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Endemic microalgae from the regions of Coahuila for use within the biorefinery concept with potential application on foods

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Biorefinery is a concept with relevance in bioeconomy, that refers to the transformation of biomass in products with high commercial interest. Also, the biomass of microalgae is a promising material in the production of compounds with high added value to be applied in food field since this biomass is rich in proteins, carbohydrates, and lipids [1]. According with the above, the isolation, identification, and cultivation of endemic microalgae from Cuatro Cienega Coahuila was carried out. Isolation of microalgae was done as follows: 1) Plating BG11 medium and cryogenization, 2) Inoculation with 100 mL of liquid BG11 medium in flasks and addition of 200 mL of liquid BG11 medium to the collected samples, 3) Addition of fresh medium every 5-6 days and inoculation of visible microalgae population in the samples with BG11 liquid medium. Moreover, for the isolation, it has been carried out using the Bold Basal Medium (BBM) [2,3]. The identification has been made morphologically. The strains identified so far are: *Pseudochlorella, Spirogyra*. As conclusions, at least three species of endemic microalgae of the semi-desert region of Coahuila have been isolated and two of them have been identified.

Keywords: *Keywords: Circular bioeconomy, sustainability of microalgae, third generation biorefinery, cultivation system.*

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Energy consumption of hydrothermal pretreatment of sweet sorghum bagasse

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The increasing energy worldwide demand has led to the search for new alternative energy sources [1], such as the production of bioethanol under a biorefinery concept [2]. Among the most used raw materials, sweet sorghum bagasse (SSB) stands out, a material rich in polysaccharides that can be transformed into biofuel [3]. In this sense, the objective of this work was to evaluate the hydrothermal energy consumption of the pretreatment of sweet sorghum bagasse (*Sorghum bicolor* (L) Moench) to the bioethanol produce. For the above, different pretreatment conditions were evaluated (temperature, residence time and particle size) that allowed identifying the optimal condition to obtain the higher concentration of cellulose (analyzed as glucans) with the lowest energy cost. The analysis of the vegetal cell wall structural components showed a concentration of cellulose, hemicellulose, and lignin of 32.65±1.47, 20.8±0.61 and 26.2±1.1%, respectively. The different combinations in the pretreatment parameters showed the same behavior in the changes in the concentration of these components. Being the cellulose and lignin fraction the ones with the higher release, while the hemicellulose concentration showed an apparent decrease. However, the most severe condition (190°C, 50 minutes, with 1 mm of particle size) allowed the mayor release of cellulose as glucans. However, it was the condition with the highest energy consumption

Keywords: *Keywords: Biomass, Sugars, High pressure processing*

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Use of gamma-ray spectrometry for a multi-element isotopic analysis in chayote Sechium edule var. virens levis samples

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The analysis of the radionuclide composition and its concentration in foods have gained attention in recent years. This analysis, for example, has helped determine the authenticity of some wines [1]. However, high concentrations of non-natural radionuclides may pose a risk to human health [2]. Mexico is the main producer of chayote (*Sechium edule v.* virens levis) in the world [3] and the central region in the state of Veracruz is the main producer of this fruit [3]. Previous studies have shown that chayote is a nutritional fruit and has healing properties [4], however, there are no previous studies of the radionuclide compostion of chayote samples from this region. Therefore, the main objective of this work was to assess the radionuclide composition of chayote samples from a municipality in central Veracruz. To achieve this goal, collected samples were analyzed in an Eg & G Ortec gamma-ray spectometer which was carrried out in a certified laboratory. This analysis showed the presence of 29 isotopes with the K^{40} (a naturally ocurring radionuclide) showing the highest levels of radiation (53.67±5.13 Bq/kg). The analysis also showed the presence of six of the twenty radionuclides regulated by the Codex Alimentarius [5] (Ru^{106}, I^{131}, Co^{60}, Ru^{103}, Cs^{134}, Cs^{137}), however, very low levels were observed in all cases (0.305±0.118 Bq/kg, 0.041±0.013 Bq/kg, 0.025±0.014 Bq/kg, 0.029±0.009 Bq/kg and 0.036±0.007 Bq/kg, respectively). In regard to the levels of detected radionuclides, chayote consumption should not pose any risk to consumers and chayote may possess minerals with positive effects.

Keywords: *Keywords: radionuclides, safety, regulation, risk*

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Brewery waste byproducts valorization through the microbial synthesis of PHB by Bacillus megaterium: 1L bioreactor scale-up

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Once the brewery waste byproducts (BSB) were integrated into the PHB production media and maximized the production, the scaling-up process has been aborded mainly based on kLa. Determination of kLa in a fermenter can be correlated with the PHB productivity, and oxygen demand of microbial population [1,2]. An important condition that affects the PHB production by *Bacillus* is the level of oxygen supply [3]. This project aims to assess different kLa levels in order to optimize the PHB production by *B. megaterium* at bioreactor level. The results shows that lower levels of kLa could enhance the PHB production, as well, the oxygen supply depletion and pH control at different stages was evaluated since it was observed an impact on the microbial growth. The equations for kLa modeling present sufficient adjustment to the experimental data (R^2<0.7), which results in the selection of recommended conditions at the lower levels of agitation speeds. In conclusion, the kLa determination contributes to the diminish of the power implied in the process, as well as to the comprehension of the effect of the oxygen limitation in the microbial PHB synthesis by *B. megaterium*. A pH control in the prevent the inhibition of the bacteria. These results will support the valorization of the BSB through the production of PHB in a bioreactor level.

Keywords: *Keywords: Brewery waste byproducts, bioreactor, Bacillus megaterium, kLa*

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Nutritional and nutraceutical properties of seven raw and germinated common been (*Phaseolus vulgaris*) varieties

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Due to its capacity to fix nitrogen, legume food is an important element in the global food system. A worldwide sustainable diet must increase the intake of legumes and decrease the intake of animal food in order to decrease the impact of the food system on the environment [1]. Common bean is an important legume food that can be integrated in a wide way into the food system improving the nutritional and nutraceutical quality of global diets. In the present work, seven varieties of raw and germinated common bean seeds were described in their nutritional and nutraceutical properties. The seed materials were produced in Hidalgo State. The harvested seeds were analyzed raw and after their germination for 144 h. The contents of protein in raw seed were from 20.59% in Flor de Junio Leon to 23.29% in Pinto Raramuri, the germination process increases slightly the content of protein in all the materials. The contents of phenolic compounds in raw seeds were from 2.04 mg GAE/g in Pinto Raramuri to 5.22 mg GAE/g in Negro Otomí, the germination process decrease the content of phenolic compounds in all the samples with exception of Pinto Raramuri. The radical scavenging capacities in raw seed were from 8.58 mg AAE/g in Pinto Raramuri to 12.36 mg AAE/g in Flor de Mayo Eugenia, the germination process decrease significantly the radical scavenging capacity. The contents of the flavonoid kaempferol in raw seeds were from 12.67 µg/g in Flor de Mayo Eugenia to 92.23 µg/g in Flor de Junio Dalia, the germination process decrease the content of kaempferol in all the samples. The germination process induces the synthesis of the isoflavone daidzein. The common bean seed is an important legume with high diversity in its composition.

Keywords: *Keywords: Food system, Legume, Common bean, Germination, Active compounds.*

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Beer production with ginger and xylooligosaccharides from agave bagasse under biorefinery concept

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Xylooligosaccharides (XOs) are products with high-added value, considered promising compounds to be applied in different areas such as food, cosmetics, materials, and bioenergy. Also, Mexico has a significant agave bagasse production, which is considered as an industrial lignocellulosic waste due to its composition, so it represents a promising biomass for various applications. So, agave bagasse is a promising raw material for XOs production [1]. The objective of this work was studying the addition of xylooligosaccharides (XOs), produced through of a second-generation biorefinery, to a craft beer designed in the laboratory. In addition, evaluate the operating conditions and strategies to produce beer added with ginger and xylooligosaccharides to unify the development of an alcoholic beverage based on the biorefinery concept. In this case, it was found that the best hydrothermal pretreatment condition was 190 °C for 10 minutes, with a 1:10 biomass-water ratio, 8.67 g/L of XOs was achieved. Subsequently, it was necessary to carry out a semi-purification process to extract only the XOs produced in the hydrothermal pretreatment, so a decantation with 96% ethanol was carried out. The extraction produced 0.78 g of XOs which were added to 0.5 L of craft beer. A laboratory-scale process was designed based on a search of various craft beer processes and styles, which allowed to create a model beer to evaluate the XOs addition and effect. These results create a new perspective for using XOs produced from lignocellulosic biomass in beverages under the concept of biorefinery, revaluing lignocellulosic materials through their conversion by sustainable processes and its application in beverages and food.

Keywords: *Keywords: Biomass Fractionation, Hydrothermal process, Lignocellulosic Materials*

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Optimization of the thermosonication-assisted extraction of acetogenins from *Annona muricata* seeds

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Annona muricata seeds are considered a waste; therefore, they can be used as a rich source of acetogenins (ACGs) [1]. The objective of the project was to determine the optimal conditions of thermosonication-assisted extraction (TSAE) to extract ACGs and their yield (%) from *A. muricata* seeds. The optimal TSAE conditions were validated, and the results obtained were compared with ultrasound-assisted extraction at 25 °C and extraction by the Soxhlet method. In addition, isolation of ACGs present in the crude extract was performed, and their solubility was analyzed with different dissolvents. Moreover, the identification of the isolated ACGs was evaluated by HPLC [3]. The validated optimal TSAE conditions to extract the highest total acetogenin content (35.89 mg/g DW) and yield (3.6%) were obtained at 50 °C, 100% sonication amplitude, and pulse-cycle of 0.5 s. TSAE was 2.17 times more efficient than ultrasound and 15.60 times more efficient than the Soxhlet method to extract ACGs. The crude acetogenic extract exhibited antioxidant capacity with values of 4308.09 µmol/g by ABTS assay. ACGs were mostly soluble in acetone (18.63 mg/mL) and methanol (18.55 mg/mL); in contrast they were insoluble in water, acetonitrile, hexane and petroleum ether. Seven ACGs were identified, and pseudoannonacin was predominant (350 mg/g). TSAE is an excellent alternative for the large-scale extraction of ACGs from *A. muricata* seeds, and these isolated metabolites can be used to formulate therapeutic drugs.

Keywords: *Keywords: Annona muricata, seeds, thermosonication, acetogenins.*

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Nutritional and nutraceutical properties of twenty seven materials of mesquite pods (*Prosopis laevigata*)

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Legume food is an important element in the global food system due to its capacity to fix nitrogen. A worldwide sustainable diet must increase the intake of legumes and decrease the intake of animal protein in order to decrease the impact of the food system on the environment [1]. Recently, mesquite pods have been described as an important source of good quality protein and active compounds for the human diet [2]. In order to explore the diversity in the composition of this legume tree, in the present work twenty seven materials of mesquite pods were described in their physical structure and composition. The color of the mesquite ponds could be from brown to black and the size could be from 11 to 23 cm, containing from 12 to 26 seeds per pod. The contents of protein in mesocarp and seed were from 9.1 to 10.5% and from 34.3 to 41.4%, respectively. The content of phenolic compounds in mesocarp and seeds were from 1.84 to 7.32 mg GAE/g and from 1.84 to 4.93 mg GAE/g, respectively. The diversity in the structure and composition of mesquite pods described in the present work highlight the potential for the development of programs for mesquite improvement with the aim to include this legume tree in the global food system.

Keywords: *Keywords: Mesquite, Prosopis laevigata, Pods, Legume, Active compounds.*

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Extraction and characterization of fucoxanthin from macroalgae Sargassum spp using green processes under biorefinery concept

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The use of this type of biomass can be of great benefit to humanity because it is a renewable resource and even because the great accumulation of this type of algae has come to cause problems in the coastal areas of Mexico, despite being a common situation in several countries. since 2015 abnormally large quantities arrived on the coasts, quantifying around 320 m3 of *Sargassum* for each kilometer of beach per day, which was a constant from August to December and in 2018 only on the coasts of Quintana Roo was quantified approximately that amount of *Sargassum*; which causes various effects, especially in tourism, conservation, and health activities, since it covers holiday seasons and the sea turtle nesting season [1]. The objective of this work was the extraction and characterization of fucoxanthin by organosolv process. Three factors were studied: temperature (50-100 ºC), residence time (0-20 min) in the bioreactor (in both isothermal and non-isothermal pretreatments) and percentage of ethanol/water (v/v) were applied on biomass of *Sargassum*. The best extraction values were in the range between 31.44, 23.80 and 22.67 µg of fucoxanthin/g of seaweed. Subsequently, tests were carried out for the quantification and identification of phenols obtaining the best yield of phenols in pretreatment 8 (100 ºC, 20% ethanol (v/v) and 20 minutes of isotherm) with 15.11 ± 0.73 GAE/g of algae. The process development in this work can be considered an environmentally friendly technology in the production of fucoxanthin in terms of biorefinery concept.

