, these compounds mainly related to desirable aromatic notes generated by esters, aldehydes, ketones, and alcohols. Among the most abundant compounds found in all the samples were alpha-pinene, lauric acid, eugenol, 2-Propen-1-ol, 3-phenyl, pelargonic acid, ethanol, linalool, acetophenone, benzene acetaldehyde, and benzaldehyde. The relationship between components and volatile compounds was established. This study shows the complexity of five traditionally consumed Mexican beverages analyzed.

Keywords: *cocoa, corn, traditional beverages, prehispanic beverages.*

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Sensory evaluation in coffee bean fermented

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The coffee is the most beverage consumed in the world and depends on components such as altitude to have changes in the generation of biochemical compounds even in the same species [1,2]. During its process, fermentation involved the action of factors such as microorganisms, which due to their metabolism have an influence on roasted coffee, generating unique sensory characteristics of coffee in the cup [3]. have been found 36 volatile compounds in roasted coffee such as pyrazines, alcohols, ketones and furans influenced by microorganisms within the fermentation, improving the quality of the coffee [2]. Cherry coffee was produced and harvested at an altitude of approximately 1350 masl, it was Fermentation was carried out with coffee beans at five times, 0, 12, 18, 24 and 36 hours, and samples were obtained in each period. They were dried at room temperature, roasted and ground. A sensory evaluation was carried out according to the cupping standards [4] with a panel of Q-Grader tasters, to evaluate the attributes of flavor, acidity, body, uniformity, sweetness, defects, among others, and thus determine the intervention of the same. There were changes from 12 hours, however, the most notable changes in the score occurred between 24 and 36 hours, where significant differences were shown. The initial total score was 82.5 with notes of honey, fresh fruit, tangerine, walnuts and hazelnuts, losing 2 points at 24 hours, with fruity, walnut, chocolate and hazelnut notes, returning to 2 points at 36 hours with citrus notes, fruity, orange, walnut and chocolate. It is considered a specialty coffee when it exceeds 80 points [3]. It was shown that one of the influences on the change in cup score and its acceptance was grain moisture and density. The change in flavors show that fermentation is a determining factor in sensory evaluation.

Keywords: *sensory evaluation, coffee beans, cup, flavors.*

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Formulation and development of a high protein Greek yogurt with immuno-protective ingredients using response surface design

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The most heard recommendation during the COVID-19 pandemic is that defenses of immune system must be kept high thanks to the nutrients in the diet [1]. Therefore, the development of functional foods that provide benefits beyond nutrition and an immunoprotective effect is required [2]. The objective was to formulate and develop a Greek yogurth with high protein content and immunoprotective ingredients using a surface design response. The physicochemical guidelines of the NOM-181-SCFI/SAGARPA-2018 were consulted for the development of a Greek yogurth base. The MiniTab19 software was used to establish the "Box-Behnken" response surface design, the concentration ranges were from 0.1 to 1% for complex B, 0.5 to 2.5% for inulin and 0.1 to 1.5% for vitamin C. A total of 15 formulas were obtained and the response variables were the sensory attributes of taste, smell, color, and texture. For sensory evaluation, a panel of 50 untrained judges and a 9-point hedonic scale were used. The results of the sensory evaluation were analyzed with MiniTab19 and the different mathematical models were tested to optimize the Greek yogurth formula. The flavor attribute was significant with a complete cubic model with adjustment $R^2=0.9788$, which allowed optimizing a formula which consisted of 0.65% complex B, 1.1% inulin and 0.55% vitamin C. In conclusion, in this work the response surface methodology was used to develop a Greek yogurth formula with immunoprotective ingredients, which represents an alternative to protect the defenses of the immune system.

Keywords: *yogurth, formulation, immunonutrition, surface response, vitamins.*

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Effect of extrusion conditions on the physicochemical and techno-functional properties of amaranth flours

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Amaranth is one of the crops that has great potential to act as alternative food grain in most parts of the world. Among the main seed processing technologies is extrusion, which offers a platform for obtaining different products from various food groups by modifying the ingredients and operating conditions. Physicochemical (PC) and techno-functional (TF) properties of extruded foods play an important part for their acceptability. Thus far, there are no reports that widely indicate the consequences that the extrusion conditions bring to the final composition and the PC and TF properties of the flours [1]. Therefore, in this investigation, the speed of the screw was changed to obtain different mechanical shear rates at different temperatures, to study the effect they have on the PC and TF properties of amaranth flours. A central composite rotatable experimental design of the response surface methodology was used. The PC and TF properties of each of the obtained flours (13 treatments) were evaluated. Appropriate and reproducible mathematical regression models ($R^2 > 0.80$, $CV < 10\%$, $p < 0.05$, and lack of fit test > 0.1) were obtained for the response variables studied as a function of the extrusion variables. Using the PC/TF properties predicted with the regression models as criteria possible food applications (such as pasta, bread, pastries, atole, baby food, tortillas) of the amaranth flours were proposed. Thus, the results of this research demonstrate that the extrusion conditions determinate the final characteristics of the flours and represent an important starting point to take full advantage of the functionality of extruded amaranth flours.

