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(Asociación de Biología de Tucumán)

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LECTURES

A1
"Miguel Lillo" Lecture

CONTINUOUS CROSSTALK BETWEEN FUNDAMENTAL SCIENCE AND BIOTECHNOLOGY FOCUSED ON THE FUNCTIONS OF TRANSCRIPTION FACTORS UNIQUE TO THE PLANT KINGDOM

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Plant Molecular Biology research is usually carried out on model species such as *Arabidopsis thaliana*, *Nicotiana benthamiana* or *Oryza sativa* non-commercial varieties grown in chambers or greenhouses. Although model plants are undoubtedly useful, there is a long way to run from these assays to crop field trials. The sunflower genome encodes some divergent transcription factors, not resolved in phylogenetic trees into the same groups as those from other species. Among them, HaHB4 and HaHB11 belong to the HD-Zip I family. *HaHB4* conferred drought and salinity tolerance to Arabidopsis plants, whereas *HaHB11* improved yield and tolerance to waterlogging and flooding. Soybean, maize, and wheat transgenic plants were obtained and evaluated in the greenhouse and field trials in different environments. Some, albeit not all, of the beneficial traits observed in Arabidopsis, were conserved in the crops. After a long and tedious regulatory process, wheat and soybeans expressing *HaHB4* were approved and released for commercialization in 2022. HaHB4 wheat outyielded 26 to 95 % its control in multiple field trials, depending on the environment. *HaHB11* generated tolerance to waterlogging and defoliation in maize in both lines and hybrids. It also increased the yield of soybean and rice plants, bringing the latter closer to their ideotype. Both technologies were then applied in elite varieties adapted to different environments with positive results. A detailed analysis of the plants transformed with each of these genes indicated that they both shared an increase in yield that correlated with the increase in stem diameter. We found a manual technique, applying weight for short periods and did not involve transformation succeeded to produce stem enlargement. Such strategy was used with tomatoes, chia, strawberries, quinoa, pepper, forestry, and other species, increasing the number of vascular bundles and stem diameter, positively impacting production and plant health. This story exemplifies the continuous crosstalk between fundamental science and biotechnology and also highlights the relevance of interdisciplinary work, necessary to achieve successful results.

A2
Opening Lecture

FORENSIC ENTOMOLOGY IN NORTHWESTERN ARGENTINA: FROM SUCCESSION EXPERIMENTS TO EXPERT'S EXAMINATION PRACTICES

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In the field of legal –both civil and criminal– investigation, in some situations it is necessary to accurately determine the moment of death. The time elapsed between death and corpse discovery is termed Postmortem Interval (PMI). At the start of decomposition, the cause, manner and time of death can be established using medical parameters up to 72 hours after death. However, as the process advances, determining PMI in the autopsy becomes more difficult and less accurate. In some circumstances, like homicide or sudden death, the corpses can be exposed to the natural effects of the environment, including colonization by insects that use the human remains as a source of food or protection. The study of insects associated with a corpse allows us to determine the PMI; this field is known as forensic or legal medical entomology. The estimation of the PMI requires knowledge of the life cycle of insects, their relationship with decomposition stages and the habitat where they are found. Therefore, it is necessary to have basic information about the local carrion entomofauna. For these purposes, field

experiments are conducted to collect the basic information to define this baseline for forensic expert's examinations. These decomposition studies use the domestic pig *Sus scrofa L*. because it is considered an analogue of the human body in terms of decomposition. In the province of Salta, studies on insect succession have been conducted since 2003, being the first records for northwestern Argentina. These investigations determined the systematic assembly of insects for all the seasons and their association with the different stages of corpse decomposition. The information obtained is used to perform the usual entomological expert's examinations applied to criminal cases, in compliance with the requirements of the provincial and federal courts. It is necessary to develop new databases and enhance the available ones with succession experiments conducted in other regions and under different environmental conditions, considering different scenes, with the aim to train expert entomologists.

SYMPOSIUM: "FOOD CHAIN INNOVATION: TECHNOLOGIES AND EMERGING PRACTICES TO IMPROVE PRODUCTION AND PROCESSING FOOD SUSTAINABLY"

A3

BIOPROCESSES FOR AGRO-INDUSTRIAL SUSTAINABILITY IN CUYO: FROM WASTE TO FOOD AND BIOACTIVE COMPOUNDS

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(On behalf of Sociedad de Biología de Cuyo)

Since the last years there has been a great interest about uses of food industries solid wastes. In a circular economy context, key for activity sustainability, where the purpose is a constant flow, solid waste must be used as resources to re-enter the production system. Technology based on bioprocesses is constituted as an alternative for this. In Cuyo region, the most representative agroindustry is related with olive cultures for oil production and grapes for wine and derivatives production. In San Juan, particularly, there are other emerging agroindustry, with a lot of potential, associated with the pistachio cultivation of and pomegranate for concentrated juice production. These activities produce tons of solid or semi-solid, lignocellulosic waste, dark in color, acidic in pH, with low porosity and a pasty texture that can reduce aeration. Organic matter includes toxic compounds such as polyphenols, polyalcohols and volatile fatty acids, which have phytotoxic effects. Their seasonal accumulation has a potential negative impact on the environment if they are not treated, since they affect soil, water sources and air quality. However, the compounds present in these solid wastes can serve as a carbon source for microorganisms through a bioprocess such as Solid State Fermentations (SSF).A Solid State fermentation is a fermentation carried out by microorganisms on solid substrates in the absence of free water. The microorganisms can be filamentous fungi, yeasts, and bacteria and the bioproducts obtained represent potential use in the industries of forage, fuel, food, chemical and pharmaceutical products, and bioremediation. In this conference, SSF applications of agro-industrial waste for ligninolytic enzymes and edible mushrooms production will be shown.