Keywords: *Keywords: Biomass, Sargassum, Seaweed, Hydrothermal process*

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Sensory evaluation and antioxidant capacity of pickled onions with the addition of natural pigments: Acachul and Beetroot

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In food processing, it is common to use colorants in order to enhance certain characteristics. Actually, it is a topic of current interest that they come from natural sources in order not to cause harm to the consumer [1]. Natural colorants from vegetable sources, in this case, beetroot (Bet) (rich in betalains) and acachul (Aca) (rich in anthocyanins) were used to color a pickle used in Mexican cuisine as a sauce or garnish [2,3]. The objective of this work was to carry out the sensory evaluation and antioxidant capacity of pickled onions with the addition of these pigments (Bet and Aca) alone and in a 50-50 combination to measure their degree of satisfaction and antioxidant potential. In the first instance, natural pigments were obtained by dehydration and spraying. Subsequently, the samples of pickled onions were prepared and the pigments (Bet, Aca, Bet-Aca) were added. The sensory evaluation was carried out through a satisfaction test with a 9-point hedonic scale with consumers and the ABTS and DPPH techniques were used for the evaluation of antioxidant capacity. The results showed that in the sensory evaluation, the Aca treatment had a higher value in color intensity (7.9), texture (7.2), harmony with the evaluated product (cochinita pibil was used as a vehicle) and general acceptance (7.7) while the control obtained lower scores in color intensity (6.9), flavor (7.1) and general acceptance (7.2). On the other hand, the antioxidant activity tests showed that the treatment with the highest activity was Bet-Aca, followed by the Aca treatment, which indicated that the addition of these pigments attributes antioxidant capacity to the food. So, they can be an option for the food industry since the coloring properties and specially to their potential health-promoting effects.

Keywords: *Keywords: Colour additives, Natural pigments, Anthocyanins, Antioxidants, Betalains*

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Spray drying of mesquite pod juice *Prosopis laevigata*

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The mesquite pod is a legume that is crushed for human consumption [1]. Although, it is possible to maximize the use of its nutrients through other transformation methods such as spray drying [2]. The study consisted of determining the operating conditions in the spray drying of the juice of the mesquite sheath (*Prosopis laevigata*). In addition to assessing the impact of the method on the characterization of the final product. In pilot tests, the variables that define the operating conditions during drying were determined. The combinations of the same were also established and the treatments were fixed. The treatment with the best results consisted of the use of a concentration of maltodextrin at 30%, the temperature of the heater controller (180 and 210 °C), the temperature in the chamber (80 and 110 °C), a flow between 10 and 18 ml per minute by means of a peristaltic feed pump (5 to 10 rpm), the air pressure (1 and 2 bar) and a relative humidity of the fan between 10 and 40 %. The powder obtained in the process recorded the best physicochemical, nutritional and microbiological properties of the final product. Humidity between 2 and 7%, a particle size of 0.125 mm (very fine dust), did not record any colony-forming units (aerobic mesophiles, total coliforms, fecal coliforms, fungi and yeasts). The bromatological content of the powder is 40 g/100g of sucrose, 4 g/100g of glucose, 7 g/100g of fructose and <0.01 g/100g of maltose. The protein content of 10 g/100g, fats of 0.39 g/100g, reducing sugars of 59.55 g/100g, dietary fiber of 5.08 g/100g. The study showed that spray drying is a way to take advantage of the juice of the pod to generate a powder of vegetable origin with potential for use in the food industry.

Keywords: *Keywords: liquid phase, sugars, proteins.*

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Development and sensory evaluation of fermented beverages based on red fruits grown in the Sierra Norte de Puebla

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Fermented beverages have been shown to have a nutritional contribution by hydrolyzing the sugars present, as well as some proteins (in peptides and amino acids) and to be beneficial to health if consumed moderately, as they are considered a source of probiotics [1]. The objective of this work was to develop fermented beverages based on red fruits (strawberry, blackberry and acachul) grown in Xicotepec de Juárez, belonging to the Sierra Norte de Puebla. First (with each fruit) a substrate based on ground and sifted fruit, sugar and, an inoculum (previously activated *Saccharomyces cerevisiae* yeast) was prepared. It was left to ferment under controlled conditions of oxygen, humidity and temperature for 72 hours [2,3]. Subsequently, the product was pasteurized at 65°C for 10 min and a minimum amount of inoculum was added to the packaging in order to generate carbon dioxide in individual 355mL bottles (champenoise method) and led to the second fermentation for 5 days, and kept refrigerated at 4°C. A sensory evaluation test was performed using a satisfaction test with a 9-point hedonic scale. Among the attributes evaluated were the color, characteristic odor, flavor of origin of the fruit and aroma of fermentation. The test was carried out with 100 consumers. The results showed that the blackberry and acachul drinks had higher scores in the parameters of color, smell, flavor and aroma. However, in the general acceptance of the product, the acachul drink with values of 8.5, on the other hand, the fermented strawberry drink obtained the lowest value with 6.5 according to the hedonic scale.

Keywords: *Keywords: Fermented beverages, red fruits, sensory evaluation, Sierra Norte de Puebla*

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Development of a memory vocabulary profile (MemVoc) for food products using coffee as a model

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Multiple references in sensory science indicate that foods evoke memories during consumption but research is limited. The objective of this research was to develop a vocabulary and implement it in a memory profile related to food as a complement for the evaluation of sensory attributes and emotions, using coffee as a model of vocabulary use. The memory vocabulary was generated with a series of successive studies that involved assigning positive and negative memories to different food groups, and after applying mathematical algorithms (WordCountAna and Factorial Approach) and contrasting memories with the scientific literature, a memory vocabulary was generated. Subsequently, the vocabulary was used to determine the profile of memories and their association with sensory attributes and emotions in samples of artisanal and industrial coffees with trained judges and consumers. The memory vocabulary consisted of a total of 14 and 12 positive and negative memory terms, respectively [1]. The vocabulary of memories was used in a similar way by both panels allowing them to differentiate between artisanal and industrial coffees. The memory profile of the coffees showed a positive association with sensory attributes and emotions, thus achieving a more robust explanation of the samples used in the research.

Keywords: *Keywords: Artisan and industrial coffees, emotions, food-related memories.*

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Characterization of a functional guava probiotic petite Suisse product using check all that apply (CATA) Methodology

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The use of probiotics strengthens the gut, which can lead to an increase in immune response [1]. The objective of this study was to develop a probiotic petite Suisse product with adequate sensory characteristics. For which, we followed the following steps. (1) The curd was elaborated using pasteurized skim milk, calcium chloride, and enzymes, which were coagulated at 37º C for 21 min. (2) For flavoring, we formulated a concentrate with guava pulp, isomaltol, monk fruit (*Siraitia Grosvenorii*), and eritritol, which was subjected to a thermal process of 85 ºC for 5 min. (3) The probiotic (*Bifidobacterium animalis* subsp. *lactis* BB-12, Chr. Hansen, Denmark) was activated in pasteurized milk that was heated at 40º C and kept at this temperature for 45 min. Therefore, the petit Suisse cheese was elaborated adding: curd (1), milk cream, flavor concentrate (2), inulin, and the probiotic (3). The product was then vacuum packed and kept in refrigeration (4ºC). We established the probiotic character of the product through a microbiological count. For the sensory analysis, we applied a questionnaire to 100 consumers, using the overall liking (OL) on a 9-point hedonic scale and a CATA (Check all that apply) with 20 attributes [2] results were analyzed with the FIZZ Software Biosystems. We found on day 1 that the UFC was 1×10^{8} and after 17 days 7×10^{7} UFC of viable bacteria; leading us to establish its probiotic characteristic (over 1×10^{6}). The product was evaluated as *"liked much"* with an overall evaluation of 7.16. It was described as a creamy (71%) natural product (73%); with fruity odor (57%), and flavor (75%) This product could be suitable for marketing because it complies with being probiotic and 80% of the consumers in this study would buy it.

Keywords: *Keywords: Sensory Analysis, CATA, petite Suisse, probiotics.*

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Influence of taste sensitivity on preference and sensory perception of Mezcal

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The perception of orosensory stimuli, which integrate the flavor, varies between individuals. This individual variation in oral sensations has genetic basis and appears to predict food liking and consumption [1,2]. The most studied source of variation is related to bitter taste perception associated to 6-n-propylthiouracil (PROP) responsiveness. Accordingly, humans could be classified as nontasters (NT), tasters (MT) and supertasters (ST) [3,4]. Evidence suggests that genetic variation in bitter taste perception contributes to differences in the level of irritation caused by alcohol perception in solutions. The aim of this investigation was to study the bitter taste sensitivity of a group of Mezcal consumers and its relationship with sensory perception and preference of it through PROP taster status. The tests were carried out in province of Oaxaca Mexico; 83 Mezcal consumers were classified by their PROP taster status and were asked to provide sensory descriptors for five Mezcal samples and rated them according to the level of liking. The three-solution test was used to classify the subjects as NT, MT and ST. Multiple Factor Analysis (MFA) was used to visualize the sensory descriptors provided for NT, MT and ST. The proportion of MT subjects were of 16%; whereas, the proportion of NT and ST was 34 and 51%, respectively. The MT provided higher liking ratings for at least three Mezcal samples. According to MFA, the Mezcal samples were organized in a similar configuration along the two dimensions. However, NT mentioned a limited number of simple terms (strong flavor, tasteless, burning in the mouth) to describe the samples, whereas ST used a more complex vocabulary (astringent, smoky, scratchy aftertaste). These data suggest that the preference for samples Mezcal was similar for nontaster and supertasters, but there are clues that the sensory perception of mezcal differs between groups.

Keywords: *Keywords: Keywords: Mezcal; taste sensitivity; 6-n-propylthiouracil taster status, consumers; free sensory characterization*

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Cross- cultural study on acceptability and sensory profile of Arepas: a Colombian traditional dish

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Cross-cultural studies can evaluate the feasibility of introducing different food products into new markets [1]. Moreover, taking into consideration that consumers are interested in knowing more about different cultures through food products. However, some of them have to be adapted or cooked in a certain way in order to have a high acceptability. In addition, it is important to have a sensory profile of each product developed, in order to understand the attributes that define them. One of the methods used for this task is called Rate-all-that-apply (RATA), which provides a sensory profile considering the intensity of attributes [2]. We chose a food product based on corn, an ingredient that is considered as heritage of both countries: Mexico and Colombia. Therefore, Arepas can be defined as corn pancakes made out of maize dough and mainly consumed in Colombia. Thus, in this study, a sensory cross-cultural research of 200 consumers of Colombia and México took place where 2 different formulations of Arepas and 3 different cooking methods (baked, grilled and fried) were evaluated using acceptability and a RATA questionnaire. Preliminary results showed one formulation as the best, and the most liked cooking method was the fried one. Each sensory profile was generated and compared based on the different country and cooking methods. Fried Colombian Arepas could be introduced as an international dish in Mexico having a high acceptability.

Keywords: *Keywords: Cross-cultural, Colombia, México, Sensory Analysis, Rate-all-that apply (RATA)*

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Development of a food supplement from Mexican rambutan peel and the evaluation of its nutraceutical properties

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Mexican rambutan husk possesses important biological compounds such as ellagitannins which are sensitive to environmental factors, for the elaboration of products with these compounds, alginate is a viable option as it protects the ellagitannins from the environment, the objective of this study is to test if the compounds maintain biological activities such as antioxidant and prebiotic [1] when incorporated in alginate. Two solutions of alginate (1% and 1.5%) were prepared, mixed with rambutan husk compounds, and adjusted to 1000 ppm for further encapsulation. The beads were dissolved in a 1% sodium citrate solution to measure biological activities and hemolysis. It was determined that the 1% alginate beads presented the best antioxidant activity with ABTS radical at 90% inhibition and for lipo- oxidation tests with an inhibition of 87%, for the prebiotic test, it was determined that the supplement does not have a prebiotic effect as it does not produce growth of lactobacilli such as *L. brevis* and *L. paracasei*, hemolysis assays determined that the supplement wasn'ttoxic since 0% hemolysis was obtained at the highest concentration of alginate (1.5%) at 1000 ppm [2]. Encapsulation by alginate is a novel way to preserve and consume food, keeping certain biological activities intact without presenting toxicity upon consumption.

Keywords: *Keywords: rambutan, polyphenols, alginate, encapsulation, biological activities.*

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Volatile profile of five jackfruit Artocarpus heterophyllus L. cultivars grown in the Mexican Pacific area

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Jackfruit (*Artocarpus heterophyllus* Lam.) a large tropical composite fruit, is grown extensively in India, Malaysia, China, and also in American countries such as Brazil [1,2] and México. The flavor of jackfruit is described with strong peculiar fruit notes [3], which depend on the content of several volatile compounds and play an important role in the overall flavor of the fruit. In this sense, this work aimed to characterize the volatile profiles obtained from five jackfruit cultivars grown in the Mexican Pacific area, correlate them among cultivars by using principal component analysis (PCA), and compare the profiles with other cultivars around the world. Headspace-solid phase microextraction (HS-SPME) coupled to gas chromatography-mass spectrometry (GC–MS) permitted the identification of eighty-six compounds. Overall, 51 esters, 13 aldehydes, 7 alcohols, 7 ketones, 7 terpenes, and 1 carboxylic acid were detected. Among them, 38 compounds have not been previously reported in jackfruit. The PCA yielded two principal components which explained 68.91% of the total variance. The BMC cultivar accounted for the highest number with 73 volatile compounds. Esters were the most important compounds found, followed by aldehydes and alcohols. The diversity of esters allowed differentiation of the cultivars. Thus, 31 esters marked clear differences between DMC, FMC, BMC, and JMC cultivars. RMC cultivar could not be grouped under this criterion. However, a PCA carried out by using the alcohol compounds showed clear differences between cultivars. Thereby, DMC, FMC, BMC, and JMC were associated with jackfruit fruits grown in Brazil, while the RMC cultivar was correlated with those grown in Malaysia. This study provides information about the first research on volatile compounds of jackfruits grown in México, which may help to develop new jackfruit cultivars with enhanced flavor properties, for application in food and horticulture fields.