Keywords: *Amaranthus hypochondriacus, Pseudocereal, Thermomechanical processing, Food product development.*

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Mini-cake with tamarind seed flour, a tamarind pulp filled with and chocolate covered, development and sensory evaluation

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Around 12,000 tons of tamarind seed are generated annually in Mexico [1]. This is a highly valuable by-product due to its nutritional components such as crude protein (13.1%), crude fiber (6.71%) and crude fat (4.82%). Despite its phytic acid content, this is eliminated when the seed is processed to obtain flour [2]. Data reported by the National Chamber of the Baking Industry indicate that the annual per capita consumption of bread in Mexico is 33.5 kg, [3]. The objective of this project was to develop and evaluate a mini-cake with tamarind seed flour and tamarind pulp filling covered with semi-bitter chocolate. Two formulations (MPVA10 and MPN2A1) were developed, both composed of the same bread base formulated; they differ in the composition of the filling. MPVA10's filled has natural tamarind pulp and sugar, and MPN2A1's filled was made with tamarind pulp and salt. Minicake was baked, cooled and filled; and then covered with chocolate. The characteristics of the sensory attributes, its acceptance and preference were evaluated by sensory analysis. In both formulations, the attribute with the highest acceptance was color and appearance (%); however, the flavor attribute was the most preferred in the MPN2A1 sample compared to the MPVA10 sample. Given the acceptance and characterization of the attributes of the cupcake, it is inferred that this is a good alternative to give value to tamarind seed flour by incorporating it into a popular and highly consumed product in Mexico. Preference in the MPN2A1 sample than in the MPVA10. From the characterization of the attributes, it can be inferred that tamarind seed is a by-product that is well accepted and highly valued.

Keywords: *Tamarind seed and flour, mini-cake, Sensory evaluation.*

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Effect of the addition of unconventional flours and salt on the mechanical properties of restructured fish

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In recent years, interest in food technologies that transform fish and vegetable proteins into various food products has increased [1]. Restructured seafood products are processed primarily from undervalued fish species, fillet trimmings, or by-products from non-commercial fish species [2]. The objective of this study was to evaluate the effect of adding amaranth or cricket flour (5 % and 10 %) and the percentage of salt (NaCl: 0 %, 1 % and 2 %) on the mechanical properties of restructured *Albula vulpes* fish. Samples were analyzed using a texturometer to get the texture profile analysis (TPA). Average hardness values showed significant variations ($P \leq 0.05$) between the different treatments. The highest hardness values were in the treatments of 5% amaranth flour with 1% salt and 10% cricket flour with 2% salt, with values of 64.55 N and 63.50 N, respectively. The cohesiveness showed values from 0.53 to 0.71 in the treatments with 1 % and 2 % salt, which shows that its internal structure was not affected. Elasticity values of *Albula vulpes* fish restructured products were not significantly affected ($P = NS$) by the addition of amaranth or cricket flour. At 1% salt, chewiness values increased as the percentage of cricket and amaranth flours increased. The addition of salt allowed to increase the mechanical properties of the restructured. Likewise, the percentage of non-conventional flours allowed to obtain pastes that induced the formation of gels with adequate textural properties for a food product. The addition of non-conventional flours and low percentages of salt for the elaboration of restructured fish products offers an alternative for the production of healthy, suitable for processing and marketing restructured fish products.

Keywords: Restructured fish products, Gelling, Amaranth, Cricket.

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Development and evaluation of a totopo based on nixtamalized corn flour, coconut and chia

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The consumption of corn tortillas in Mexico provides the population with 38.8% of protein, 45.2% of calories and 49.15% of the calcium of the RDI. Nixtamalization increases the availability of most amino acids, and therefore tortilla chips are made, either, directly with tortillas or with dough [1]. Chia seed is 30% oil, of which 64% is Omega-3, providing an adequate concentration that helps heart and brain and combat oxidative stress [2]. Coconut pulp is high in fat and calories, moderate in carbs and protein, coconut oil may boost HDL cholesterol and reduce LDL cholesterol. Objective. Develop and evaluate a totopo of corn, coconut and chia. Methods. Three formulations were developed with corn, coconut and chia seed flour, using the mixture of chia seed, lemon and chili as a variable. For each formulation a dough was created, laminated, cut and baked. Physicochemical, microbiological and sensory analyzes were carried out on all formulations. Results. The most widely accepted totopo shows a color with red-orange pigmentation, a spicy flavor with acid and sweet notes, a crunchy texture, it provides 205 kcal/100 g, moisture 4.36%, protein 11.54%, etheral extract 10.20%, dietary fiber 11.15%. The microbiological results comply with the specifications of the NOM-187-SSA1/SCFI-2002. Conclusion. It was possible to obtain a product that complies with Mexican regulations, a process that allows its safe production, provides low caloric intake compared to similar products found on the market and is a proposal for a versatile food with high nutritional value.