A4

SIMPLE AND ECONOMIC PROCESS TO OBTAIN A WHEY-DERIVED FOOD INGREDIENT

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In Argentina, the dairy industry represents an important sector of the economy and the productive capacity is quite concentrated. There are substantial differences between the large dairy companies and the smaller ones; this inequality is reflected not only in the milk processed volume but also in the technologies used to their effluents´ treatment. Whey (W) is the liquid released

after casein coagulation and is the most abundant by-product generated in cheese production, representing ~85% of the volume of milk used. W retains a significant amount of nutrients from milk, being proteins and lipids the more relevant. These biomolecules are dispersed in a high volume of liquid, which cannot be used as such for human consumption due to its unpleasant taste. The treatments that are currently used to recover W nutrients are inaccessible to small cheese producers; thus, efforts have been made in the development of a process that allows the concentration of proteins and fat from W at low cost, without the need for investment in equipment or infrastructure. The basis of the process is the electrostatic interaction established between W-proteins (β-lactoglobulin and α-lactalbumin) and carboxymethylcellulose, which gives rise to associative phase separation in acid medium. The variables of this coacervation process were adjusted on a pilot scale, making it possible to obtain, from 100L of W, 25L of a liquid protein and fat concentrate. This pseudoplastic fluid presents colloidal characteristics and is stable at pH≥4. The proteins retain their thermal aggregation capacity and although the concentrate does not have foaming capacity, it does form and stabilize emulsions. The concentrate can be completely redispersed if it is lyophilized, in a volume 1.6 times smaller than the original, which allows increasing the protein concentration for the production of gelled structures. The liquid concentrate has been found appropriate as an ingredient in a variety of foods: dairy desserts, cheese spreads, ice creams, and breads.

A5

APPLICATION OF MOLECULAR AND MICRO-SPECTROSCOPIC TECHNIQUES IN MEAT QUALITY DETERMINATION

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(On behalf of Sociedad Argentina de Biología)

Beef production is a highly relevant activity for the agri-food system in Santiago del Estero, the region, and Argentina due to its export potential. The quality of the meat is developed throughout the production chain. The production system links seek to respond to market demands with defined quality standards, with the aim of guaranteeing the consumer the origin, quality, and traceability of the product. In this context, we have approached the study of beef quality using molecular and micro-spectroscopic techniques, comparing these results with conventional physicochemical techniques, which allowed us to characterize samples from animals finished in different management systems. Among the employed molecular techniques, the analysis of genome-wide association has enabled the identification of potential molecular markers associated with genes that determine meat quality. For the tenderness attribute, the identified genes are related to fatty acid metabolism, while for the marbling characteristic, genes involved in the olfactory receptor pathway, integral membrane components, and signaling were highlighted. These results allowed the establishment of an advanced technological service (STAN) for the evaluation of microsatellite markers in Braford cattle. Simultaneously, the expression of genes associated with quality attributes (protein and lipid oxidation, tenderness, intramuscular fat content, among others) was determined, showing differential expression between animals supplemented with corn silage and pasture-finished animals. On the other hand, the effect of post-mortem ageing time and the activity of proteins that contribute to the tenderization process were studied. The obtained results suggest that these proteins remain stable for 14 days of ageing and both contribute to the degradation process of muscle fibers, enhancing meat tenderness. Finally, the use of Raman micro-spectroscopy (RMS) as a non-invasive tool to predict quality attributes, including tenderness, and the use of scanning electron microscopy (SEM) to characterize muscle fibers were evaluated. In this regard, the analysis of Raman spectra and SEM images allowed the identification of bio-physicochemical markers and differentiation between tender and tough samples, as well as between fresh and aged samples. The obtained results suggest that the implementation of evaluated molecular and micro-spectroscopic techniques provides information to enhance pre- and post-slaughter practices in meat production systems and proves highly useful for the meat industry.

A6

INOCULATION OF *BACILLUS* SP. CHEP5 AS A BIOLOGICAL STRATEGY FOR THE CONTROL OF FUNGAL DISEASES IN PEANUT

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Peanut production in Argentina is characterized by the excellent organoleptic and sanitary quality of the grain obtained. The largest cultivated area has been registered in Córdoba, becoming a crop with a marked regional profile. Fungal diseases negatively affect the crop, highlighting leaf pox, and as diseases of the rhizoplane, blight, wilt, rot and smut of peanut caused by *Thecaphora frezii*, a disease with the highest prevalence and intensity. Infection by *T. frezii* occurs when the gynophores penetrate the soil (at the time of peg development), affecting the ovary and then, the grain. The rhizoplane disease that represents our pathosystem model of study is wilt caused by *Sclerotium rolfsii*. In trials in plant culture chambers, the inoculation with bacterium *Bacillus* sp. CHEP5 reduced the incidence and severity of wilting and induced the plant defense response by increasing peroxidase activity and the production of phenolic compounds. Taking into account that biotechnology constitutes a useful tool in sustainable agriculture, the use of biocontrol microorganisms is considered one of the alternatives with the greatest implementation success. In field trials carried out during three agricultural seasons using an application scheme both in furrow and foliar and at different times, the effect of *Bacillus* sp. CHEP5 on peanut smut was evaluated. The incidence (percentage of diseased pods) and the severity (five grade scale) of the disease were determined. The lowest values of incidence and severity were registered in plants inoculated with *Bacillus* sp. CHEP5 in the furrow and 10 days before or after peg development, observing a decrease of 86% and 82%, respectively. In addition, an increase in the amount of phenolic compounds was found in these plants, indicating an induction of the plant defense response. Based on these trials and the studies carried out previously in the peanut-fungal pathogen-*Bacillus* sp. CHEP5 interaction, it is concluded that this bacterium represents a biotechnological alternative that can be adopted in the integrated management of fungal diseases, contributing to a sustainable peanut production.