Keywords: *Keywords: jackfruit, volatile compounds, tropical fruits, HS-SPME.*

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Effect and viability of the incorporation of coconut by-product in the elaboration of a baked salty snack

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Many snacks have excessive amounts of sodium, sugar, or fat in their formulations. By incorporating by-products into their production, the nutritional characteristics of these foods may be improved. As a result, reformulation incorporating by-products such as those obtained after the extraction of virgin coconut oil represents an opportunity to improve snack composition while also utilizing this residue. [1,2]. The objective of this work was to incorporate virgin coconut oil by-product in the elaboration of an optimized baked salty, low in sodium snack, using a Box-Behnken experimental design. The coconut by-product was gotten by a dry cold extraction process, used in the industry and communities, due to its performance and easy applicability [3]. The snack formulation included: coconut by-product, nixtamalized corn flour, water, and salt. It was possible to get a formulation with an expected desirability of 1.00, with R^2 values over 0.73 for the response variables and include over 50% of coconut by-product. The water activity and moisture were into the predicted values, while a* and b* were near the prediction. The proximal composition of the snack was (in g/100 g) 28.61 crude fat, 16.75 protein, 2.74 ash, 1.84 moisture, and 50.06 carbohydrates. The snack passed the color sensorial test, but the participants said the flavor was the most important factor in choosing a snack. The increase of the content of fat and protein into de snack is relevant because the fat from the coconut is principally the medium-chain fatty acid lauric acid. Also, the protein contains an important amount of amino acids. Is for that, that the use of coconut by-product as an ingredient of a salty snack is an interesting opportunity to enhance the nutrimental characteristics of these kinds of foods and to use this by-product.

Keywords: *Keywords: Keywords: Coconut by-product, Baked salty snack, Optimization, Water activity, Moisture, Color*

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Snacks with attributed functionality as an alternative for persons with neurological conditions

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Research has found out that nutritional support has been a key factor in arranging the performing of cognitive capacities and lessening the neurological problems. Selecting the balanced diet is extremely important for improving brain health, so new approaches are needed to design snacks that are accessible for these conditions [1]. In this work it is described the design of many products focused on patients with neuropathy. The snacks were developed using the elements that make up a balanced brain-healthy diet such as complex carbohydrates, fibers, essential fatty acids, protein, and vitamins though avoiding unhealthy foods as added sugars, trans fats, refined grains and processed food. Snacks such as a type of brownie, a Mug cake and type of nuggets were designed using oatmeal and amaranth and legumes flours. In the case of the brownie and the nuggets the formula was complemented with freeze-dried sardine flour. Sensory attributes as appearance, colour and flavour were measured with a JAR test as well as the level of acceptance for the products with patients with autism spectrum disorders and attention deficit hyperactivity disorders children of a Foundation of different ages. They found that the products were "More than what I expected" and were preferred in a ranking near 6. The texture attributes of the brownie were that hardness decreased and it was more rubbery, elastic, cohesive and chewy.

Keywords: *Keywords: snack, neurological disorders, healthy, legumes*

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Sensory and FTIR analysis as a novel method for the differentiation of cocoa liquors for fine chocolate production

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This study focuses on low-toasted criollo cocoa liquors (118 °C) that are going to be used as the raw material in the production of Colombian fine chocolates. The objectives of this investigation were the identification and differentiation of liquors of criollo cacao varieties from different geographical origins in Colombia. Fourier-Transform Infrared Spectroscopy (FTIR) (Bruker 70, Germany) was used to develop a rapid method for the detection and classification of distinct types of cocoa liquors using a small amount of sample and reducing analysis times. FTIR equipment emits a beam of infrared region irradiation (4000-400 cm^{-1}) [1], presenting functional groups and molecular bonds that absorb specific frequencies of energy [2]. Descriptive sensory analysis was evaluated in Colombia by a trained sensory panel (6 judges) (NTC-3929) [3] to define the flavor profile (chocolate, sourness, bitter, fruity, floral, green, astringency, sweet, nut, and off-flavor) for each sample. As a result, the FTIR spectra from criollo and commercial cocoa liquor were identified with similar signal patterns but differences in the intensity. Principal Component Analysis (PCA) of the FTIR spectra was developed using Minitab 17 (Minitab Inc., State College, PA, USA), presenting a variability value close to 80% correlating the sensory and FTIR results. Finally, the sensorial analysis showed values of 7.0/10 and 8.5/10 in the general impression parameter for commercial sample and criollo liquor, respectively. Besides, the criollo liquor presented a balanced profile, with the following notes: high chocolate, medium red fruits, and nutty. These notes were mainly influenced by compounds such as 2-phenyl-2-butenal and ethyl caproate identified by FTIR. In conclusion, there was a high correlation between sensory analysis and the FTIR technique to identify the Colombian criollo cacao. Besides, this differentiation process will help to revalorize the criollo cacao, promoting its cultivation on a higher scale.

Keywords: *Keywords: Keywords: Colombian criollo cacao; Fourier-Transform Infrared Spectroscopy (FTIR); Sensory Evaluation; Theobroma cacao, Principal Component Analysis PCA.*

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Cross-cultural differences in Acceptability of Mexican and American cheese products

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Cross-cultural differences are of importance for understanding the sensory differences among acceptability and willingness to purchase food products [1, 2], which could have a commercial impact. The objective of this study was to establish if there were differences in the perception of sixteen varieties of cheeses, half of them were American style and the other eight Mexican. Six students from Aguascalientes, Mexico and five students from Fresno, California participated in the study that took place during an exchange program both in Mexico and in the USA. Participants, considered as semi-trained judges, had previous sensory evaluation experience. All the questionnaires were rated in English and attributes were explained beforehand. Participants used RATA (Rate all that apply) for evaluating 19 different attributes that included appearance, aroma, texture, and flavor; a 9 point liking hedonic scale, and willingness to buy (yes/no). Results showed that the profile descriptive analysis was similar for all the cheeses evaluated. There were differences mainly in three attributes: elasticity, saltiness, and acidity; which could be explained by cheese making practices differences between countries, because in Mexico more salt is added, melting salts are used for increasing elasticity, and milk ripening takes place. The liking of products and the purchase willingness are influenced by cultural differences. American students' preferred the cheeses that they were familiar with, which also happened with the Mexican students. We found that cultural differences influence liking and perception of cheese, even though the perception of the cheeses is similar. Based on these results, the next steps are that we could consolidate a commercial alliance between both countries.

Keywords: *Keywords: Cross-cultural, Sensory Analysis, Dairy Products, Cheese.*

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Development, physicochemical properties, and sensorial analysis of three products made from chickpea (*Cicer arietinum* L.)

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Chickpea is a legume with a high protein content (18-25%) of high biological value, and a high content of bioactive compounds [1]. Therefore, the aim of this work was to develop three food products based on chickpea: a vegetable beverage (CVB) with a high amount of soluble protein and rich in polyphenols, a fermented chickpea beverage (FCB) and a fresh cheese analogue (FCA). CVB was formulated by five treatments (T1, water soak; T2, citrate buffer soak, 0.2 M, pH 4.5; T3 and T4, carbonate buffer soak, 0.2 M, pH 9.0; and T5, scalding with 0.15% NaHSO3 and carbonate buffer soak (0.2 M, pH 9.0). Total solids, lipids, ash, protein, reducing sugars, starch, mineral profile, and an acceptance test were determined in all the beverages for those with the highest protein content. FCB was derived from CVB and was obtained by fermentation with Lactobacillus delbrueckii sub. bulgaricus and Streptococcus thermophilus for 8 h. Finally, FCA derived from the solid chickpea residue resulting from the preparation of CVB to reduce the high percentage of by-products. According to results, all formulated products showed attributes (physicochemical and sensorial) to consider them as good vegetable-products with high-quality protein.

Keywords: *Keywords: chickpea, beverage, vegetable protein, fermentation, cheese analogue*

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Spent hibiscus flower powder (*Hibiscus sabdariffa* L) as ingredient in the production of petit suisse cheese

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The growing demand for healthy foods, and care for the environment, has led the agri-food sector to innovate by using by-products with a good nutritional value, which provide good technological characteristics [1,2]. The objective of this work is to use dried hibiscus flower calyx powders dehydrated by hot air flow with two different particle sizes (J60: 250 µm and J80: <180 µm), and whey protein, as powdered ingredients. to enrich petit suisse (QP) cheeses, sweetened with two sweeteners (sugar: A and erythritol:E), (QP-J60-A, QP-J60-E, QP-J80-A, QP-J80-E), for analyze its bromatological, physicochemical, mechanical and sensory properties. From the inclusion of 4.5% of J60 and J80, and 8% of protein, QP resulted that are a good source of dietary fiber, and the protein content increased to 50%, compared to the control sample (commercial product). Carbohydrates were decreased to 50% in QP-J60-A and QP-J80-A, and to 80% in QP-J60-E and QP-J80-E, this was related to moisture content since QP-J60 -E and QP-J80-E, were slightly wetter. The fat, the total solids, as well as the pH, did not present significant differences between the samples. The QP-J60-A and QP-J80-A were firmer, cohesive, consistent, and viscous than the control; differences in texture are closely related to the sweetener used and the particle size of the powder. Regarding the color, the samples with powders presented faint violet tones, compared to the control that had pink tones. All sensory attributes (appearance, texture, taste, and smell) of the QPs were close to just as they like, however, QP-J80-E was the most preferred. The use of spent roselle powder as an ingredient in the development of QP provided an excellent nutritional content, in addition to providing color, flavor and texture.

Keywords: *Keywords: Spent hibiscus flower powder, petit suisse cheeses, sensory properties*

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Personality influence on food preference in a Mexican population

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Individual personality traits are associated with multiple health-related behaviors, such as the consumption of nutritious foods and physical activity [1,2]. In the present investigation, we evaluated a Mexican population to study the relationship between the five personality traits (agreeableness, conscientiousness, extraversion, neuroticism, and openness to experience) and the preference for foods classified into 13 groups. Five hundred and seven participants answered the five-factor model personality questionnaire. In addition, they provided data on consumption frequency and level of liking for 13 food groups, the type of physical activity they perform, and data for calculating their Body Mass Index. A Pearson correlation analysis was applied to all the measured variables. Correlation analysis showed that the participants' age, gender, and socioeconomic status correlated with agreeableness, conscientiousness, and neuroticism. The liking and consumption of the 13 food groups were positively correlated, suggesting that participants consume the foods they like. Fruit and vegetable consumption was positively correlated with three of the five personality traits: agreeableness, conscientiousness, and openness to experience. The consumption of alcoholic beverages was also positively correlated with extraversion. Contrarily, the consumption of fast food and Mexican snacks, was negatively correlated with conscientiousness and neuroticism. The findings of the present investigation highlight the links between personality and preference and consumption of healthy foods.

Keywords: *Keywords: Food consumption, big five personality, food liking, Mexican population*

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Benchmarking of rice-based beverages

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The consumption of plant-based beverages is a growing trend and it has been identified as a very profitable market. By 2023 (19,669 million $ USA), the global market for plant-based beverages is expected to be significantly larger than in 2017 (9,834 million $ USA). Initially, focus was put on soy beverage, but currently other plants are attracting attention, such as the rice-based beverage. Considering the interest in this type of beverages and the market variety, the objective was to evaluate the current market in Europe and US with special emphasis on their composition and nutritional value. The non-dairy commercial beverages were analyzed based on the nutrition label and ingredients listed on the packaging or the information provided on the website of the retailers. All the drinks examined were rice-based and blends of rice-based with pseudocereals, pulses, fruits and nuts. The main ingredient in all the drinks was water, with rice being the second most important ingredient, up to 20%, although in blended drinks its presence was reduced to 3.3%. Despite rice was the main ingredient, there was significant variation in their nutritional content. Caloric content ranged from 20 to 76 Kcals, showing the lowest content the rice-based beverages and those containing cocoa providing the highest calorie content. The fat content was very variable, reaching up to 3.3 g/100 g in the case of rice-based drinks combined with nuts. The maximum sugar content found was 8%, and they were generally low in sodium (≤ 0.3%) [1]. Where fibre content was indicated, this value was less than 0.8%. The drinks with the highest protein content (1.8%) were those combined with soy. Finally, combining rice with other plant-based sources for producing drinks is a good strategy to improve the nutritional profile by modifying the lipid profile and increasing the protein content.

Keywords: *Keywords: Drinks, Non-dairy Beverages, Plant-based, Consumption*

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Effects of mild-thermal treatments over the innocuity and quality of a functional mixed fruit beverage

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Fruit consumption is important because of its components that include water, nutrients and antioxidant compounds that have been reported to have a beneficial effect in the prevention of some diseases [1]. Thus, the consumption of fruit-based beverages is perceived as a healthy habit because they maintain a large part of their bioactive compounds and nutrients [2, 3]. In this work, a mixed fruit beverage was formulated using fig, guava, cranberry, pineapple, kiwi and strawberry juices at different concentrations (Xn 26-60 % v/v). The overall acceptability (OA) of 36 regular consumers was estimated using a hedonic scale and then transformed into acceptability percentages. The formulations with the highest acceptability were pineapple juice with cranberry (Y2) with an OA value of 75 % and guava, cranberry and pineapple juice (T8) with an OA value of 85 %. Subsequently, the efficacy of mild (90,70 and 60 °C / 3 min) and ultrapasteurization (UHT, 121 °C / 2s) heat treatments was studied. Changes in microbial counts, physicochemical attributes, amount of phenolic compounds and antioxidant potential during 30 days of cold storage were evaluated. After treatments, all treated samples showed a lower presence of microorganisms. Samples exposed to 90 and 70 ºC of Y2 reached a SL of 45 days, while T8 reached a SL of 25 days. Therefore, the formulation of juices processed by mild heat treatments with low impact on the physicochemical, sensory and antioxidant potential of fruit-based beverages is an option to offer fresh, safe and functional products to consumers.