Keywords: *Totopo, nixtamalized corn, coconut, chia*

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Curcuminoids content, oxidative stability, and sensory acceptance in a snack-type product made with banana slices added with curcuminoids

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Banana is the most cultivated tropical fruit in Mexico and the fourth most important [1]. On the other hand, *Curcuma longa* L. is a plant rich in compounds with powerful antioxidant activity [2]. Curcuminoids content, color, oxidative stability, and sensory acceptance were evaluated in a snack-type product made with banana slices added with curcuminoids. The slices were immersed for 1, 3, 5, 7, and 9 minutes, in ethanolic extracts of turmeric with 1, 3, and 5 mg of curcuminoids per mL; drained, fried, and analyzed. Curcuminoids content was determined by UV-Vis spectrophotometry. Color changes were analyzed by estimating L* a* and b* coordinates. Sensory evaluation was carried out through a hedonic test. TBARS analysis was used to evaluate the oxidative stability in the stored product. Increases in the immersion time and concentration of curcuminoids in the extracts generated a higher content of curcuminoids, a decrease in luminosity, and a more intense yellow color in the product. The maximum content of curcuminoids (310.22 mg/g) was reached in products immersed in extracts of 5 mg/mL. The oxidative stability in the stored product was better when the extracts of 1 mg/mL were used. In the color attribute, a significantly higher level of liking was observed in the product treated with the ethanolic extracts of curcuminoids, compared to a control treatment. This coincides with other authors who used curcuminoids in different foods [3,4]. In conclusion, the immersion of banana slices in ethanolic extracts of turmeric before to frying favors the curcuminoids content, the oxidative stability, and the general acceptance in the snack-type product.

Keywords: *Banana, Curcuminoids, oxidative stability, Snack-type product.*

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Starch addition of pomegranate jam to increase its yield

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The jam is a food product obtained by cooking and concentrating the clean juice and healthy pulp with the appropriate maturity level. A problem with pomegranate jam is the low yield because the pulp in the arils is lower than other fruits, and another problem is the seeds then; the producers only use the juice. Therefore, this research aimed to determine the effect of the addition of potato starch on the yield and physicochemical characteristics of pomegranate jam, with pectin of high and low methoxyl levels. The starch concentrations were 0, 3, 5, and 8 %. Was evaluated the pH and °Brix of the juice were according to the NMX-F-131-1982 [1]. The pomegranate jam presented aW of 0.83, °Brix was from 62.0 to 64.5; this parameter is within the CODEX STAN 296-2009 [2], the average yield was 73.04%, having some losses in the evaporation of the juice; the samples of low methoxyl presented a greater acidity level, the color was affected in the luminosity by the addition of starch, especially in the parameters of L and a*. A sensorial analysis was carried out using a 5-point hedonic test with untrained judges and two variables, one with white bread and another one offering only jam. The results showed that the combination of bread and jam gained major acceptability among the untrained judges; meanwhile, the pure jam was only acceptable in correspondence with the control itself. In conclusion, a jam with a concentration of starch at 3% and low methoxyl level pectin was the treatment with better physicochemical conditions and acceptability, and the yield increased by 7%.

Keywords: pomegranate, juice, starch, pectin, methoxyl.

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Physicochemical characterization of malanga starch (*Colocasia esculenta*) obtained from a fourth quality agro-residue

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Edible coatings and films are an environmentally friendly preservation alternative to improve and prolong food quality during pre-and post-harvest handling. Among the main materials used in films are hydrocolloids, polysaccharides, proteins and lipids, which form edible coatings that can be obtained from agro-residues, such as tubers rich in native and modified starch, being the main polysaccharide and energy source [1]. The malanga variety that is cultivated in the state of Veracruz is (*Colocasia esculenta*), 25% of the production does not meet the requirements for its commercialization and is being used to generate value-added by-products. Obtain fourth-quality malanga starch giving an added value to this agro-residue. The process for obtaining starch was based on what was proposed by [2] determination of physicochemical properties by the methods: Moisture (AOAC. 923.03), Ash (AOAC. 925.10), Protein (AOAC. 990.03), Amylose and Amylopectin was determined by the spectrophotometric method proposed by [3] and functional properties of gelatinization temperature and viscosity [4]. Obtaining a yield of 284 ± 52 g per kilogram of fresh malanga rhizome of fourth quality, in the characterization the following were obtained: % Moisture (13.61 ± 0.02), % Protein (1.7 ± 0.01), Ash % (0.25 ± 0.03), Amylose % (23), Amylopectin % (77), the gelatinization temperature was $65^{\circ}\text{C} - 68^{\circ}\text{C}$ and had a viscosity of 1170 ± 2 Cp. A yield of 28.4% of native starch obtained from the fourth quality taro was obtained with high elasticity and thickening property, as well as a gelling agent capable of being used in the application of edible coatings and films.