A7

INTEGRATION OF TECHNOLOGIES AND STRATEGIC ALLIES THAT CONTRIBUTE TO SUSTAINABLE PRODUCTION

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Food provision while mitigating environmental impact will constitute a challenge because it requires a substantial rise in food production without deleterious impacts on natural ecosystems. Historically, agricultural revolutions have hinged upon advancements in cultivar development, intensified inputs utilization, and the expansion of arable lands. Future food production mandates an extension of agricultural frontiers into regions characterized by adverse climatic and soil conditions, coupled with a reduction in the usage of agrochemicals. Biotic and abiotic stresses have a detrimental impact on plant growth, reproduction, and, consequently, on agricultural activities, resulting in diminished yields, profitability, and quality. In this context, plants have evolved mechanisms for acclimatization and adaptation, enabling them to endure adverse environmental conditions. These adaptive responses encompass morphological-mechanical, biochemical, and molecular processes. Bioinputs, such as biofertilizers and bioinductors, emerge as ecologically promising alternatives, presenting the challenge of sustaining food production and economic viability while adhering to more natural and sustainable agricultural practices. Bioinputs encompass microorganisms, chemical agents, and extracts derived from microorganisms or plants, all of which exhibit the potential to augment crop yields and overall plant health. Particularly, horticultural crops, notable for their direct human consumption,

intensive cultivation, and susceptibility to various phytosanitary issues, stand to reap substantial benefits from these natural and sustainable technologies. Notably, the application of bioinductors and plant growth-promoting bacteria led to promising outcomes, including increased crop yields in both field and greenhouse environments, enhancements in fruit quality parameters, and augmented resistance against pathogenic fungi, as well as heightened tolerance to abiotic stresses.

POSTER PRESENTATIONS

A8

HEMOGLOBINOPATHY S COMBINED WITH OTHER CONGENITAL ERYTHROCYTE PATHOLOGIES IN TUCUMÁN

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Hemoglobinopathies are inherited disorders caused by defects in globin genes. Their coexistence with other erythrocyte pathologies generates a complex clinical and hematologic phenotype, the diagnosis of which requires a combination of clinical evaluation, laboratory tests and family study. Objective: To determine the hematologic phenotype of hemoglobinopathy S co-heritance with other congenital erythropathies and its frequency in Tucumán. Methods: A descriptive cross-sectional study was carried out between 2003 and 2023, including 1195 individuals who requested investigation of hereditary anemia in the Laboratory of Clinical Biochemistry I. Hemogram, iron profile, hemoglobin electrophoresis (HbE), sickling and complementary tests were performed. Results: Hemoglobin (Hb) S was detected in 42 patients (4%), of which 28 were heterozygous (HbAS), 7 homozygous (HbSS) and 7 compound heterozygous [HbS/βThalassemia; HbS/HbC; HbS/Hereditary Spherocytosis (HS)]. In the HbAS group the majority were adults and had a normal hematologic profile (mean Hb g/L males: 14; females: 12.5). HbSS cases were detected in children aged 1-5 years old with severe anemia, positive sickling test, and mean levels HbS of 83% and HbF of 15%. The HbS/βThalassemia cases evidenced marked anemia with a high HbA2 concentration (4.9%) and the presence of IVSI-1 mutation. The HbS/HbC coexistence was confirmed by alkaline and acid EHb. Cases with HbS/EH had normocytic anemia, reduced erythrocyte osmotic resistance, positive sickling and presence of HbS in the EHb. Conclusion: The HbS heterozygous state generally presents no symptoms, whereas the coexistence of other erythrocyte pathologies leads to a more severe hematologic and clinical phenotype, which requires the use of specialized techniques and family study. Accurate diagnosis is essential for appropiate treatment and genetic counseling.

A9

IMPACT OF OXIDATIVE STRESS AND SPERM DNA FRAGMENTATION ON MALE FERTILITY

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An imbalance between oxidant-antioxidant conditions in seminal plasma generates oxidative stress in the gametes, causing damage to the sperm DNA and its membrane, conditioning the paternal genomic contribution to the embryo. Objective: To evaluate the seminal oxidant-antioxidant balance and sperm DNA fragmentation in men without offspring under assisted reproduction treatment. Methods: Semen samples from patients without offspring and with repeated failures of in vitro fertilization treatments were studied (GP). The control group (CG) consisted of men with proven fertility and normal seminal

parameters (WHO 2010). The following were determined: a) spermogram, b) thiobarbituric acid reactive species (TBARS); c) antioxidant defenses: superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GPx); d) proinflammatory cytokines: IL-6 y TNF-α; and e) sperm DNA fragmentation. Statistical analyzes were performed with InfoStat software. Results: The GP group showed significantly lower levels of spermatozoa with normal morphology compared to controls (Kruger % PG= 3; CG=5). TBARS concentration was significantly higher in GP than in CG [µmol/L GP=2.69 (2-3.4); GC= 2.30 (1.64-2.85)]. GP showed significantly higher CAT activity than GC; SOD levels were significantly lower than controls (mUSOD/mg prot GP=946.55 (565.9-1053.3); GC=1077.8 (917.6-1248.5). TNF-α was significantly higher in GP [(pg/ml) GP= 11.6(3.93-15.9); GC= 2.74(1.88-7.65)], and IL-6 were similar in both groups. Greater sperm DNA damage was observed in GP. Conclusions: These results show that gametes from the GP group show greater redox and inflammatory imbalance negatively affecting sperm DNA integrity. Early detection and intervention to correct these imbalances could improve the effectiveness of assisted reproduction treatments in this group of patients.