Keywords: *Keywords: fruit beverage, mild-thermal treatment, innocuity, sensorial quality*

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Kombucha with jackfruit (*Artocarpus heterophyllus* Lam): Phenols, anticarcinogenic and antioxidant effects

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The pulp of jackfruit (*Artocarpus heterophyllus* Lam) contains bioactive compounds [1] and a high sugar concentration (16-25%), making it a potential fruit for the production of fermented beverages, such as kombucha. Recent studies have shown that kombucha has antioxidant [2] and antiproliferative effects due to its content of phenolic compounds, specifically in human breast cancer cell lines (MCF-7), human colon cancer (HCT-116), epithelial lung adenocarcinoma (A549), ileocecal colorectal adenocarcinoma (HCT8) and epidemiode cell carcinoma (Hep-2) [3], effects that could be potentiated by the addition of jackfruit pulp in the development of kombucha. Therefore, the aim of the present investigation is to study the kombucha beverage with jackfruit pulp and to evaluate its antioxidant and antiproliferative effect on human hepatocarcinoma cancer cells (HepG2). As relevant results, it was found that the ethanol content presented values within the range for this type of beverage. The content of phenolic compounds and antioxidant capacity (DPPH, FRAP and ABTS) was higher in the samples with jackfruit pulp (KV60L and KV60P), mainly due to the FRAP assay (0.90 and 1.09 mg ET/mL, respectively), so it could be that the phenolic compounds present act as chelators against free radicals. The percentage viability of human hepatocarcinoma cells (HepG2) decreased with the treatment of these kombucha samples (55-75%). The KV60P sample presented better sensory (color, odor, flavor, consistency, and overall acceptability) and microbiological (total coliforms, aerobic mesophiles, and molds and yeasts) qualities compared to the KV60L and KV samples. It is concluded that the kombucha samples with added jackfruit pulp potentiate the antioxidant and antiproliferative effect on human hepatocarcinoma cells (HepG2), being the KV60P sample an alternative in the diversification of products with bioactive potential based on jackfruit.

Keywords: *Keywords: Keywords: jackfruit pulp, kombucha, phenolic compounds, antioxidant capacity, antiproliferative capacity, sensory evaluation.*

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Sensory characterization of soybean drinks made with commercial grain grown in Mexico

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In northern Mexico, there is an important production of soybeans [1]; however, no evidence of organoleptic attributes analysis in Mexican soybean products was found, so the objective of this work was to sensorially characterize soymilk made with commercial grain grown in Mexico based on seven organoleptic attributes. A panel of trained judges evaluated 11 soymilks made from commercial soybeans [2] grown in Mexico, two soymilks made from commercial soybeans reported to be free of lipoxygenases, and one control soymilk. Flavor attributes evaluated were beany, milky, greasy, toasted, bitter, metallic and rancid. The results showed that the soymilks from the JP 30790 and JP 28955 genotypes generated low beany notes. Mexican variety Guayparime S-10 obtained the lowest beany flavor note. The soymilks of Huasteca 700 and Vernal varieties obtained highest values in the milky flavor and JP 30790 and JP 28955 materials obtained intermediate values in this attribute; in rancid attribute, a value of zero was obtained in all the soymilks. The scarce beany notes and the high milky attribute, as well as the zero value in the rancid attribute favor an acceptable flavor in the soymilks. This evaluation leaves precedent in Mexican soybean varieties and prepares for a future genetic analysis to verify if they are candidate materials to be used in genetic improvement programs focused on providing better flavor characteristics.

Keywords: *Keywords: Soymilk, Beany flavor, Lipoxygenase, Descriptive analysis*

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Using evolutionary algorithms to disaggregate consumers' preferences of a sensory evaluation

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Food product design base-on consumer preferences is a pertinent form to increase the success of the products in the market. There are diverse ways to gather the consumer's preferences on a set of products. One of these ways is to perform a sensory evaluation. This type of evaluation can be analyzed using multi-criteria decision aid (MCDA) methods to choose, classify, or rank products. MCDA is an area of operational research to deal with problems with multiple criteria [1]. One of the best-known MCDA methods from a relational approach is ELECTRE-III [2]. This method is used to rank a set of alternatives or products. To perform the ranking, ELECTRE-III requires evaluating the products using a set of criteria, the values of the weights, and the thresholds of preference, indifference, and veto of each criterion. For the latter, an elicitation process with the consumer is necessary, which can be tiring. When a consumer issues an evaluation of products and he/she is asked to rank the products or the criteria, he/she does so by aggregating his preferences. Thus, to know the values of weights and thresholds of the criteria, it is necessary to use preference disaggregation methods. This work aims to disaggregate weights and thresholds issued by fifty-three non-trained panelists in a sensory evaluation. Each panelist valued six products using six criteria and provided a ranking of products in ascending preference order. The preference disaggregation was done using an evolutionary algorithm. Obtained results indicate the convenience of using metaheuristics for the exposed purpose. It is because the algorithm could obtain values of weights and thresholds of consumers with high feasibility. Using weights and thresholds of consumers can significantly support decision-makers in the product design and reduce the failure rate in the market.

Keywords: *Keywords: Keywords: Disaggregation of preferences, Evolutionary algorithms, Sensory evaluation, Product design.*

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Development of a vegan food formulated with galactan and mannitol from marine algae

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At present, the world population faces growing health problems such as obesity and overweight, which are risk factors for chronic diseases such as diabetes, cardiovascular diseases and cancer, these are due to poor diet and food consumption highly processed. In addition, brown macroalgae contain fucoidan and mannitol, the latest is a compound that is extracted from the brown seaweed *Macrocystis pyrifera* found in Mexico on the coast of Baja California, Mannitol is a polyol that is applied as an ingredient in the development of food for its properties, among which it is a non-cariogenic product and its low caloric intake, this last aspect is very important because it can be consumed by diabetic people by not increasing blood glucose levels. In this work, yogurt was made based on coconut milk due to its nutritional contribution and as an alternative to the health problems involved in the consumption of cow's milk, such as lactose intolerance and allergies. *Macrocystis pyrifera* and *Gelidium robustum* seaweed was carried out, and of its extracts obtained by hydrothermal processing, the extracts were subsequently lyophilized and stored in clean plastic bottles for later use. Two types of milk were made from coconut (*Cocos nucifera*) using water and coconut water for the extraction, called coconut milk with water and coconut milk with water and coconut water, the milks were characterized and subsequently the coconut milk yogurt was made by adding three concentrations of sucrose (0, 5 and 10%) and two concentrations of galactane (0 and 0.5%), during the fermentation (6 h) sample was taken every hto measure acidity, pH, total sugars, viscosity in final time and the viability of BAL (*Streptococcus thermophillus* and *Lactobacillus bulgaricus*) was also determined, as well as their growth kinetics in MRS agar. It can be concluded that algae extracts are useful for the elaboration of a yogurt-like product, giving it the characteristics of traditional yogurts and in the case of mannitol demonstrating its prebiotic potential.

Keywords: *Keywords: Seaweed, Hydrothermal process, Food technology, Mannitol*

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Yeasts with potential biocontrol of *Colletotrichum gloeosporioides* in avocado (*Persea americana* Mill. cv. Hass) and characterization of action mechanisms of *Yamadazyma mexicana* LPa14

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Anthracnose produced by *Colletotrichum gloeosporioides* causes avocado pre and postharvest losses. Chemical control of postharvest diseases has shown toxicological risks. Due to this concern, antagonistic yeasts can be used as a natural alternative to control this phytopathogen [1]. This study aimed to isolate and identify biocontrol yeasts from avocado fruits, select the most promising yeast to control *C. gloeosporioides*, and evaluate its action mechanisms. Twenty-three strains were isolated from the avocado fruit epicarp. Seven yeasts showed *in vitro* antagonistic potential with inhibition of mycelial growth from 60.06 ± 10.36 to 87.17 ± 8.43% ($p < 0.05$), and inhibition of spore germination from 95.32 ± 7.68 to 100.00 ± 0.00 ($p > 0.05$). These yeasts were identified as *Meyerozyma caribbica* (1), *Yamadazyma mexicana* (3), *Candida aaseri* (1), *Hyphopichia burtonii* (1), and *Candida parapsilosis* (1). *In vivo, Yamadazyma mexicana* LPa14 exhibited the highest biocontrol potential. Hence, it reduced the severity and incidence of anthracnose by 63.63 and 40%, respectively. This strain did not present toxicity and showed the ability to survive in adverse conditions of low a_w (0.96-0.98) and high temperature (38 ºC) [2]. The biocontrol mechanisms exerted by *Y. mexicana* included reduction of mycelial growth and inhibition of spore germination, wound colonization, competition for space and nutrients, biofilm formation, and production of volatile organic compounds (VOCs). In recent years, the identification and application of VOCs to inhibit fungal pathogens have been of interest [3]. VOCs produced by *Y. mexicana* inhibited the spore germination by 88.58 ± 9.28% and mycelial growth by 66.16 ± 0.72 ($p < 0.05$). The yeast volatilome included ketones, alcohols, esters, and acids. In conclusion, this study demonstrated that *Y. mexicana* is a viable candidate for the biocontrol of *C. gloeosporioides* and could be used as a suitable option to control preharvest and postharvest anthracnose in avocado fruits.

Keywords: *Keywords: Keywords: Yamadazyma mexicana, Colletotrichum gloeosporioides, Biocontrol, Action mechanism, Volatile organic compounds, Avocado.*

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Determination of zoonotic bacteria in brooded tilapia from Hidalgo State as a risk to public health

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Tilapia is one of the most popular consumed fish farmed around the world [1] and has an alimentary relevant role in the state of Hidalgo, nevertheless, its intense farming production causes a drop in the inmunitary system leading to proliferation of bacteria [2] with potential to cause zoonosis or foodborne diseases. The objective of this paper was to isolate and detect different bacteria with zoonotic or foodborne potential from fishes randomly selected, coming from farms located in the cities with major levels of aquaculture production. Colonial bacteria were isolated from several organs. Using ERIC-PCR (Enterobacterial Repetitive Intergenic Consensus) [3], we created a similarity dendrogram to discriminate clonal strains and used a specific primer to discriminate *Aeromonas spp* strains. The remaining strains were identified throughout 16s rDNA gen. Sequencing results lead to notice genres as *Acinetobacter spp, Aeromonas* (*veronii, sobria* and *hydrophila*), *Pseudomonas spp.* and *Vibrio cholerae*. Some of these microorganisms pose a threat to public health as causes of disease in humans as consequence of intake or bad cooking [4]. Acknowledge of these microorganisms become relevant as some of these pathogens can be carried in the entire production process even through storage at 4°C [5,6].

Keywords: *Keywords: Tilapia, Molecular identification, Zoonosis, Foodborne, Hidalgo*

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Bioformulation of *Yamadazyma mexicana* by electrospraying: anthracnose control and effect on postharvest quality in avocado (*Persea americana* Mill. cv. Hass)

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The objectives of this study were to optimize the composition of a bioformulation of *Y. mexicana* LPa14 by electrospraying process to obtain high survival and an intermediate release rate. Likewise, the antagonistic activity of the microencapsulated yeast for the anthracnose control in avocado fruits, and the yeast effect on the quality of avocado fruit were assessed. From a Box Behnken design of 15 treatments, the survival percentages of microencapsulated *Y. mexicana* ranged from 40.50 to 99.00%, and release rates from 0.11 to 0.42 Log CFU g^{-1} h^{-1} ($p < 0.05$). The quadratic models were properly fitted [1], and the optimal concentrations that maximized the survival percentage (95.17 ± 1.86%) of the yeast and allowed an intermediate release rate (0.32 ± 0.03 Log CFU g^{-1} h^{-1}) were: 25% whey protein concentrate, 0.03% sodium alginate and 2.25% arabic gum. The optimal bioformulation was more effective in avocado fruits stored at 6 ºC for 10 days and ripening at 25 ºC for 5 days, which reduced the severity and incidence of anthracnose disease by 88.93 and 80.00%, respectively. The gradual release of the yeast in the epicarp at 6 and 25 ºC ensured an effective concentration (7.13 Log_{10} CFU $fruit^{-1}$) to perform its antagonistic activity until day 15th [2]. Like other yeasts, *Y. mexicana* did not alter the physicochemical quality of avocado fruits [3]. In conclusion, a powder bioformulation with high viability, intermediate release, effective, eco-friendly, and safe for application in avocado fruits was obtained. The optimal bioformulation of *Y. mexicana* can be used as an alternative for the control of anthracnose during the pre and postharvest stages, and to increase the shelf life and commercial value of avocado fruits during the supply chain both in the environment (25 ºC) and cold chain (6 ºC).