Keywords: *Agro-residue, Malanga, Starch, Edible.*

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Development of honey-based beverage fermented by *Lactiplantibacillus plantarum* 299v

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Honey and fructophilic lactic acid bacteria are considered as promising candidates for food production or use as food ingredients [1]. The present study uses *L. plantarum* 299v to ferment a honey-based beverage for eight hours at 30 °C. The percentage of honey concentration was established (10, 15 and 20% of honey) according to a sensory evaluation of 5-point Likert scale [2], obtaining that 15 and 20% of honey were the most desired respectively. The bacterial growth rate, measured with optical density and acidification rate, measured by pH and titratable acidity (TA) of the all concentrations (10, 15 and 20% of honey) of honey-based beverage were then determined when the strain was activated in MRS broth (without adaptation) and when it was activated in the beverage with 15% of honey (with adaptation) [3]. It was observed that the fermentation process is faster when the strain is adapted to honey. The results of the growth rates, pH, and TA for non-adapted bacteria were 0.00516 h⁻¹, final pH of 5.7 and 3.5 g lactic acid per liter of final TA with 15% honey and 0.00512 h⁻¹, final pH of 5.7 and 2.7 g lactic acid per liter of final TA with 20% honey. The results for bacteria with adaptation were 0.01906 h⁻¹, final pH of 5.3 and 4.0 g lactic acid per liter of final TA with 15% honey and 0.018283 h⁻¹, final pH of 5.4 and 4.2 g lactic acid per liter of final TA with 20% honey. The results obtained could be used as a reference to elaborate an alternative probiotic drink through lactic acid fermentation of non-dairy origin.

Keywords: innovation, food preservation, biotechnology, potentially probiotic.

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Physicochemical stability and sensory acceptance properties of a hydrolyzed plant-based milk of oat and chickpea as affected by addition of gum

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In the last decade there has been a notable increase in the consumption of plant-based milks. Despite this, there are not many beverages made with blends of grains. The effects of the addition of xanthan and gellan gums (0.01, 0.025 y 0.05 %) and combinations of oat and chickpea milks pre-hydrolyzed (40:60, 50:50, 65:35, 80:20 and 90:10) on their physicochemical and sensory properties were assessed. Gum dose of 0.01% had an acceptable viscosity in all formulations with values between 15.23 y 17.8. Formulations with higher proportions of chickpea milk had more protein and ash compared to those with more oat milk content. Major proportion of oat milk reduced the physicochemical stability values corresponding to sedimentation rate (1.8974 ± 0.095 g/mL) and turbidity (0.585 ± 0.013 A°) in comparison with chickpea milk, likely due to the presence of β -glucan and fibers [1]. Sensory evaluation revealed that beverages containing 60 % chickpea milk had the lowest scores for the flavor and mouthfeel sensory attributes obtaining scores of 4.4 and 4.8 points, respectively. The study concluded that doses of 0.01% of xanthan and gellan gums improve the stability of mixture beverages with oat and chickpea milks. Thus, a higher proportion of oat milk can reduce physicochemical stability but increase sensory acceptance in a plant-based milk blend (oat and chickpea), which can be a promising nutritious alternative to other plant-based milks from a single type of grain.

Keywords: *Mixed plant-based milk, Oat, Chickpea, Physicochemical stability, Sensory properties.*

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Formulation and sensory evaluation of honey bee energy gels for cyclists' requirements

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The nutritional needs and caloric intake during training and competition of athletes, such as cyclists, can be covered through diets rich in carbohydrates or supplementation in energy bars, drinks, powders, and gels to name a few [1]. Therefore, the objective was to formulate energy gels based on honey and its sensory evaluation by cyclists to determine their degree of acceptance and preference. The results showed that when carrying out preliminary tests and applying a 2³ factorial experimental design where the following variables and levels were evaluated: honey (70 and 75% w/v), xanthan gum (1.0 and 1.4% w/v), and acid citrus (1.2 and 1.8% w/v), of which after evaluating physicochemical parameters, only three were selected to perform the sensory evaluation using a mixed hedonic scale applied to 50 cyclists to determine the degree of acceptance and preference of the gels; the sensory evaluation showed that the best attributes were a sweet flavor, medium acidity, yellow color, smooth consistency, whose most accepted formulation (96%) was the one that contained: honey 75% w/v, xanthan gum 1.4% p/v and citric acid 1.2% w/v, in addition to creatine, ascorbic acid, sodium citrate, magnesium chloride, potassium iodide and calcium lactate with a final pH of 3.24. In conclusion, energy gels formulated with honey, creatine, vitamin C, and ions (Na, K, Mg, Ca, Cl, and lactate) can be accessible with a high degree of acceptance for cyclists, which will contribute to meeting their energetic and nutritional requirements, having an impact not only on their performance during training but also in competitions, as well as in the reduction of negative effects that could arise due to the deficiency of any of these ions, the accessible price that product represents, and the use of bee honey as a raw material that would benefit the economy of small Tamaulipas beekeepers.