A10

ASSOCIATIVE CHRONOBIOLOGICAL STUDY BETWEEN PERCEIVED LIFE QUALITY AND ALTITUDINAL GRADIENT IN ECOREGIONS IN THE PROVINCE OF JUJUY (2022)

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The province of Jujuy has differentiated ecoregions due to the altitudinal and topographic gradient, whose altitude ranges from 400-6000 meters above sea level, generating a variety of environments to which human populations distributed in the province are exposed. Objective: To study the association between altitude and subjective life quality, in three of the most representative populations of the higher ecoregions in contrasting seasons (Summer - Winter 2022), hypothesizing that altitude influences people's perception of well-being. Methodology: 78 individuals were studied, selecting those with a neutral chronotype, generating a tetra-dimensional profile (physical health, mental health, social relations and environment) and 2 items on the perception of quality of life and personal health, using the standardized WHOQOL-BREF (W-B) questionnaire as it has shown psychometric power in previous research. (Hernández et al, 2018). Statistical analysis: ANAVA, Kruskal Wallis, simple correlation and linear regression. Results: The statistical analysis showed a clear association between the analyzed variables (altitude -masl- and average of W-F values, perceived life quality) for the winter season (R2=0.955), the opposite being the case for the Summer season (R2=0.359). The tetra - dimensional profile obtained from the rest of the variables studied, accompanies these results. Conclusion: There is a marked association between perceived life quality (W-B) with the altitudinal profile in the Winter season, but not in the Summer season, where the trend is reversed in low altitude areas. This is reflected in the climatic comfort.

A11

SARS-COV-2 VIRAL LOAD DETERMINATION IN WASTEWATER DURING THE SECOND AND THIRD WAVES OF COVID-19 IN TUCUMÁN, ARGENTINA, AS AN EPIDEMIOLOGICAL SURVEILLANCE TOOL

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Wastewater-based epidemiology (WBE) provides temporal and spatial information about the health status of a population. The objective of this work was to analyze and report the epidemiological dynamics of SARS-CoV-2 in the province of Tucumán, Argentina, during the second and third waves of COVID-19. During the period April 2021 and March 2022, 16 sampling points were studied, from which wastewater samples were collected over time. For the SARS-CoV-2 search, viral concentration with PEG (Polyethylene Glycol) was performed from the samples, and pellet homogenization with TRI Reagent® followed by RNA purification. Detection of viral nucleocapsid markers (N1 gene) was carried out using one-step RT-qPCR. Viral loads were determined for each positive sample using a standard curve. The results were related to the number of positive cases on the sampling dates. A higher number of copies/ml was observed on days prior to peak cases, and a sharp decline in positive cases was associated with a low viral load. The results made it possible to monitor the behavior of SARS-CoV-2 infection by determining viral load during epidemic outbreaks consistent with the second and third waves of COVID-19. Wastewater monitoring is a useful epidemiological indicator to anticipate increase in cases of COVID-19, detect infection outbreaks, and thus monitor the progress of the pandemic.

A12
CODING, CLASSIFICATION AND RESPONSIBLE DISPOSAL OF EXPIRED MEDICINES OF HOUSEHOLD ORIGIN IN THE PERIOD 2022-2023

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The inadequate disposal of disused or expired drugs (DED) has led to a significant increase in their traces in surface and groundwater, soils, and aquatic flora and fauna, which constitutes a global concern due to the environmental contamination they generate. Objectives: to collect DED of household origin in the Municipality of San Miguel de Tucumán in the period 2022-2023; to segregate and code the DED according to the Anatomical, Therapeutic, Chemical (ATC) Classification System; and to carry out the final disposal of the expired medicines collected. Students and teachers of the Pharmacy University carried out responsible DED collection campaigns in public spaces of the capital's municipality and in the Department of Pharmacognosy. During the segregation, medicines were separated from recyclable materials. The DED were classified by pharmaceutical form and chemical nature of the active ingredient (AI), which allowed coding. Seven collection and awareness campaigns for the safe disposal of DED were scheduled and carried out. 1,400 kg of recyclable material was recovered and sent to municipal urban waste collectors. A total of 426 AIs was coded, the majority of them were solids and semisolids of low and medium hazardousness: 15% analgesics – anti-inflammatories (acetylsalicylic acid, paracetamol, ibuprofen); 9.7% antihypertensives (enalapril and carvedilol); 9.5% lipid-lowering agents (statins); 8.6% hypoglycemics (biguanides and sulfonylureas), and 8.3%. Vitamins, highly hazardous: 12.5% antibiotics (β-lactams and aminoglycosides), and 9.4% controlled medications (alprazolam, benzodiazepines). Final disposal was carried out by encapsulation (65%), dilution (20%), inertization (10%), hydrolysis (3%), and thermal decomposition (2%) according to the chemical characteristics of AI. The encapsulated medicines were used to make bricks that will be used as foundations for benches in green spaces outdoors. These actions contributed to raising awareness among the population and reducing the environmental risks of these emerging pollutants.