Keywords: *Keywords: Keywords: Yamadazyma mexicana, Electrospraying process, Biocontrol, Bioformulation, Survival, Release rate.*

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Food Security from Family Farming as a Self-Sufficiency Approach

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According to fao, a significant part of agricultural production is devoted to meeting human demand for food [1]. The UN projects that the world's population will reach 9.735 billion by 2050 [2]. The population in Mexico, in 2018 was more than 125 million inhabitants; of this total, 39.16% of the population was located in rural localities; thus representing a significant sector that requires food self-sufficiency [3]; since economic income is minimal and there is a lack of communication routes; In addition, people's health is diminished by the lack of quality food and/or lack of availability. Thus, the present study proposes to make more efficient the availability of food from its self-production based on the practice of family gardens. A case study was developed from a backyard garden located in the Sierra de Zongolica, Veracruz-Mexico, in order to identify the impact of feeding family members since the implantation of a backyard garden, with products such as tomato, potato, pea, bean, zucchini; and raising animals such as sheep, chickens and pigs. The study showed to date, an improvement in the food parameters of family members —measurements of nutritional status and measures of health status— given that there is availability, access and stability, thus guaranteeing food security. Finally, an adequate diet allows people to develop their activities and generate defenses, so the backyard garden is an alternative that has the ability to support the cultivation and breeding of food for self-consumption.

Keywords: *Keywords: Keywords: Backyard Garden, Self-Sufficiency, Food Security, Socioeconomic Development.*

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Comparative genomic analysis of phylogeny, resistome and virulome and *E. coli* from food and clinical source.

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Escherichia coli is a resident in diverse hosts and environments, sometimes acts as pathogenic bacteria causing intestinal and extraintestinal infections [1]. This diversity of lifestyles is associated with the high plasticity of its genome, frequently involving the presence of virulence genes and an increasing number of antibiotic resistance genes [2,3]; however, understanding the transmission of these bacteria their virulence and antibiotic resistance determinants through the food chain is poorly understood. Objective: To analyze the phylogenetic relationship and the virulence and antibiotic resistance gene content of *E. coli* genomes of food and clinical origin. Seventy-seven *E. coli* genomes of food-borne and 649 of clinical origin deposited in GenBank until 2020, were analyzed *in silico*. The analysis was performed using different bioinformatics tools. Seven phylogroups (A, B1, B2, C, D, E and F) were identified in genomes from both populations, with phylogroups A, B and E being the most frequent. Of the 218 different STs found combining the two populations, only 16 STs matched. Also, we identified four pathotypes in the food genomes (EHEC EPEC, STEC, DAEC) and three others in the clinical genomes (UPEC, EIEC and EAEC). We identified 175 antibiotic resistance-associated genes with 15 antibiotic families involved, with those associated with resistance to aminoglycosides and beta-lactams being the most prevalent. Also, more than 40% of foodborne genomes showed the presence of at least one virulence gene. We identified 72 types of virulence genes, which were mostly associated with the process of adherence. This analysis revealing the wide clonal diversity of *E. coli* in both niches, highlights that foodborne strains represent a risk to human and animal health not only because of their pathogenicity but also because of the potential role of acting as reservoirs of virulence determinants and antibiotic resistance.

Keywords: *Keywords: Escherichia coli, resistance genes, comparative genomics, virulence genes, food chain.*

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Determination by isothermal microcalorimetry of the sensitivity of phytopathogenic fungi of tropical fruits against an ethanolic extract of jaca leaf (*Artocarpus heterophyllus* Lam.)

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The aims of this study were to 1) evaluate the antifungal activity of jackfruit leaf ethanolic extract on phytopathogenic fungi isolated from tropical fruits by isothermal microcalorimetry (IMC) and poison agar test, and 2) correlate by Pearson correlations the data from both assessed techniques. The kinetic parameters (maximum growth rate (μ_{Max}), total heat (ϕ_{Max}), time to peak, and lag (λ) phase) varied by fungal isolate (*Colletotrichum gloeosporioides* previously isolated from mango, avocado, and jackfruit; *Penicillium italicum* from Persian lime, *Penicillium digitatum* from orange, and *Rhizopus stolonifer* from jackfruit). Different concentrations of extract (1, 2, and 5 mg/mL) were used. The results indicated a reduction of the ϕ_{Max} produced by the fungi and a higher percentage of inhibition at a concentration of 5 mg/mL of extract compared to the control without extract ($p < 0.05$), this effect is attributed to the high content of total soluble phenols, tannins and flavonoids in the extract [1]. Pearson coefficients were established to determine the relationship between the two techniques. The correlations showed that the λ phase and μ_{Max} are highly related (> 0.51) to the percentage of mycelial growth inhibition measured in the *in vitro* test, being possible to relate the kinetic parameters to the growth of a microorganism [2]. In conclusion, the IMC allowed continuous and real-time monitoring of the assays with all tested phytopathogenic fungi, and oxygen depletion in fungal growth allowed rapid determinations. Therefore, this study contributes to the use of IMC as an alternative to complement classical fungal inhibition methods.

Keywords: *Keywords: Isothermal microcalorimetry, jackfruit leaves, ethanolic extract, antifungal activity.*

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Phytochemical characterization and pre-emergent evaluation of plant extracts of Agave lechuguilla, Larrea tridentata and *Syzygum aromaticum*.

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Weeds compete with crops for nutrients and water provided by the soil, causing poor crop development and wilting. One solution is chemical herbicides, which are harmful to health. [1]. An alternative solution are plant extracts of Agave lechuguilla, Larrea tridentata and Syzygum aromaticum with bioherbicidal activity. [2]. A phytochemical characterization was performed using three types of extraction: aqueous, ethanol and CH3COOH. Extracts were made at 10% m/v, resuspended at 2500 ppm for quantitative and qualitative phytochemical tests. Coupled HPLC-MS and FT-IR were used to corroborate the presence of the compounds. Elemental analysis showed the presence of some minerals. However, as for the germination inhibition tests, it was found that the ethanolic extracts were the ones that favored the bioherbicidal activity. It is concluded that the extraction with ethanol presents a higher percentage of inhibition, the extractions with water and acetic acid also present germination inhibition in a lower percentage, being a new alternative for the substitution of chemical products in the treatment of crops.

Keywords: *Keywords: Syzygum aromaticum, Agave lechuguilla, Larrea tridentata, herbicide, weed control.*

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Evaluation of the antimicrobial and cytotoxic effect of the *Rosa gallica* extract and development of a food supplement

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In recent years, it has been shown that certain food supplements can control or alleviate diseases caused by bacteria due to their bioactive components [1]. The aim of present investigation is the development of a food supplement type "Gummies" based on aqueous extracts of *Rosa gallica* and its proximal analysis (humidity, ash, protein, fat and fiber), as well as the evaluation of the antimicrobial effect by the diffusion method in well and by microplate for the calculation of the minimum inhibitory concentration and its minimum bactericidal concentration on *Streptococcus mutans*, *Lactobacillus acidophilus* and *Candida* spp. In addition, evaluating the cytotoxic effect using the *Artemia salina* model. The results of the antimicrobial effect tests show inhibition halos up to 9.1 mm and 8.1 mm for *S. mutans* and *L. acidophilus* respectively, while for *Candida* spp it was not inhibition. In microplate analysis, MIC were observed at 500 ppm with 90 % and 83.1 % for *S. mutans* and *L. acidophilus* respectively, the MBC were observed at 1000 ppm for both strains. Finally, within the cytotoxicity analysis, the results were considered valid as long as the value was not greater than 10 % lethality in *A. salina* [2,3]. The result was moderately toxic to the extract until 1000 ppm. In the proximal analysis of the supplement, values of 89.6 %, 1.17 %, 2.98 %, 3.31 %, for humidity, ash, protein and fat respectively were obtained. The tests showed that the aqueous extract of *R. gallica* at 1000 ppm has an antimicrobial effect on study bacteria and is not toxic at lower values of this concentration; in addition, this can present a practical way for the control of oral diseases worldwide.

Keywords: *Keywords: Extract, Rosa gallica, food supplement, inhibition, cytotoxicity.*

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Characterization and genome analysis of six novel Vibriophages associated with acute hepatopancreatic necrosis disease-AHPND

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Vibrio parahaemolyticus is the most frequent causal species of AHPND in shrimps, an important cause of gastroenteritis for humans, and economical losses in the shrimp farming industry [1]; the major activity that sustains many regions worldwide. Bacteriophages have recently re-emerged as an alternative therapy for food safety [2, 3]. A total of six novel phages, which infect Mexican AHPND-causing *V. parahaemolyticus* strains, were isolated in estuarine and beach water, and seafood from Sinaloa, Mexico. Host range assay showed that CHI, ALK, M3, C2, M9, and M83 could infect 50.0% of the strains tested. Phages exhibited latency periods of 10 to 30 min and burst sizes of 34 to 168 PFU/cell. No transfer RNA (tRNA), virulence, or antibiotic resistance genes were found in either genome and their life cycle were classified as lytic by the PhageAI platform. Phylogenetic and comparative genomics analyses assigned phages M3, C2, M9, and M83 as new members to the genus of *Maculvirus*, *Autographiviridae* family, whereas, ALK and CHI phages were assigned as new members of *Queuovirinae* subfamily. The bacterial challenge test revealed that all phages can significantly inhibit the growth of *V. parahaemolyticus* strains ($p \leq 0.05$). In summary, these phages may be a promising alternative for the control of *V. parahaemolyticus* in future *in vivo* experiments.

Keywords: *Keywords: Phages, Vibrio parahaemolyticus, AHPND, characterization, genome analysis.*

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Effect of ultrasonic nebulization in the control of blue mold and quality of Persian lemon (*Citrus latifolia* T.)

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Penicillum italicum causes in the Persian lemon the blue rot which generates great economic losses. Synthetic fungicides prevent the manifestation of fruit diseases; however, they can cause resistance in the fungi, and harm both the environment and consumers. Ultrasonic nebulization (UN) emerges as a method of application for GRAS agents with several perks: savings agents, low volumes of solution required, homogenized droplets dispersion (1 to 20 microns) and larger area of coverage. The aim of this research was evaluated the effect of UN as an application system of acetic acid (AA) and distilled water for the control of *Penicillium italicum* and quality tests in Persian lemon. The UN treatments (AA 1.0%, 1.5%) significantly (p 0.05) reduced the blue rot development, showing at 25ºC a 50% of incidence and at 15ºC a 20% in the fruits stored. The severity in preventive and curative tests at 25ºC was reduced by UN treatments from 10 mm to 2 mm in fruit wounds; while at 15ºC severity reached only 1mm in both tests. This behavior could be because AA induces the production of enzymes as a defense mechanism against pathogens, these enzymes degrade the cell wall of the fungus [1]. The quality parameters of lemons were not negatively affected by UN compared to the controls, because of fruits showed lower weight losses during 20 days of storage at 15ºC. It is speculated that the mist drops infiltrate through natural openings and the evaporation of the internal water of the fruit is prevented due to the low temperature [2]. Therefore, the application of acetic acid by UN method has the potential to control the disease caused by *P. italicum*, reducing the incidence and severity, in addition, an early application does not affect the quality parameters during prolonged storage.

Keywords: *Keywords: Ultrasonic Method, Blue Mold, Quality Parameters, Citrus Fruit, GRAS Agents.*

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Detection and quantification of *Vibrio parahaemolyticus* in the frozen shrimp process

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Vibrio parahaemolyticus (Vp) is the leading cause of gastroenteritis-related illness linked to seafood consumption [1-2]. At national and international level, measures to control Vp has been promoted and now most microbiological standards and criteria for fish and seafood include its quantification [3]. There are many studies of Vp in shrimp, but information is needed about its levels in the raw frozen shrimp process to help to set suitable controls. Thus, the main objective of this study was to quantify Vp as associated risk along the raw frozen shrimp process. For this, shrimp, water and direct contact surface samples were collected at three raw frozen shrimp processing facilities. Samples were analyzed for Vp with a previously standardized MPN-PCR method [4]. Vp was widely distributed all over the raw frozen shrimp process, almost 70% of the samples were positive for Vp. Highest values were for bay shrimp at the reception and first wash stages, while the lowest were for the final frozen product. At reception stage, 80% of the samples were positive for Vp, varying from non-detected to 4300 MPN of Vp/g. All shrimp samples were fit to human consumption according to Mexican and USA microbiological criteria, but 25% of the shrimp samples were above the Japanese recommended values (100 MPN Vp/g) [5]. Concluding, Vp was found in all the frozen raw shrimp-tail processes decreasing its levels along the process. Vp levels were influenced by shrimp origin and process stage. Shrimp processors should pay more attention to bay shrimp at the reception stage to guarantee and effectively reduce Vp. More studies are needed to support the effect of shrimp origin on Vp levels.

Keywords: *Keywords: V. parahaemolyticus, MPN-PCR, shrimp, process.*

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Antimicrobial effect of plant growth promoting rhizobacteria

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Plant growth promoting rhizobacteria are defined as saprophytic bacteria that lives in the rhizosphere and colonize plant's root, promoting plant growth and protecting it from the attack of phytopathogenic microorganisms [1], due to different mechanisms, like competition for space and nutrients and the production of several compounds, such as antibiotics, lytic enzymes, and antifungal metabolites [2]. The objective of this work was to evaluate the antimicrobial potential of strains of the genus *Streptomyces* spp. and *Bacillus subtilis* against phytopathogenic microorganisms of agricultural interest such as *Fusarium oxysporum* and *Clavibacter michiganensis*. Nine strains were evaluated, three of the genus *Streptomyces* and six of the species *B. subtilis*, of which all showed inhibition against phytopathogenic fungi *F. oxysporum*, in the case of *B. subtilis* strains, inhibitions of 11.5% to 23.1% were obtained and for the genus *Streptomyces* the percentages of inhibition were from 34.9% to 39.6%. In the inhibition assay against *C. michiganensis* most of the strains presented a 100% inhibition after five days, compared to different antibiotics used as a control. These results show that the strains used in this work have both antifungal and antibacterial activities that could be useful for crop protection, since these bacteria are found naturally in soils, which can generate an impact on production for the agricultural sector.