Keywords: *Sensorial evaluation, Honey bee, Energy gel, Cyclists.*

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Effect of the incorporation of candelilla wax oleogels on Frankfurters sausages

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Cold meats are the foods most consumed nationally, of the total 50% corresponds to sausages [1] being a meat emulsion one of its main components is saturated fat, which can trigger cardiovascular diseases [2]. The objective of this work is to study the effect of oleogels as a substitute or complement of saturated fats in the formulation of Frankfurters sausages during 21 days of storage. Sausages have been formulated with 100% and 50% candelilla wax oleogel (2.5%) with canola oil, replacing saturated fat, as well as a control group with 100% saturated fat, which were analyzed in terms of moisture, ashes, fats, proteins, and hardness, the results indicated that in the moisture content, the control sample was the one with the highest capacity to retain water, due to the fact that the edible oil is highly hydrophobic, even at 21 days the formulations showed the same behavior, the determination of ashes observed a decrease in all the formulations studied as a function of time, this is probably due to the maturation of the system since the same behavior was observed in the determination of proteins, however, in the determination of hardness, the values were increased in all the formulations as a function of time, indicating a possible polymorphism in the fat-protein system itself, this induced by storage time and temperature (~4°C), this would lead to the structuring of the meat matrix, which would point to the potential use of these materials in meat industry.

Keywords: *saturated fat, edible oil, oleogels, sausage.*

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Perception of soy and dietary fiber intake on undesirable effects in menopause

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Women in the menopausal stage can suffer various effects that affect their quality of life if diet and physical activity are not part of their lifestyle [1]. Therefore, the objective of this study was to evaluate the perception that women in the menopause have of the consumption of soy and foods with a high content of dietary fiber to a reduction of these undesirable effects. The results obtained showed that 63 women evaluated had between 35 and 57 years old, of which only 4 of the evaluated women did not have children, among the symptoms with the highest incidence were weight gain, mood changes, dry skin and hair thinning, 95% are not under any hormonal treatment; the majority of the population frequently consume irritating foods (75%), with a high prevalence of gastrointestinal diseases (62%), overweight or obesity and high blood pressure, 56% of women do not perform physical activity, they do not usually consume soy (63%); foods associated with a higher content of dietary fiber included cereals, vegetables, and fruits, but a high percentage of the population does not usually consume fiber from fruits (79%). According to the correlation analysis, a $R^2 0.98$ was obtained, which showed that there is a high association between these inappropriate habits and the presence of side effects at this stage. In conclusion, 92% of the evaluated women perceive that the consumption of nutritious foods contributes to their well-being and health, nevertheless this positive perception, they do not usually include these food groups in their diets and have inadequate habits, so the present study will have a positive impact on the lifestyle of the female population if intervention

Keywords: *Menopause, Soy, Fiber, Perception, Lifestyle.*

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Nutritional properties and sensory evaluation of corn tortillas added with cabbage (*Brassica oleracea* var. capitata L.)

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Since pre-Hispanic times, corn tortillas (CTs) have been a staple food in Mexico, providing high satiety. The consumption of CTs is essential and gives meaning to daily food practices. However, they can be problematic for diabetes patients [1]. Thus, developing healthier CTs may be a viable option for managing nutritional restrictions without affecting the population's traditional eating patterns. CTs are ideal for incorporating components with improved nutritional value, such as cabbage flour (*Brassica oleracea* var. capitata L.) [2]. The aim was to determine the nutritional value, mineral content, and sensorial analysis of CTs added with cabbage flour. CTs were developed with cabbage flour (w/w) as follows: 0% (T0), 5% (T5), 10% (T10) and 15% (T15). The nutritional value of the CTs was statistically improved ($p < 0.05$) when cabbage was added. In the treated CTs, mainly at T15, moisture and fiber increased, the protein was similar, while fat and energy content decreased. T15 had higher K, Na, and Mg concentrations ($p < 0.05$) than the other treatments. T10 and T15 had similar Ca, Fe, Zn, and P contents to T5 and T0 ($p < 0.05$). Taste, color, and overall impression were similar ($p < 0.05$) between T0 and T15. However, differences ($p < 0.05$) in aroma and texture were found. Likewise, 75% of the judges indicated that they would "surely buy" at T0, while for T15, it was 53.85%. The higher fiber content and lower energy content observed in the treated CTs are desirable properties in developing healthy foods. The minerals are necessary for many metabolic events, such as maintaining stable cellular structures at optimal levels. In conclusion, the addition of 15% cabbage flour improved the nutritional properties of CTs by decreasing its caloric intake and increasing its fiber, and mineral content without compromising its sensory acceptability. Therefore, they could be a healthier food option for the Mexican diet.

Keywords: Nutritional properties, cabbage, mineral content, sensory evaluation, type 2 diabetes.

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Development of baguette-type bread with insects of the order Orthoptera, sunflower seeds and peanuts

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Functional foods play a preventive role since they reduce the risk factors that cause the appearance of diseases [1]. Therefore, functional foods can be natural, or to which some component has been added, increased or eliminated, also those to which the nature or bioavailability of some of its components or any of these previous combinations [2]. Grasshoppers can be viewed as functional foods by their very good source of phenylalanine (22 to 117 mg/g protein) [3]. This work consisted in the development of baguette type bread with functional characteristics based on insects of the order *Orthoptera*, sunflower seeds and peanuts. Three different formulations were used (10, 20 y 30% from grasshopper flour) and each experiment was performed in triplicate. Once the breads were obtained, a sensory evaluation was carried out with a trained panel (by 20 panelists) where the sensory characteristics of the bread were evaluated. Finally, a statistical analysis was carried out in the InfoStat software to obtain the best accepted bread. The results showed that the best bread was formulation 2 (20% grasshopper flour), highlighting the attributes of flavor, color, smell and texture. The mentioned formulation was compared with a commercial baguette, surpassing the latter in preference according to the results statistically analyzed in the Minitab19 software with an analysis of homogeneous groups using a hedonic scale. Statistical tests were carried out with $p < 0.05$. This work proved that the use of grasshopper flour is an excellent alternative in the elaboration of functional foods because it exceeded the acceptance results of the commercial product with which it was compared.