A13

ACQUIRED FACTOR VIII INHIBITOR, AN IMMUNOLOGICAL PROBLEM. REPORT OF 5 CLINICAL CASES

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The association between the hemostatic and immune system is longstanding. An imbalance of the immune system, whether due to idiopathic causes, pregnancy/childbirth or underlying disease can trigger the formation of autoantibodies that would be

responsible for breaking the hemostatic balance, leading to bleeding or thrombosis. Acquired factor VIII inhibitor or acquired Hemophilia (AH) is a rare bleeding disorder but with high morbidity and mortality. It usually presents as sudden bleeding in patients with no history of coagulopathy. The laboratory plays an important role in carrying out reliable and reproducible tests that allow detecting the presence of the early specific FVIII inhibitor and monitoring its remission during treatment. Five patients between 30- and 71-years old presenting with symptoms of massive bleeding were studied and referred to the Haemastasis Laboratory. Basic tests were performed such as Prothrombin Time (PT), Activated Partial Thromboplastin Time (APTT), Thrombin Time (TT), Fibrinogen (Fib), factors dosage (VIII, IX, XI and XII), correction tests with normal plasma, FVIII Inhibitor Potentiation test, factor VIII parallelism curve and VIII Inhibitor quantification. An ACL TOP 300 automatic coagulometer with IL reagents was used. Results: all 5 patients showed prolongation of the APTT (median: 79 sec, range 54-111 sec), medication interference was ruled out with TT. All showed no correction with normal plasma (Median Rosner Index: 20, range 20 to 22.5), very decreased Factor VIII levels (Median 0.5, range: 0 to 6.5 U/dl), parallelism curve with values less than 0.98 (Median 0.92, range: 0.74 to 0.94); Potentiation values greater than 10 (median 14.5 range: 11 to 79); and positive inhibitor quantification (Median: 11, range 2.8 to greater than 32 UB/mL). Conclusion: Acquired factor VIII inhibitor is a very rare pathology with high morbidity and mortality; the favourable evolution of the patient depends on the correct and early diagnosis, being crucial the standardized work methods of a trained laboratory.

A14

RESPIRATORY SYNCYTIAL VIRUS CIRCULATION IN HOSPITALIZED CHILDREN UNDER 5 YEARS OF AGE. TUCUMAN 2021-AUGUST 2023

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Acute respiratory infections (ARI) are a cause of morbidity, mortality and hospital admissions in children around the world. Among viral ARI, respiratory syncytial virus (RSV) is the main causative agent of lower acute respiratory infection (LARI) in infants, immunocompromised and can cause severe ARI in senior citizens. The timing and duration of RSV circulation vary depending on the year and region of the country, although seasonal patterns were altered after the SARS CoV2 pandemic. Objective: Describing the circulation of RSV from January 2021 to August 2023 in children under 5 years of age with LARI, hospitalized in public and private institutions in Tucumán. Materials and methods: A descriptive cross-sectional study was conducted. 8714 nasopharyngeal aspirate or swab samples were analysed. They were processed by immunofluorescence for detection of antigen of Influenza A and B, RSV, Metapneumovirus, Adenovirus, Parainfluenza 1, 2 and 3 and Rhinovirus (RV) by RT-qPCR. Results: Out of 8714 samples, 3135 (36%) were positive for some respiratory virus. Of these, there were RSV 1924 (61%). In 2021 it begins to circulate in epidemiological week 13, together with the beginning of schooling, with a peak between Epidemiological Week (EW) 22 and 30. In 2022 it circulated in EW 15 with a peak between EW 22 and 28 and then descended, without becoming negative. In 2023, it continues to peak between EW 13 and 20. 154 of the RSV positive samples had co-detection with RV. The main diagnosis at the time of admission was Bronchiolitis. Conclusion: In 2020 pandemic, social isolation was implemented throughout the world. These restrictions and other non-pharmaceutical measures implemented caused a drastic decrease in RSV detection. During 2021, 2022 and 2023, the circulation of RSV and other respiratory viruses resumed, but they have not yet recovered typical seasonal patterns. Local and national epidemiological surveillance must be reinforced to continue monitoring viral circulation and thereby facilitate the implementation of prevention, diagnosis and treatment strategies.

A15

COMPARISON OF PURITY PARAMETERS OF OLIVE OILS OF THE VARIETIES ARBEQUINA, CORATINA, PICUAL AND BARNEA FROM THE ANTINACO-LOS COLORADOS VALLEY, LA RIOJA.

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The Mediterranean diet is associated with a lower incidence of pathologies of cardiovascular origin and greater longevity. These health benefits have been attributed, in some proportion, to the consumption of olive oil. Despite the relevant biological effects that this oil has, in Argentina and particularly La Rioja, there is little data available on the content of compounds with antioxidant potential. Our objective was: To evaluate and compare the features of fatty acids and phenols of four varieties of olive oil, Arbequina, Coratina, Picual and Barnea, from the Antinaco-Los Colorados, Chilecito-La Rioja valley. We worked with six samples of each variety, belonging to three agricultural entrepreneurship in the Valley. The fatty acid profile tests (COI/T.20/Doc. nº 24) and total polyphenols (Folin-Ciocalteu test) were carried out. Correlation analysis was performed with INFOSTAT. After carrying out the tests, it was found that there is a difference between the four varieties of oil analyzed, with Coratina being the one with the highest content of oleic acid (74.41%), and polyphenols (595.35 mg of EAG/kg of oil). Also, differences were observed in the results considering the origin of the samples. Taking into account the percentages of fatty acids and polyphenols, it can be concluded that Coratina would be the variety that would present the best beneficial effects for consumers.