Keywords: *Keywords: Keywords: Rhizobacteria, antimicrobial activity, phytopathogenic microorganisms, Streptomyces spp., Bacillus subtilis.*

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Food waste habits in Chihuahua, Mexico: An Online survey

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The end of hunger and malnutrition is highlighted among the United Nations' Sustainable Development Goals (SDG), and the uneven distribution and large generation of Food Waste and Loos (FWL) are global problems. According to SDG 12.3, it is necessary to decrease in half, the per capita global food waste (FW) to achieve a sustainable food production and consumption system. An initial step is the estimation of FWL throughout the food production chain. A modified online survey (17-items questionary) was used to estimate the average household food waste in Chihuahua, Mexico, related to food consumption habits, social-demographical conditions, and general FW knowledge. The survey was widely promoted by university students and faculty from February-March 2022, for the Chihuahua State population. A total of 863 responses were collected; 65% of the respondents were women; with a median age of 36-51 years old. Results show that 58% of the respondents were frequently or always responsible for food purchases. A large proportion of respondents never bought unpleasant fruits and vegetables (58%), and in the majority of households, never or sometimes discharged fruits and vegetables (82 %). The main reasons for FW habits were that more food was bought than what they can eat (54 %), still, many reuse the food that was not consumed immediately (40%). Nearly 50 % have no previous knowledge of the FW worldwide problem. The online survey can be a useful tool to estimate the real dimension of the problem, and to prepare tailormade diffusion campaigns for different regions in Mexico. Communication and educational strategies directed at the Mexican population at large are needed, as a strategy to comply with the SDG.

Keywords: *Keywords: food waste; estimation; sustainability.*

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Evaluation of the Effect of Thermal and Thermosonication Treatments on the Safety and Nutritional Value of Cacao Mucilage Exudate

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Cocoa mucilage exudate (CME) is a cacao fruit derivative with high nutritional and energy value. CME´s high sugar (>160 g/L) content make it a microbial breeding ground, which limits its commercialization. Additionally, when CME is discarded by the industry, a negative environmental impact is generated [1,2]. Therefore, this contribution compares the effect of thermosonication (TS) with pasteurization on the CME´s microbiological and nutritional quality. A Rotating Composite Central Design with Categorical Factor was performed. Temperatures ranged from 60 to 70°C and processing times varied between 2 to 20 minutes were used. Sonication (A 50%, 5s on/off pulses) was selected as the categorical factor. The CME treated by both methods complied with the provisions of the Colombian Technical Standard 5468 for good microbiological quality. The TS results achieved a greater significant decrease of microbial load than pasteurization with optimum conditions at 65°C and 15 minutes. This was evidenced by contour graphs, where TS showed a larger minimal region. Furthermore, the minimum conditions studied (60°C, 2 minutes) showed Composite Desirability (DC) values of 0.4808 and 0.0000 for TS and pasteurization, respectively; this means that TS managed to reduce microbial load while pasteurization required higher temperature and time. Furthermore, the nutritional value for optimal conditions, potassium, zinc and TPC were maintained in a 98, 100 and 84% for TS in contrast to 70, 86 and 70% for pasteurization. In conclusion, TS enables the transformation of food by products into functional foods with commercial possibilities and is a promising emerging technology with milder restrictions on the processing operating conditions that guarantees the safety and nutritional value of fruit juices with greater efficiency than conventional methods.

Keywords: *Keywords: Cocoa mucilage exudate, nutritional value, pasteurization, thermosonication.*

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Distribution of volatile compounds during the distillation of ancestral mezcal in clay pots

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Mezcal is a Mexican alcoholic beverage divided into three categories: ancestral, artisanal and mezcal [1]. The ancestral mezcal is distinguished by its distillation in clay pots. The adequate control of this stage is essential so that the mezcal can comply with the physicochemical specifications established by the official Mexican standard [1]. This work aimed to determine the behavior of volatile compounds during the first and second distillation (rectification) of a production batch of ancestral mezcal. The Maestro mezcalero distilled a must with 4.88% alcohol by volume (ABV). The must was placed in 100 L clay pots and heated with firewood. Five pots were monitored during the first distillation and two in the rectification. For every 500 mL of distillate, 100 mL of sample were taken for analysis in a gas chromatograph and digital densimeter. The volatile compounds showed similar distillation behavior during the first distillation and rectification. In the rectification, the head fraction was cut when the distillate stream contained 70% ABV, the heart fraction was cut to 33% ABV, and the tail fraction when the flow contained 14% ABV. The head fraction was characterized by the predominance of aldehydes (97-60 mg/100 mL anhydrous alcohol), higher alcohols (630-586 mg/100 mL a.a.) and esters (2041-820 mg/100 mL a.a.); the tail fraction was distinguished by the predominance of methanol (270-400 mg/100 mL a.a.) and furfural (3.4-6.9 mg/100 mL a.a.). These results showed that during the distillation progress in clay pots, the concentrations of higher alcohols, esters, and aldehydes decrease, while the methanol and furfural concentrations increase.

Keywords: *Keywords: mezcal ancestral, mezcal distillation, distillation curves, volatile compounds*

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Production and Characterization of PHB nanoparticles loaded with carvacrol

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In this work, biopolymeric nanoparticles (NPs) were produced by nanoprecipitation and characterized. The aim was to protect and control the release of carvacrol (Ca), a natural antimicrobial (NA) plant-based that has shown activity against Gram+, Gram- bacteria and fungi [1]. The NPs were made using the polymeric matrix polyhydroxybutyrate (PHB) produced by several organisms, such as some bacteria, as a reserve energy source. PHB shows similar properties to polyolefins but is bioabsorbable, biodegradable and biocompatible [2]. NPs loaded with Ca (PHB-Ca-NPs) presented a hydrodynamic diameter (δh) between 207 and 248 nm with monomodal distributions, which represent that they are suitable for food and human health applications [3]. PHB-Ca-NPs showed polydispersity indexes (PDIs) below 0.35 in all cases. In addition, zeta potential (pζ) values were less than -25mV. The PDI and pζ values indicate that the PHB-CA-NPs are stable for at least 42 days when they are stored in refrigeration [4]. The encapsulation efficiency (EE%) and loading capacity (LC%) values were up to 34% and 31%, respectively; these values were similar to those reported in the literature [2,4]. In conclusion, it is possible to encapsulate CA in NPs of PHB with adequate δh, PDI and pζ, producing high-spectrum NA systems for food and human health applications.

Keywords: *Keywords: Polyhydroxybutyrate, carvacrol, nanoparticles, antimicrobial.*

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Influence of the exogenous application of selenium on the antioxidant properties of jalapeno pepper (*Capsicum annuum* L.)

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The Capsicum consumption market has increased in the last 30 years, with a global production of approximately 36 million tons, with Mexico being the second main producer [1]. The Capsicum fruits are a rich source of biochemical compounds such as capsaicinoids, carotenoids, vitamin C and E, and flavonoids [2], and have been used in traditional medicine with antioxidant, anticancer, among others [3]. Selenium (Se), Aluminum (Al), Cobalt (Co), Sodium (Na) and Silicon (Si) are the five main beneficial elements that have been classified as biostimulants in plants [4]. Particularly, Se is one of the elements used with biofortification purposes, and has biostimulant properties, which grants the opportunity to obtain crops with all the properties of a functional food [5]. This research aims to evaluate the antioxidant properties of jalapeño pepper fruits, in response to Se supplementation in Na_2SeO_3 and nSe forms, applied at the 15, 30, 45 and 60 days after planting, at concentrations of 1, 15, 30 and 45 mg/L. The application of nSe at 45 mg/L showed the best performance, with increments of 40% of Vitamin C (442.58 mg/100 g DW), 36.7% of total phenols (805.01 mg/100 g DW), 68.2% of flavonoids (324.7 mg/100 g DW), 13.91% of total carotenoids (0.210 mg/g DW), and an inhibition of 59% of the ABTS radical, compared to control treatment. The results showed the favorable response of the exogenous application of Se in the concentration of bioactive compounds of jalapeno pepper, as well as the opportunity to obtain functional foods that can be consume daily.

Keywords: *Keywords: Keywords: food biotechnology, bioactive compounds, selenium, antioxidant capacity, biofortification, functional foods.*

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The complete biodegradation pathway of geraniin by Aspergillus niger GH1 in solid-state fermentation

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Ellagitannins are polyphenolic compounds with great biological importance. When ellagitannins are biodegraded, a hydrolysis of these compounds occurs and produce ellagic acid, a highly bioactive compound [1]. Nevertheless, the pathway of degradation of these compounds have not been cleared. The aim of this work was to stablish the biodegradation pathway of geraniin, an ellagitannin, by solid-state fermentation (SSF) with *Aspergillus niger* GH1. Geraniin previously extracted from rambutan peel and purified was used as substrate for SSF with polyurethane foam as support, Czapeck-dox medium, and *A. niger* GH1 as microorganism [2]. The fermentation was carried out at 60 h recovering extract every 6 h. The extracts were analyzed by HPLC/MS to identify the molecules produced during fermentation and stablish the biodegradation pathway. At 0 h the principal molecule identified was geraniin, by 12 h an increase of dimers of tergallagic-O-hexoside was noticed, and by 18 h the geraniin was completely biodegraded and the amount of ellagic acid increased. The biodegradation pathway could be defined as: geraniin-dimers of tergallagic-O-hexoside-ellagic acid. This was the first work were the biodegradation of geraniin was studied and stablished.

Keywords: *Keywords: ellagitannins, ellagic acid, biodegradation, geraniin, solid-state fermentation*

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Bioactive potential of peptides obtained from amaranth by fermentation with lactic acid bacteria and Bacillus species

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Bioactive peptides are amino acid sequences that positively influence the consumer's health [1]. They can be produced from high-protein foods, such as amaranth. Bioactive peptides have already been obtained from amaranth using enzymatic hydrolysis, but there are other strategies such as fermentation with lactic acid bacteria (LAB). The objective of this work was to obtain peptides with bioactive potential from amaranth by fermentation. Amaranth seeds were purchased at a store in Saltillo, Coahuila, Mexico. The seeds were then ground and sieved. A proximate analysis of this material was performed. The percentage of total protein degradation (TPD) of 123 strains of LAB was determined using the Bradford technique. A semi-solid fermentation was carried out with amaranth flour and selected LAB. Water/salt soluble extracts (WSE) containing the released peptides were obtained. Peptide concentration was determined by the OPA method. The inhibition percentage of angiotensin converting enzyme-I (ACE-I) was determined using the ACE kit-WST. The protein concentration was 15.3 ± 0.4. The %TPD of the LAB was between 0 - 95.95%. The 11 best ones were selected which correspond to the *Enterococcus*, *Lactobacillus*, *Bacillus* and *Leuconostoc* genera. A peptide concentration of between 1.59 and 1.74 was obtained. WSE were shown to have a ACE-I inhibition between 56.76% and 80.67%. These results are higher than those reported by Ayala-Niño et al., [2]. Peptides with antihypertensive activity were released from amaranth using fermentation with LAB. The significance of the work was to recognize that LAB fermentation can release peptides with antihypertensive activity.

Keywords: *Keywords: Bioactive peptides, fermentation, lactic acid bacteria, ACE-I inhibition, amaranth*

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Extraction of ellagic acid from Mexican rambutan peel by fermentation in solid medium with a yeast.

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Rambutan (*Nephelium lappaceum* L) is a tropical fruit from Thailand, Indonesia, and Malaysia. In Mexico, it is cultivated in the state of Chiapas, which is the main producer. Rambutan peel is of great interest because it contains several bioactive compounds, including ellagic acid, which is extracted through the solid-state fermentation bioprocess that has emerged as an alternative methodology [1,2]. The objective of this work was to evaluate the growth of two yeast strains on rambutan peel and to demonstrate which of the two strains can accumulate a higher concentration of ellagic acid by solid-state fermentation. The results showed that both *S. cerevisiae* and *Y. lipolytica* adapted to the substrate increasing their biomass up to 8.75 and 11.68 % respectively, followed by the identification and quantification of ellagic acid by HPLC/ESI/MS, whereby the results showed that *S. cerevisiae* was the yeast able to accumulate a higher concentration of ellagic acid, 40.54 mg/g were obtained. In conclusion, it was demonstrated that both yeasts evaluated were able to grow on rambutan husk under solid-state fermentation conditions; however, the strain that accumulated a higher concentration of ellagic acid was *S. cerevisiae*. This study demonstrated that it is possible to recover bioactive compounds such as ellagic acid under solid-state fermentation-assisted extraction conditions. So far, no studies have been reported on the extraction of ellagic acid from rambutan peel using the solid-state fermentation bioprocess using yeast as a biological model.