Keywords: *Grasshopper, Commercial Baguette, Functional, Phenylalanine.*

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Analysis of the texture profile of thermally processed tender jackfruit and its potential use as a meat analog

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Thermal processing is the most efficient and economical technique for the long-term preservation of tender jackfruit in ready-to-cook form on a commercial-scale [1]. The objective was to evaluate two types of thermal treatments on the texture profile of tender jackfruit (*Artocarpus heterophyllus* Lam) to define its potential use as a meat analog. The effect of boiling temperature (80, 90 and 100 °C for 5, 10 and 15 min), and steaming processing (121 °C, 5, 10 and 20 min at 1.5 atm) was evaluated on the texture profile of tender jackfruit sections (core, cortex and perianth). The thermal conditions to process were compared with cooked animal meats as references measuring the texture profile. Finally, an edible formulation using processed tender jackfruit as a meat analog was performed and characterized. The hardness, chewability and shear force values of tender jackfruit sections decreased with the highest temperature and processing time; however, core section exhibited the highest texture values followed by perianth and cortex. All jackfruit sections exhibited similar texture parameters to meat references when they were processed from 90 to 100 °C for 5-15 min by boiling process and 121 °C for 5-10 min by steaming process. The sterilized edible formulation exhibited good content of ashes, total protein and dietary fiber; as well as a high digestibility (88.92%). In addition, this formulation conserved soluble phenols with antioxidant capacity, without microbial growth during 15 days of storage at 25 °C and with high sensorial acceptance. According to this analysis, whole tender jackfruit has a potential use as an analog of beef, pork, shrimp and chicken meats.

Keywords: *texture profile, tender jackfruit, thermal processing, meat analog.*

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Development of low-calorie jam made from Roselle (*Hibiscus sabdariffa* L.) calyx and its by-product

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Two jams formulation were developed, a traditional jam made from roselle calyx (TJ) containing sucrose (50%) and low-calorie jam made from roselle by-product (LCJ), generated as result of beverage production. To reduce calories sucrose was partially (26%) replaced by allulose. Physicochemical, phytochemical, rheological and sensory properties of the jams were determined. LCJ had a lower energy value (193 Kcal/100g) compared to TJ (302 Kcal/100g). The value of total soluble solids (66 °Bx) and water activity ($A_w = 0.79$) did not present statistical differences ($p < 0.05$) between the jams. The lack of roselle extract in the by-product, and therefore in LCJ, resulted in a decreased in pH value from 2.50 to 2.40, titratable acidity from 0.64 to 0.45% (citric acid) and antioxidant capacity ($-DPPH = 0.88$ to 0.60 and $ABTS = 1.50$ to 1.014 mg/g Ac. A), with respect to TJ, without significant changes ($p < 0.05$) in color parameters. The dynamic rheological testing indicated a gel-like behavior ($G' > G''$) in whole jams. Also, sucrose content decreased in LCJ caused decrease in gel strength which was evidenced by a decrease in apparent viscosity (1321 to 1028 Pa) without affecting sensory characteristics of texture, which allowed a good general acceptance. The results suggest that a partial replacement of sucrose by allulose allowed obtaining a product with a reduced calorie content; in addition, by-product from the production of roselle beverages can be used for development of a sensorially acceptable jam with physicochemical properties of a traditional product. This development is intended to add value to roselle by-product and promote its reincorporation into the food supply chain since it is a material rich in bioactive compounds with biological potential [1] and in some way contribute to sustainable development.

Keywords: Food by-product, jam, reducing sugar, sensory evaluation.

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Shelf life of lactobacillus isolated from human milk and infant formula in a fermented food

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Cantaloupe (*Cucumis melo*), has low sugar content and antioxidant and anti-inflammatory properties but economical losses are up to of 9-46 million pesos [1]. The foam mat drying method (FMD) is based on increasing the surface area and the porous structure of the materials due to the incorporation of air by lowering its density, it is relatively simple and facilitates the removal of water from fruit juices and vegetable purees [2]. The objective of this work was to obtain a probiotic food, easy to handle that reduces losses by increasing its shelf life using lactobacilli isolated from human milk and commercial infant formulas. Ripe melons purchased from the supermarket were used. They were washed, cut and the juice was extracted using a cold press and blanched. Fermentation was carried out for 24 h/37 °C using one lactobacillus isolated from human milk (HM), and two from different infant milk formulas (F1 and F2) and pH and °Brix were measured. The FMD was carried out with egg albumin and melon juice (1:5 w/w) in 15x5x1 cm beads in a dehydrator at 55 °C with air flow for 2.5 h until constant weight was achieved. The dried material was ground and viability of the microorganisms were determined using MRS agar. At the end of the fermentation, pH was 4.88 and as for CFU, these were 6.5×10^3 , 5×10^3 , 5.5×10^3 /mL (HM, F1, F2). CFU decreased after FMD. At day 3 and 5 they increased in 3 log. This behavior could be due to the humidity present in the dried samples even though it was very low [3]. These results allow us to propose the foam mat drying technique as a way to obtain powdered foods and preserve microorganisms.