A16

ISOLATION AND CONSERVATION METHODS OF A BACTERIUM PRODUCING METABOLITES OF BIOTECHNOLOGICAL IMPORTANCE

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Nature is an endless source of microorganisms, which by themselves or by producing metabolites, may have applicability in human life. It is worth noting the heterogeneous endophytic microbial population present in plants. Sugarcane juice, a crop of economic importance in Tucumán, is not an exception as it presents a varied microbiota (yeasts and bacteria) due to its rich nutrient composition. As an example, a fermentative GRAS bacterium of biotechnological importance (in the production of metabolites) will be cited. Once a microbial strain of interest has been isolated and identified, it is essential to preserve its phenotypic, genotypic and viability characteristics. The aim of this work was to isolate a GRAS strain with potential biotechnological applicability from sugar cane juice, to determine its phenotypic traits of interest and to evaluate their preservation after short, medium, and long-term conservation. The isolation was carried out based on a special type of mobility that the strain presents in a specific solid medium (MEGI). Macroscopic and microscopic observation of the cultures in the different stages of isolation was performed (MEGI). Fermentation capacity and antimicrobial activity of the bacterium under study were determined from a liquid culture. The bacterium was conserved in a) liquid medium at 4°C (short term, monthly aliquotation); b) 20% glycerol at -70°C (medium term) and c) lyophilization in MEGI and 10% skimmed milk (long term). After different periods, bacterium was activated, and the production of ethanol and soluble and volatile antimicrobial metabolites were evaluated. The results obtained showed that the isolate corresponds to the GRAS bacterium, due to the evidence of phenotypic characteristics of biotechnological applicability. Such characters and viability were preserved after the conservation of the bacterium with the methods tested. The isolated strain will be subject to genetic analysis to determine its genus and species.

A17

ANTIMICROBIAL EFFECT ON PHYTOPATHOGENS OF SOLUBLE AND VOLATILE COMPOUNDS PRODUCED BY A BACTERIA ISOLATED FROM SUGAR CANE JUICE FROM TUCUMÁN

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In the last decades, efforts have been made to find alternatives beneficial to the environment and human health in the control of crops pathogens. A bacterial isolate obtained from sugarcane juice in Tucumán (P22) produced antimicrobial metabolites, inhibiting the growth of E. coli AB1133 and E. coli DH5α (control strains). The objective of this work was to determine antimicrobial action on phytopathogens for important crops in Northwestern Argentina, as well as to preliminary characterize the nature of the compounds responsible of this effect. Fermentations were carried out in Standard Medium, at 27°C, 260 rpm for 96 h. The supernatant (SN) was obtained by centrifugation (15,000 rpm, 10 min). The antimicrobial activity of soluble compounds was determined using the well plate technique against phytopathogenic bacteria: Pseudomonas syringae pv fomato DC3000 and Pseudomonas viridiflava. The unit of activity (AU) was calculated employing E. coli strain as control, referred to 1 ml (AU/mL). The presence of volatile compounds (Voc´s) produced by P22 was evaluated by the method of simultaneous confrontation in Petri dishes against the phytopathogenic fungi Botrytis sp. and Colletotrichum acutatum. For E. coli AB1133, inhibition was observed up to 1/2 dilution (Titre 40 AU/mL), while for P. syringae pv tomato and P. viridiflava inhibition was produced up to 1/3 and 1/4 dilutions, respectively. Using the method of double reciprocals, it was possible to calculate the MIC for the bacteria under study, showing greater sensitivity to the soluble compounds P. viridiflava. The Voc's produced by the bacteria inhibited the growth of Botrytis sp. and Colletotrichum for 15 and 10 days respectively. Results have demonstrated that both the SN (soluble compounds) and the Voc´s (direct action of P22) showed antimicrobial action. Therefore, it is proposed to consider P22 in the composition of a phytosanitary product to be used in biological control.

A18

PRIMING TREATMENT TO IMPROVE THE PERFORMANCE OF *SALVINIA MINIMA* DURING THE PHYTOREMEDIATION OF VINASSE

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During bioethanol production, an effluent called vinasse is generated, which constitutes a potential contaminant of water resources, so it is important to look for treatments to improve its quality before dumping. One option that is being investigated, is phytoremediation. However, vinasse is highly toxic to any living being, so the species used must be resistant. The objective of the work was to improve the performance of Salvinia minima during vinasse remediation with a priming treatment before contact with the effluent. Plants were exposed to the priming solution for 48h and then placed in the pre-treated effluent diluted 1:10 for 28 days. After 8 days a change of plants was made. In the effluent it was determined: pH, conductivity, color and content of phenolic compounds. In the plants, H_2O_2 and malondialdehyde (MDA) were quantified as damage indicators. The results showed a decrease in the content of phenols, conductivity and color in the effluent treated with primed plants. The plants with and without priming used during the first 8 days showed an increase in the content of H_2O_2 and MDA, unlike the second plants set, in which a decrease in these parameters was observed. It is concluded that the application of priming improved the performance of S. minima during remediation, which could be related to a stimulation of endogenous mechanisms and/or the activity of microorganisms present in the rhizosphere. Damage indicators showed activation of oxidative processes during the first stage, which could impair the remediation process. The plants used in the second stage showed a decrease in H_2O_2 and MDA, favored by the improvement of the effluent conditions. The color and conductivity of the vinasse are parameters that must be considered when dumping/discharging this effluent; therefore, although these results are promising, it is necessary to optimise the design of treatments that improve the quality of the effluent.