Keywords: *Keywords: Ellagic acid, rambutan, SSF, yeast*

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Induced defense by secondary metabolites produced by *Bacillus atrophaeus* in tomato (*Solanum lycopersicum*) plants and fruits against *Pseudomona syringae* pv. tomato

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Tomato is one of the most economically important crops for México, however, this crop can be affected by *P. syringae pv.* tomato causing bacterial speck [1]. For the control of plant pathogens, the use of plant growth promoting bacteria has been proposed as an alternative to the use of chemical pesticides. The secondary metabolites from these bacteria can induce the plant growth and also its defense system [2]. The aim of this work was to induce the defense mechanism in tomato plants and fruits by secondary metabolites of *B. atrophaeus B5* against *P. syringae pv. tomato*. *B. atrophaeus* culture (B5) and B5 cell-free bacterial culture (BFC) were spray-applied on plants grown under greenhouse conditions and then inoculated with *P. syringae* DC3000. Methyl jasmonate (MeJA) and water were applied as a positive and negative control respectively. Plants showed significant differences in aerial part length in MEJA, B5 and BFC treatments at the 3rd month of growth. With the application of B5 and BFC a higher root elongation was observed of 78.4% and 72.15% respectively, a higher number of flowers was obtained in the MeJA, B5 and BFC treatments. Gene expression analysis revealed an induction of PAL, ERF and NPR1 gene expression in B5 and BFC treated plants. Fruits from plants treated with strain B5 and BFC in postharvest stage, the severity of disease was decreased by 63.4% and 52.1%. The results obtained suggested that *B. atrophaeus* strain B5 or its secondary metabolites are a promising candidates to promote plant growth and induce the plant's defense system.

Keywords: Tomato, P. syringae pv. tomato, defense system in plants, B. atrophaeus B5.

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Biological characterization and genome analysis of the novel phages vB_VpaP_AL-1 and vB_VpaS_AL-2 infecting Vibrio parahaemolyticus associated with AHPND in *Penaeus vannamei*

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Acute hepatopancreatic necrosis disease (AHPND) is a life-threatening disease to recently stocked shrimp [1], mainly caused by *Vibrio parahaemolyticus* and, to date, it has not been effectively controlled [2]. Bacteriophages are a promising method to control bacterial diseases in aquaculture [3], however, few studies have characterized the bacteriophages that infect Latin American strains [4]. Here, two lytic vibriophages (vB_VpaP_AL-1 and vB_VpaS_AL-2) were isolated from estuary water in Sinaloa. The host ranges were tested using ten AHPND-causing strains isolated from Mexico and phage AL-1 was able to infect two strains while AL-2 infected four. One-step growth curve showed that AL-1 produced 85 PFU/cell and AL-2 produced 68 PFU/cell in 30 and 40 min, respectively. Both phages were able to tolerate temperatures ranging from 20 to 50 °C and pH values ranging from 4 to 10. Phages AL-1 and AL-2 have double-stranded DNA genomes of 42,854 bp and 58,457 bp, respectively. In total, 53 and 92 putative ORFs associated with the phage structure, packing, host lysis, and DNA metabolism were predicted in the phage's genomes, respectively. The lifecycle was classified as virulent for both phages [5]. Comparative genomic analyses assigned phage AL-1 as a new member of the genus *Maculvirus* in the *Autographiviridae* family, and phage AL-2 as a new member of the *Siphoviridae* family. These findings suggest that vB_VpaP_AL-1 and vB_VpaS_AL-2 are potential biocontrol agents against AHPND-causing *V. parahaemolyticus* from Mexico.

Keywords: *Keywords: Bacteriophages; Phage therapy; Vibrio parahaemolyticus; AHPND.*

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Improve of the conditions of Solid-state fermentation assisted extraction (SSFAE) for the recovery of carotenoids from Mexican tomato waste

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Background: The is a food rich in multiple nutrients, highlighting the content of carotenoids, mainly lycopene for its important antioxidant activity [1]. Due to its plan origin, there are significant losses and waste [2]. The aim is to revalue Mexican tomato waste to improve the previously established Solid-state fermentation conditions and increase the content of total carotenoids recovered. **Results:** Based on previous results of this same research, an experimental Box-Behnken design was established to improve the amount of carotenoids recovered by Solid-state fermentation with *Aspergillus niger* GH1. The conditions at: 65% humidity, 33 ºC, $1x10^6$ (spores/g) inoculum size increase the total carotenoids recovered from 3.60±0.09 to 10.14±0.27 mg/g dw compared to previous studies. **Conclusions:** There are no literary reports on SSFAE for the recovery of carotenoids from tomato waste. The results allow postulating a sustainable alternative for the recovery of carotenoids. It is necessary to evaluate the quality of the recovered pigments, as well as the possibility of their application in the food field.

Keywords: *Keywords: Solid-state fermentation, Aspergillus niger GH1, Tomato waste, Carotenoids*

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In vitro melanin synthesis dark pigment with melanin-like characteristics from residues of amaranth and *Pleurotus ostreatus*

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Melanin is a polymer that has biological properties such as antioxidant activity, metal chelation, electrical semi-conductivity and the ability to precipitate proteins, among others, these properties could be used for the benefit of human health. This biopolymer is present in almost all living beings, in mammals it is responsible for the color of the skin, hair and eyes, in vegetables and fungi it is responsible for the so-called "enzymatic browning", so named because it is the product of enzymes with polyphenol oxidase activity on the polyphenols present. In search of melanin synthesis, by-products of the amaranth harvest and third category *Pleurotus ostreatus* are used to reduce a little the contamination of the field and at the same time obtain a product that replaces the melanin obtained from squid. The dark powder synthesized from extractable polar polyphenols obtained by methanolic extraction [1] as a substrate of a crude enzymatic extract with polyphenol oxidase activity obtained from *Pleurotus ostreatus* [2] gave higher absorbance readings between 200 and 400 nm which is consistent with the literature [3], gave positive reaction with ammoniacal silver nitrate, precipitated in acid medium, was insoluble in all organic solvents except DMSO and alkali. Had 143.12 ± 2.33 mgeq of gallic/g of dry sample. Showed antioxidant and iron chelating activity. In conclusion, the synthesis of a dark pigment with theoretical characteristics of melanin [3] in the laboratory is possible for its possible application in products with health benefits such as nutraceuticals, functional foods or even medicines.

Keywords: *Keywords: synthesis, biopolymer, polyphenol, melanin*

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Transient expression of an antihypertensive recombinant protein on Nicotiana tabacum leaves

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Hypertension affects millions of people worldwide and is a risk factor for developing other diseases that can lead to death. Currently, the drugs approved for its treatment generate undesirable side effects, the search for alternatives to prevent and treat this disease is an important current line of research. Peptides with antihypertensive activity have exciting potential for the development of functional or nutraceutical foods; although they have already been produced efficiently in bacteria, research focus on its production in plants is limited Recently, amaranth globulin 11s has been modified to contain the antihypertensive biopeptide VY (4x), generating the recombinant protein AMR5 (IC50 0.034 mg/mL) that has major antihypertensive activity and it has been produced only in *E. coli* [1]. The objective of this work was the transitory expression of the AMR5 on a vegetal model of commercial interest. The methodology consisted of amplifying the AMR5 cDNA and cloned into the entry vector, pENTR-D/TOPO; subsequently cloned, using the Gateway technology, into de expression vector pB7WG2D that contains the constitutive promoter CaMV 35S. The vector pB7WG2D-AMR5 was inserted into *A. tumefaciens* electrocompetent cells and positive colonies were validated by PCR. Transient expression was performed on *Nicotiana tabacum* leaves by agroinfiltration method and it will be evaluated on three contrasting times (4, 8, and 15 days after the procedure) through molecular and protein analysis using PCR and Western Blot techniques. Expected results are the amplification of the AMR5 cDNA and presence of the AMR5, in different expression levels depending on the time after the genetic transformation, on the total protein extract from the transformed leaves. The transient expression of AMR5 on vegetal models will lead the research to future vegetal based production of the antihypertensive peptide VY by stable expression of the AMR5 on plants that could potentially be nutraceutical or functional foods.

Keywords: *Keywords: Hypertension, biopeptides, ACE inhibition, transitory expression*

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Bioconversion of corn cob to ethyl acetate with W. anomalus

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The main goal of this work is to characterize different strains of *W. anomalus*, to produce ethyl acetate from agro-industrial residues. To achieve this, we evaluated five strains of *W. anomalus*, one from NRRL collection (Y158) and others isolated from natural sources (beetles' guts (CA and CB), a corn cob hydrolysate (HA), and fermented coffee grains (FC)), in a synthetic media. We took samples after incubating for 24 hours, and separate the supernatant, ethyl acetate was analyzed by gas chromatography. Rojas *et. al*, reported a maximum yield of ethyl acetate of 1.502 g/L after the first 24 hours of the fermentation [2], in our experiments we obtained a maximum yield of 0.58 g/L and 0.51 g/L by the strains CA and FC, respectively. The chromatograms depict that there are other volatile compounds produced by *W. anomalus;* according to Volkmar *et. al.*, some of these compounds may be useful for the food industry (such as ethyl propanoate and 2- phenylethyl acetate) [3]. Also, we performed experiments in a Bioscreen equipment to determine the growth kinetics and the production of ethyl acetate; a media composed of both glucose and xylose, improved the ethyl acetate production, compared to the ones formulated with only one of these sugars. The strains FC and CB yielded the maximum amount of ethyl acetate under these experimental conditions, (0.4 g/L for both strains, having a growth rate of 0.19 $h,^{-1}$, and with an initial OD_{600} value of 0.22 and 0.36, respectively), and the strain Y158 had the highest value of growth rate (0.21 h^{-1}), but the lowest yield of ethyl acetate (0.24 g/L). We concluded, that *W. anomalus* could be a suitable candidate to obtain ethyl acetate from agro-industrial residues, but it is necessary an analysis of the relationship between oxygen transfer rate and metabolism.

Keywords: *Keywords: W. anomalus, ethyl acetate, corn cob, fermentations*

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Enzymatic production from hydrothermal hydrolysates of macroalgae-*Gelidium robustum* using fungal fermentation in biorefinery terms

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The biorefinery presents a platform to utilize renewable biomasses for high added value compounds production, however, some factors keep precluding the massification of the technologies and production, mainly the rentability of the process, The focus of the present work evaluates the capacity to obtain high added value compounds using national endemic sources of the pacific coast of Mexico, it was studied the utilization of algae- *Gelidium robustum* as substrate, this biomass is currently used mainly in the hydrocolloid industry, different pretreatment conditions for the biomass fractionation was utilized, using a central composite design using conditions of 170, 180, 190 °C for 20, 25 and 30 min. The hydrolysates of the selected treatment were used as substrate comparing the growth rates between 3 species of the *Aspergillus* genera; *Aspergillus aculeatus*, *Aspergillus homomorphus* and *Aspergillus niger*. Four different configurations were used to compare the growth rates, the solid phase obtained of the pretreatment moistened with enriched media, the liquid fraction over a polyurethane inert support, and in a relation solid-liquid similar to the obtained of the obtained in the pretreatment (1:24). the enzymatic production was studied indirectly analyzing the protein content, total sugar content, pH, conductivity, β-glucosidase activity, and β-galactosidase activity of the crude fermentation extracts. An enzymatic activity was found at 86 h for β-glucosidase (0.01 U/mg). It was found that the hydrolysates and liquor obtained with hydrothermal pretreatments from *G. robustum* can be utilized for enzyme production.

Keywords: *Keywords: Bioprocess, Hydrothermal process, Algae, Seaweed*

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Cnidoscolus aconitifolius as a source of antithrombotic secondary metabolites: isolation of its bioactive compounds via liquid partitioning

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Thromboembolic diseases are the leading cause of mortality worldwide. Since antithrombotic therapy causes gastrointestinal bleeding, natural resources can be considered coadjuvant therapy [1]. According to ethnobotanical and chemical reports, *Cnidoscolus aconitifolius* represents a thromboembolic coadjuvant [2]. Previously, an ethanolic extract (JP2) reported the highest antithrombotic potential representing a bioactive compounds source [3]. In bio-guided assays only the active fractions continue the separation, resulting in the isolation of bioactive compounds. As part of a bio-guided assay, this work aimed to purify JP2 by liquid fractionation. JP2 was partitioned with hexane, ethyl acetate, butanol, and water. The fractions were evaluated in platelet-rich plasma for antiplatelet activity. Also, they were evaluated in platelet-poor plasma through thrombin and activated partial thromboplastin time assays for anticoagulant activity. Finally, they were evaluated in a previously formed blood clot for fibrinolytic activity. The data were analyzed with a two-way ANOVA. The partition process led to hexanic (JP8A), ethyl acetate (JP8B), butanolic (JP8C), and residual aqueous (JP8D) fractions. With statistically significant difference ($p < 0.01$), JP8C had the most potent inhibitory effect on platelet aggregation and blood coagulation, while JP8B had the greatest effect on fibrinolysis. In conclusion, JP8B and JP8C were the fractions with prominent *in vitro* antithrombotic activity, directing the study towards obtaining bioactive secondary metabolites.

Keywords: *Keywords: Cnidoscolus aconitifolius, Antiplatelet, Anticoagulant, Fibrinolytic, Secondary metabolites.*

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Evaluation of extraction conditions of bioactive compounds from leaves of *Amaranthus hybridus* L.

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Quintonil (*Amaranthus hybridus* L.) belongs to the *Amaranthaceae* family and is consumed in different ways [1,2]. This plant contains bioactive compounds, which are beneficial to human health [3]. Therefore, the aim of this study was to determine the best extraction conditions to obtain bioactive compounds from (*Amaranthus hybridus* L.). The extractions were carried out by soxhlet (S) and ultrasound (U) methods, performing 8 treatments and having as response variable condensed tannins (C.T.), which were determined by the HCl-Butanol quantification method and hydrolyzable tannins (H.T.) which were determined by the Folin-Ciocalteu quantification method. For both extraction methods, treatment 8 (20 min, 70°C, 1:1(m/v), 50% ethanol) obtained the most significant results. Of the different parameters and extraction methods evaluated, the highest C.T. contents were 2.12 g/L and 1.53 g/L by S and U respectively, the results for H.T. were 132.69 g/L and 109.26 g/L by S and U respectively. Akubugwo *et al.* [1] reported 0.49 for tannins by S method and Gutierrez-Avella et al. [4] reported 0.139 for tannins by U method, comparing with the results obtained, they are more significant in our present work, this can be attributed to the conditions used. In this research work, both methods favored the release of these bioactive compounds, however it is attributed that the ultrasound method is usually more advantageous for the extraction of these compounds. This type of plant has not been studied much at present, so the compounds obtained can be applied to pharmaceutical or dermatological products.