Keywords: *Lactobacillus*, *Foam mat drying*, *Shelf life*, *Cantaloupe*.

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Development of a rabbit meat protein concentrate

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Rabbit meat stands out due to its high biological value, low lipid content and its functional properties of pH and WHC [1]. It may become ideal to be used in the formulation of restructured meat products by modifying the lipid content and adding a series of bioactive compounds that provide functionality to the food [2]. To evaluate the effect of addition of key ingredients on the physicochemical characteristics and the sensory acceptability of the protein concentrate of rabbit meat. Different formulations were obtained from the following ratios of olive oil (6, 9, and 12%), walnut (5, 10, and 15%) and agavines (3, 7.5, and 12%). The physicochemical evaluation (i.e., pH, WHC, and color) of the rabbit meat protein concentrate was carried out in addition to the sensory evaluation (i.e., ordering test) to measure acceptability and identification of the best formulations. The factor that most influenced the pH was the concentration of olive oil, ranging between 7.0-7.7, while, 40% of WHC, was obtained by increasing the concentration of agavines, and finally the factor that most contributed to the color was the concentration of walnut. In sensory acceptability, the samples with higher acceptability were those having higher concentration of walnut derived from the fact that the organoleptic characteristics in the final product were improved. A protein concentrate of rabbit meat enriched with walnut, olive oil and agavines, with acceptable physicochemical and sensory characteristics was obtained. Supporting local producers of rabbit meat, as well as providing a functional meat product that could provide a benefit to the health of the consumer.

Keywords: Rabbit, Meat, Protein concentrate, Acceptability.

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Development of a dehydrated toast with the inclusion of fresh pineapple pulp (*Ananas comosus*)

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In order to develop a toast with the inclusion of fresh pineapple pulp, a prospective, experimental, cross-sectional and descriptive research. With four stages: formulation, processing, evaluation (physicochemical, nutritional and sensory) and technical study for small-scale production. For the formulation and preparation, nixtamalized corn flour, fresh pineapple pulp, yellow V dye and water were used [1]. Moisture content, dry matter, protein, ashes, fat and crude fiber were determined. The content of energy and dietary fiber was estimated [2]. A subjective sensory acceptance test was carried out, with a hedonic scale of 9 points where 1 indicates "I dislike it very much" and 9 "I like it very much", of the attributes color, smell, taste and texture, to 40 judges, over 18 years old, of both genders [2]. The technical study of small-scale production was carried out. A toast with a rigid and crunchy consistency was obtained, 13 cm in diameter with an intense yellow color. The general acceptance level was 75%, with an average acceptance for color of 7.68, texture of 7.92, taste and smell of . With a content of 380 Kcal/100g and dietary fiber 1.6 g/100g. The technical study consists of the reception of raw material, storage 1 (6C, white light 80% RH) for the fresh pineapple pulp (15 Brix) and water, storage 2 (19C, white light, >75% RH). For the nixtamalized corn flour, salt and yellow dye V, mixed/kneaded (paddle mixer for dough 40RPM/5min), baked (tortilla machine at 270C/3min), dehydrated (oven 200C/5min), cooled (stainless steel trays), packaging (horizontal bagger with roulette) and final storage. It can be concluded that the toast was characterized by a new flavor, color, smell and texture similar to traditional toast, with a global sensory acceptance of 75% and kneading, baking and dehydration are identified as process control points.

Keywords: *dehydrated toast, pineapple pulp, hedonic scale, subjective sensory evaluation.*

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Analysis of the texture of gels made from the hydration of the hydrocolloid obtained from *Plantago psyllium ovata*

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Plantago psyllium ovate mucilage is a naturally occurring food grade polysaccharide composed of natural arabinoxylan. Arabinoxylan is a hemicellulose found in both the primary and secondary cell walls of plants, including woods and cereal grains, consisting of copolymers of two pentose sugars: arabinose (22.6%) and xylose (74.6%). Psyllium mucilage extracted from the husk of Plantago psyllium ovate has multiple uses in human nutrition [1]. Its applications are directly related to the area of nutrition and human health as it helps control cholesterol problems, colon cancer prevention, and blood sugar control. This hydrocolloid has been used in the food industry mainly to modify texture properties and rheological properties [2,3]. Its use has made it possible to improve the functionality of some foods due to its great hydration capacity with water molecules and its low syneresis. The great capacity of Psyllium to generate a gel with water has been investigated, since it has been a medicinal remedy since ancient times. This hydrocolloid has a gel-generating fraction that reaches between 55% and 60% of the Psyllium husk [4,5]. This is a viscous polysaccharide that does not provide nutrients to humans, which is why it has enormous potential for use in people's nutrition to combat the obesity epidemic that affects many countries in the world such as the United States and Mexico. For this reason, this research will present an analysis of the texture and rheology properties of hydrocolloid mixtures with water, in concentrations of 3% to 8%, to study the structural behavior of the gels obtained. And a two-spring Maxwell model will be used to estimate the rheology of these gels and their potential in food formulation.