A19

ELABORATION AND CHARACTERISATION OF AN EDIBLE FILM BASED ON CHITOSAN FUNCTIONALISED WITH ANTIOXIDANT CHAYOTE EXTRACT

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In the last decade, the development and application of safe, biodegradable edible coatings with suitable technological and functional properties to help extend the shelf life of fruits has been persued. Chitosan is one of the biomaterials with the greatest potential. However, its main disadvantage is its high water vapor permeability, so an alternative is its functionalization by incorporating antioxidant and plasticizing bioactive components into the polymer matrix. The aim of this work is to evaluate the effect of adding hydroalcoholic extract of chayote leaves (EHCh), Sechium edule (Jacq.) Swartz and glycerol (G) on chitosan films (Q). From two concentrations of EHCh (0.07 and 0.15 wt.%) and concentrations of G (20 and 40 wt.%) incorporated into a chitosan base were evaluated for their effect on the physical, mechanical, optical, barrier, morphological and antioxidant properties of the film. Results showed that the incorporation of G increased the density and moisture values by 78.2% and 71.3%, respectively. The films with 40% weight of G and 0.15% EHCh exhibited a plasticizing effect, which was observed with a decrease of 38.3% in tensile strength (RT) and 72.1% in the elongation percentage. at break (%AR). Regarding the optical properties, the addition of EHCh acted as a barrier to light transmission, the water vapor transmission rate (VTA) showed that all samples tested decreased up to 6.5% compared to the control films. By electron microscopy, it was observed that the films produced appear homogeneous. The film with 40% weight G and 0.15% EHCh presented the best behavior, showing adequate physicochemical properties, and could be considered a potential fruit coating. The present work shows that the use of functionalized chitosan bases generates better results than those obtained when using non-functionalized chitosan.

A20

ANATOMICAL AND PHYTOCHEMICAL STUDIES OF *ANADENANTHERA COLUBRINA, EUCALYPTUS GRANDIS* AND *PINUS SYLVESTRIS* BARK

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Anadenanthera colubrina (Vell.) Brenan (cebil), *Eucalyptus grandis* W. Hill ex Maiden (eucalyptus), and *Pinus sylvestris* L. (pine) are distributed in the Argentine Northwest and are used for medicinal purposes. Eucalyptus and pine bark were collected at INTA Famaillá, and cebil at Raco, Tucumán. The samples were subjected to maceration and mild dissociation (Boodle) for their macroscopic and microscopic analysis. For the phytochemical study, alcoholic extracts (AE) and decoctions (D) were prepared. The macroscopic characters in cebil showed a reddish-brown outer bark (OB), very hard and with warts of variable size. The inner bark (IB) with reddish wood. In light gray eucalyptus (OB), it appears in the form of sheets that is decorticated from the trunk and (IB) reddish in color. In pine (OB) brownish brown, hard with a scaly surface, and (IB) grainy. The microscopic characters in cebil presented cortical parenchyma with oxaliferous cells, tannic cells, and numerous circular and ovoid starch granules. Abundant woody fibers, with calcium oxalate crystals accompanied by tannin cells. In eucalyptus, abundant thin-wall fibers, parenchyma cells, and oil cells were observed. While pine presented starch in parenchymatic cells and fibers with simple and areolated scores. The phytochemical march revealed the presence of reducing compounds, quaternary amines, flavofenos, quinones, and polysaccharides. In cebil and eucalyptus, catechic tannins, leucoauntocyanidin, and bitter principles were detected. No coumarins were found in the eucalyptus AE. Anthocyanins were detected in the AE of cebil and in the D of eucalyptus. Only in the AE of cebil, flavonoids and anthracenoids were found. While sterols were positive in the AE of the three species. These results make it possible to identify the characteristic cellular components for each cortex and relate their contents to the chemical composition of these species that could be responsible for their use as preventive and/or therapeutic alternative therapy.

A21

PHARMACOBOTANICAL CHARACTERIZATION AND ANTIOXIDANT ACTIVITY OF *ANADENANTHERA COLUBRINA* SEEDS (CEBIL)

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The seeds of *Anadenanthera colubrina*, var cebil (Fabaceae), were used since ancient times in popular medicine and in sacred rituals for their psychotropic effects. The objective of this work was to carry out the pharmacobotanical characterization and evaluate the antioxidant activity of cebil seeds. For pharmacobotanical characterization, dissociation techniques were applied with 5% potassium hydroxide, histochemical tests to determine the presence of alkaloids, tannins, mucilage, oils and starch. To determine the antioxidant activity of aqueous and alcoholic extracts, the 1.1-diphenyl-2-picryl hydrazyl (DPPH) stable radical scavenging method and the β carotene/linoleic acid system were used. Calcium oxalate crystals (druses), osteosclereid-type sclerenchyma cells and macrosclereids that are part of the seed integument were observed in the dissociated. The presence of alkaloids, tannins, mucilage and lipid droplets was also detected in the integument, parenchyma of the endosperm of the seed and in the embryo. The results of scavenging activity on DPPH reveal that the alcoholic and aqueous extracts at a concentration of 1 mg/ml have a significant scavenging activity of free radicals (91.23% and 73.28% respectively) similar to the values obtained for the positive controls: BHT (84.50%) and Quercetin (93.43%). The β carotene/linoleic acid system reveals that the alcoholic and aqueous extracts (2mg/ml) presented an antioxidant activity greater than 70% (BHT and Quercetin exceeded 80%). Micrographic and histochemical studies of cebil have diagnostic value for the identification of its cellular elements and active constituents, of importance for future phytochemical and toxicological studies. The demonstrated antioxidant activity could contribute to the beneficial properties of this species in traditional medicine.

A22

EVALUATION OF ANTIOXIDANT CAPACITY AND ACUTE TOXICITY IN ARRAYÁN FRUITS (*Eugenia uniflora* L.)