Keywords: *Keywords: Soxhlet, ultrasound, Quintonil, condensed tannins.*

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Production of requesón cheese with exopolysaccharide from fermented whey

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Whey is a byproduct of the dairy industry with great potential for the development of new products [1]. Exopolysaccharides (EPS) are molecules produced by microorganisms that have been shown to improve rheological characteristics and increase the yield of food products where they are added [2]. The objective of this project was the production of requeson cheese from whey with EPS produced by fermentation using the EPS-producing microorganisms *Lactobacillus delbrueckii* ssp. *bulgaricus* NCFB 2772 and *Streptococcus thermophilus* SY-102. We evaluated both changes in whey during fermentation and the characteristics of the requeson cheese made with both strains, comparing them with a control requeson cheese made with non-fermented whey. At the end of the fermentation, we found that the maximum level of EPS production was reached at 33 hours for both microorganisms and that both fermented requeson cheeses showed an increase in yield of 20% compared to the control. From this research we concluded that the use of EPS-producing microorganisms is a viable option for optimizing the use of whey.

Keywords: *Keywords: whey, whey proteins, exopolysaccharide, requesón*

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Enzymatic hydrolysis of whey proteins by ficin assisted by microwave heating

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Whey proteins are a rich source of bioactive peptides. Antihypertensive peptides are of special interest due to the prevalence of hypertension worldwide [1]. Enzymatic hydrolysis is the most suggested method to produce bioactive peptides. The use of vegetable proteases have been poorly studied. Ficin (EC 3.4.22.3) is a cysteine protease from fig latex [2]. The aim of this study was evaluate the effect of microwave heating pretreatment on the enzymatic hydrolysis of whey proteins using ficin. Whey proteins solutions were hydrolyzed with the vegetable enzyme ficin. Previous the enzymatic hydrolysis the protein solution was treated by microwave (MW) heating using a closed-vessel microwave digestion system ETHOS EASY (Milestone SRL, Sorisole, Italy), and the effect of the time and temperature were evaluated. The whey protein hydrolysate were analyzed for antioxidant activities viz. 2,2′-azino-bis (3-ethylbenzthiazoline-6-sulphonic acid) (ABTS), 2,2′-diphenyl-1-picrylhydrazyl (DPPH), and Angiotensin-Converting Enzyme (ACE) inhibitory activity. The electrophoresis showed the complete hydrolysis of whey proteins β-lactoglobulins and α-lactalbumins, this suggests that ficin hydrolyzed whey protein into peptides of less than 5 kD. The treatment with the highest percentage of hydrolysis was that of 85 °C and 6 minutes. The highest ACE inhibitory activity was with the MW treatment of 100 °C and 9 minutes. For the antioxidant activity, all of the treatments tested for 70 ° C had the highest antioxidant capacity in the ABTS assay. However, in the DPPH assay, a minimal activity of radical scavenging was observed. No direct relationship was found between enzymatic hydrolysis and ACE inhibitory and antioxidant activity. The enzymatic hydrolysis of whey proteins with ficin produces hydrolysates with ACE inhibitory activity and antioxidant activity, this bioactivity were increased when the process was assisted with microwave heating. This hydrolysate can be used as nutraceutical food.

Keywords: *Keywords: bioactive peptides, vegetable proteases, whey protein, enzymatic hydrolysis.*

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Optimization of chlorogenate hydrolase activity production by *Aspergillus niger* CR1

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Chlorogenate hydrolase is an enzyme that catalyzes the hydrolysis of chlorogenic acid. This enzyme can be used for the extraction of caffeic acid from chlorogenic acid-rich agro-industrial by-products [1], as well as for the synthesis of bioactive caffeic acid derivatives [2]. These compounds have important biological activities and potential applications as food additives. The aim of this work was to optimize the production of enzymes with chlorogenate hydrolase activity by *Aspergillus niger* CR1 in Solid State Fermentation (SSF). SSF was carried out in Erlenmeyer flasks using perlite as solid support and chlorogenic acid as carbon source. The effect of culture medium components on the production of chlorogenate hydrolase activity in SSF was evaluated using a Plackett Burman experimental design. Factors that significantly affected the enzyme production were optimized using a Central Composite Design (CCD). In the exploratory experiment, the concentration of KH_2PO_4, $CaCl_2$ and chlorogenic acid significantly affected the enzyme production. Chlorogenic acid acts as a carbon source and as an inducer, while KH_2PO_4 and $CaCl_2$ provide micronutrients and contribute to pH regulation. In the CCD experiment the linear and quadratic term of the chlorogenic acid concentration and the linear term of the KH_2PO_4 concentration showed significant effect on the enzyme production. The optimal conditions for chlorogenate hydrolase activity production were: 0.074 g/L of KH_2PO_4, 0.024 g/L of $CaCl_2$, and 27.1 g/L of chlorogenic acid. Under these conditions an activity of 33.1 U/L was predicted. This represents an increase of 74% of the activity obtained with the basal culture medium. In conclusion, the concentration of KH_2PO_2, $CaCl_2$ and chlorogenic acid affect the production of enzymes with chlorogenate hydrolase activity by *Aspergillus niger* CR1 in SSF. These results will allow the development of a process to obtain bioactive caffeic acid esters with potential application as food additives.

Keywords: *Keywords: Chlorogenic acid, Chlorogenate hydrolase, SSF, Aspergillus niger*

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Detection of the main egg allergens in different foods

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Hypersensitivity is an exacerbated reaction of the immune system to an agent that is harmless under normal conditions, type I hypersensitivity; mediated by IgE turns out to be the most important, due to the pathologies it generates in humans [1]. The egg stands out as a food of interest for the development of the study, due to its frequency of consumption in Mexico and the use of some of its proteins in other food processes. Ovomucoid, ovalbumin, ovotransferrin and lysozyme are considered the main allergens of the egg because they have the capacity to participate in mounting an allergic response thanks to the molecular properties of their components, these proteins are mainly found in the egg white. In this work, the production of polyclonal antibodies [anti-egg white] was made and the detection of egg protein allergens in some foods was evaluated by means of ELISA and Western Blot methods in different foods. By Western Blot, was detected ovalbumin in raw egg, fried egg and cake; ovomucoid was detected in fried egg, cake and flan. By ELISA method the egg allergens were detected in raw egg, fried egg, cake, mayonnaise and flan. This is important, since it allows us to know if any food contains these allergens that could cause damage to the health of some hypersensitive people. Especially in foods where it is not declared that it contains eggs.

Keywords: *Keywords: Allergen, antibody, egg, ovalbumin, ovomucoid, ovotransferrin.*

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Comparison of the antioxidant activity of medicinal plants used as anti-inflammatory infusions in Viesca, Coahuila.

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The Mexican semidesert is distinguished by its endemic vegetation, the inhabitants take advantage of this vegetation in different ways and through empirical practices they attribute to certain plants the remedy against certain affections. The objective of this research was to evaluate and compare the antioxidant activity of aqueous extracts of four semi-desert plant species from Coahuila (Parthenium hysterophorus, Ephedra antisyphilitica, Heterotheca inuloides, Parthenium incanum). A phytochemical profile and a bromatological characterization were carried out where the percentage of ash, moisture, fat, fiber, protein and sugars were measured; the total antioxidant activity was determined through ABTS, DPPH [1] and FRAP [2] reductions. It was evidenced that the plant with the highest antioxidant capacity was E. antisyphilitica with 88% reduction of ABTS radical, 87.5% reduction of DPPH radical and 88.01 mg eq trolox/g sample, the species with the closest values was H. inuloides with 87.31%, 23.51% and 23.05 mg eq trolox/g sample respectively. It is concluded that E. antisyphilitica has the highest antioxidant capacity compared to other plant species in the region, it was also identified that E. antisyphilitica is a little studied and valued species, finally the results confirm the potential use of E. antisyphilitica as a supplier of antioxidants in biotechnological processes for its revaluation.

Keywords: *Keywords: ABTS, DPPH, FRAP, Mexican semidesert plants.*

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Unconventional starches incorporated into cocktail sausages

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Starch in native form as raw material has wide application in food development due to its techno-functional characteristics. Starch is used as a binder in sausage manufacture due to its ability to increase water and fat retention [1]. In this context, the objective of the present investigation was to evaluate the effect of the addition of native starches from the fruit *Sechium edule* (SS) and the bean *Phaseolus vulgaris* (PS) in cocktail sausages for their moisture content, water holding capacity (WHC) [2], emulsion stability [3] and texture profile analysis. The sausages were prepared with beef and pork; the standard formulation was compared with two different starch mixtures. The starch combinations were: 1) 1.5% SS, 1.5% PS and 6.0% of a gelling agent; 2) 1.5% SS, 6.0% PS and 1.5% of a gelling agent, (at a total solid concentration of 9% w/w). The samples were stored at 4 °C until analysis. The results indicated that the 2 starch mixtures, for the moisture content and WHC, were that lower that the control ($P<0.05$) by 66.98±0.48% and 1.88±0.21 %, respectively. The emulsion stability, determined for water loss (WL) and fat loss (FL), in the cocktail sausages with the starch mixtures showed a statistically equal behavior ($P>0.05$) to the control; where, WL was 60.59±4.19 % and FL was 53.50±4.17 %. The starches addition, in their 2 combinations, maintained the structure of the cocktail sausages, evidenced in the texture profile analysis, by the hardness (1089.5±350.45 g), adhesiveness (0.75±0.23 mJ), resilience (0.084±0.02), cohesiveness (0.236±0.07), springiness (15.315±2.31 mm), gumminess (233.14±80.05 g) and chewiness (33.05±12.33 mJ). As such, it is concluded that the starch mixtures of this research have application as a binding agent and emulsion stabilizer without any effect on textural properties of the sausages.

Keywords: *Keywords: starch, binder, Sechium edule fruit, Phaseolus vulgaris, emulsion, texture.*

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Cnidoscolus aconitifolius as a source of antithrombotic secondary metabolites: isolation of its bioactive compounds via vacuum liquid chromatography

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Thrombosis is the leading cause of mortality worldwide. Since antithrombotic drugs cause gastrointestinal bleeding, natural resources could represent a coadjuvant therapy [1]. Ethnobotanical and chemical studies indicate that *Cnidoscolus aconitifolius* has a coadjuvant potential in thrombosis [2]. In previous work, the ethyl acetate (JP8B) and butanol (JP8C) fractions were obtained by partitioning from the ethanolic extract (JP2). These showed high antithrombotic potential, representing bioactive metabolite sources. In bio-guided assays, the active fractions continue the separation, resulting in the isolation of the bioactive compounds [3]. This work, aimed to fractionate JP8B by vacuum liquid chromatography (VLC). Therefore, JP8B was purified by VLC using hexane, ethyl acetate, methanol, and water. For antiplatelet activity, fractions were evaluated by the turbidimetric technique in platelet-rich plasma. They were also tested for anticoagulant activity in platelet-poor plasma using thrombin and activated partial thromboplastin time assays. Finally, fractions were tested for fibrinolytic activity in a previously formed blood clot. The VLC led to 22 fractions named from JP9A to JP9B. The homogeneous group JP9I–JP9K presented the highest antiplatelet effect, while the homogeneous group JP9S–JP9U presented the highest anticoagulant and fibrinolytic effects. The multivariate ANOVA indicates that JP9U presented the highest global biological effect. JP9U presented prominent in vitro antithrombotic activity, directing the study towards bioactive secondary metabolites.

Keywords: *Keywords: Cnidoscolus aconitifolius, Antiplatelet, Anticoagulant, Fibrinolytic, Bio-guided assay.*

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Solid-state fermentation assisted extraction of bioactive phenolic compounds from grape pomace

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Mexico has an annual grape production of 351.31 million tons [1], of which 80% is destined for the wine industry. This industry generates between 60-50% of waste during processing, generating a problem with the treatment and final disposal of this waste, which could be used to obtain bioactive compounds by different methodologies. The effect of solid-state fermentation (SSF) of grape pomace with *A. niger* GH1 on the release of bioactive phenolic compounds with antioxidant capacity was studied. Methodology. A SSF was carried out using grape pomace as substrate and support; the conditions for SSF were temperature of 30°C, the humidity of 70%, pH 5, inoculum number of $1x10^6$spores/mL, in 108 h kinetics with sampling every 12 h [2]. Results. In the evaluations of compounds of interest, total flavonoids and condensed tannins showed increases according to the initial values, for total flavonoids an increase of 4.5 with respect to the initial value was registered for 84 hours of fermentation, and for condensed tannins an increase of 1.2 was obtained for 12 h of fermentation. HPLC analysis showed the presence of compounds such as quercetin and 4-vinylguaiacol, which report anti-inflammatory activity [3,4]. Conclusions. The ability of the fungus to degrade the cell wall allows the release of bioactive phenolic compounds present in grape pomace.

Keywords: *Keywords: Extraction, Grape pomace, Fermentation, Bioactive compounds.*

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