Keywords: *Texture, rheology, hydrocolloid, fiber, viscoelasticity.*

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Analysis of the limits of addition of mango peel flour and mango kernel flour to obtain an extruded food

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Between 15 and 25 million tons of mango waste are generated annually and most of this is disposed of in landfills, this represents an environmental and economic problem [1]. The peel and kernel of mango are a source of polyphenols, carotenoids, dietary fiber, and vitamins, so they can be added to the development of new functional foods [2]. In this work, the physicochemical properties of mango flour were analyzed and the limits of addition to an extruded food were evaluated. Mango peel and kernel flours were characterized by physicochemical analysis. Extrusion conditions were: 120 °C, 100 rpm, 17% moisture content and 20 g/min of feed flow. Two screening designs 2² with central point were evaluated, components were White Corn Flour (WCF), Mango Peel Flour (MPF) and Mango Kernel Flour (MKF). Response variables were Torque, Specific Mechanical Energy (SME) and Expansion Index (EI) [2]. The first design point was 25% WCF and 75% MPF, whose results were EI (1.05), Torque (3.7 Nm) and SME (136.75 J/g). And the second was 50% WCF and 50% MKF, with results of EI (1.40), Torque (14.7 Nm) and SME (543.31 J/g). Statistical analysis concluded that mango flours can be added at up to 75% MPF and 50% MKF. This indicates that mango residues can be transformed into flour to be converted into value-added products. Generating in this way new markets for local producers.

Keywords: *Mango Peel Flour, Mango Kernel Flour, Extruded food, Mango waste.*

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Physicochemical evaluation of a macadamia-nut beverage

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The study's objective was to investigate the effect of thermal treatment (TT) on the physicochemical stability, fatty acid profile (FAP), and antioxidant capacity (AC) of macadamia nut-based beverages stabilized with xanthan gum (XG) and soy lecithin (SL). An extreme vertices mixture design ($n = 18$) was used, varying the macadamia nut, SL, and XG. The three most stable and sensory acceptable formulations were prepared in duplicate, and a set was subjected to TT (85 °C / 15 min). The results show that adding XG and SL decreased the Sauter's diameter ($D[3,2]$), Brouckere's diameter ($D[4,3]$) and increased the zeta potential (ζ) of macadamia beverages. After applying TT in beverages, an increase in $D[3,2]$, $D[4,3]$, and ζ occurred. The decrease in particle size and the increase in ζ are signs of stability [1]; however, there was no positive effect on the sensory evaluation of beverages. After processing and TT, the FAP of beverages changed, decreasing SFA and PUFA and increasing MUFA. No significant difference ($p \geq 0.05$) was observed in the FAP of beverages with and without TT. The AC determined by DPPH and ABTS decreased in most beverages upon the TT application. In conclusion, XG and SL increased the stability of the beverages, and the TT modified particle size and AC but maintained the FAP. The consumption of plant-based beverages is increasing worldwide [2], so a proposed macadamia nut beverage may interest consumers seeking new flavors and healthy products.

Keywords: vegetable beverage, zeta potential, particle size, fatty acids, antioxidant capacity.

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Cempasuchil (*Tagetes erecta*) as a raw material to increase the carotenoid content of cookies

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Tagetes erecta Linn known in Mexico as cempasuchil is a plant which belongs to *Tagetes* genus and is appreciated for its yellow, orange, golden or bicolored flowers, and also for its particular aroma. It is an ornamental and ceremonial flower appreciated in Mexico because of its use in traditional rituals, such as "día de muertos" (day of the dead) [1]. Cempasuchil is rich in carotenoids and due to the presence of these biocompounds it is commonly used as natural pigment in food [2]. For this reason, the aim of the present research was to developed a cookie formulation using cempasuchil as a raw material to increase the carotenoid content. Cempasuchil flowers were purchased at local markets in Mexico City. Petals were separated from the stem and dried on an air dehydrator at 60°C for 8 h. The dried petals were ground and sieved. Three different formulations were elaborated: Control (non cempasuchil addition), 2.5 addition (added with 2.5% of dried cempasuchil) and 5 addition (added with 2.5% of dried cempasuchil). Proximate composition was determined following the AOC procedures. Carotenoids were quantified by the isochromic technique by using a spectrophotometer. Differences among samples was determined by ANOVA test using GraphPad prism software. Results shows that the addition of cempasuchil do not change the proximate composition of cookies ($p > 0.05$), but increases its carotenoid content ($p < 0.05$) suggesting that this edible flower could be used as a raw material to increase this important phytochemical with provitamin A activity.

Keywords: *Cempasuchil, carotenoids, cookies, edible flowers.*

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