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Eugenia uniflora L. known as *arrayán, ñangapirí,* or *pytanga*, is a species native to South America. In our province there are two varieties, purple (Em) and red (Er). The fruits are an important source of antioxidant and nutraceutical compounds, for the content of calcium, phosphorus and secondary metabolites. They can also offer industrial potential by conserving our natural resources. The objective is to study the antioxidant capacity and acute toxicity of aqueous and hydroalcoholic extracts of fruits *Eugenia uniflora,* purple and red variety. The fruits were collected in spring 2021 and kept frozen until the time of analysis. The seeds were removed and the fruit was processed with peel, aqueous and hydroalcoholic extracts of both varieties were made. The Total Antioxidant Capacity (TAC) was evaluated with DPPH• and $ABTS^{\bullet+}$ radicals, for different concentrations of the samples obtaining the effective concentration that captures 50% of the radicals (IC_{50}). In vitro cytotoxicity was evaluated with the lethality test of *Artemia salina* L., determining the mean lethal concentration (LC_{50}). The data were analyzed statistically and the LC_{50} was determined with a 95% confidence interval. The CI_{50} values for DPPH• radicals were Em: 218.21 ug/ml, Er: 178.50 ug/ml; and with $ABTS^{\bullet+}$, Em: 103.92 ug/ml and Er: 156.81 ug/ml. The mean lethal concentration (LC_{50}) was calculated by linear interpolation of the % mortality values, for each concentration, per experiment. Viability in the control group was 100 %, with no changes in behaviour observed. Extracts from the three species showed no cytotoxic activity, with LC_{50} above 1000 µg/ml, the samples being considered non-toxic. The results show its antioxidant potential and the non-toxicity of the extracts studied, expanding the possibilities of technological applications in the region.

A23

ANALYSIS OF REDOX AND INFLAMMATORY PARAMETERS AS POSSIBLE RISK FACTORS IN ACUTE LEUKEMIA

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Several studies have indicated that oxidative stress and inflammation are involved in the pathogenesis and evolution of several types of neoplasms, including acute leukemia (AL). Objective: To study the association between AL and some parameters related to redox balance and inflammation as possible risk factors for this pathology. Methodology: A case-control study was performed between 2018-2022. It was composed of 89 newly diagnosis AL patients and 68 healthy individuals. The antioxidant enzymes activity Catalase (CAT), Superoxide Dismutase (SOD), Glutathione peroxidase (GPx); the concentration of Malondialdehyde (MDA), Nitrites (NO_2^-) and the non-enzymatic antioxidant Glutathione (GSH), were determined in serum by spectrophotometric methods. Also, IL-6 and TNF-α levels were measured by ELISA. The association study, the cross products ratio, Odds ratio (OR), was calculated with confidence interval (CI) of 95%, based on the determination for each variable of the sensitivity and specificity obtained from the receiver operating characteristic (ROC) curve. Results: A moderate association was observed between AL with elevated levels of oxidative damage (OR=2.8; CI=1.43-5.70) and a strong association between AL and a higher activity of the antioxidant enzymes CAT (OR=8.53; CI=2.85-25.60) and GPx (OR=13.74; CI=4.95-38.12). Also, a strong association was found between AL and increased IL-6 concentration (OR=10.34; CI=4.90-21.80). However, increased levels of SOD, GSH, NO_2^- and TNF-α had no significant association with this pathology. Conclusion: These findings indicate a systemic imbalance in newly diagnosis AL patients, characterized by a proinflammatory state associated with elevated IL-6 levels, as well as increased oxidative damage and increased demand for enzymatic antioxidants, which could increase the risk of developing this disease.

A24

ROLE OF THE TUMOR SUPPRESSOR PROTEIN BRCA1 DURING THE EMBRYONIC DEVELOPMENT OF *Xenopus laevis*

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Breast cancer (BC) is a complex, heterogeneous and multifactorial disease, mainly influenced by genetic and environmental factors. The main gene related to hereditary BC is Brca1 (Breast cancer 1), which has ubiquitous expression including the mammary gland and ovary. BRCA1 has a key function in the detection, processing and repair of DNA double-strand breaks, and is also involved in cell cycle control and transcriptional regulation. More than 1000 mutations of the BRCA1 gene have been described, mainly resulting in truncated and inactive proteins, which cause genetic instability and the appearance of tumors. Notably, Brca1 is expressed during vertebrate embryonic development, opening a unique opportunity for its study in an *in vivo* context. In this work we performed loss of gene function experiments, using CRISPR technology in embryos of the amphibian *Xenopus*. *Xenopus* is an ideal genetic animal model for the study of genetic human pathologies due to its phylogenetic closeness and the practical advantages these embryos possess. The results, employing the strategy of messenger RNA degradation using Cas13 nuclease and brca1-specific guide RNAs, indicate that Brca1 plays a key role in the development of early ectodermal tissues, such as the non-neural ectoderm, since in its absence, a discolouration of epidermal cells is observed (58% n=21/36), and in tissue differentiation since when its function fails, the cement gland, an early specialisation gland

possessed by Xenopus embryos, fails to develop properly (63% n=23/36). We also observed later effects such as alterations in eye formation (54% n=14/26). This experimental approach will enable us to create a model that can be used to study Brca1 function in normal conditions and infer any potential pathological processes.

A25

IMPACT OF GENISTEIN AND DAIDZEIN ON *IN VITRO* MATURATION OF BOVINE OOCYTES

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Reproductive biotechnology aims to improve the production of pre-implantation embryos in a cost-effective way. A crucial step is the *in vitro* maturation (IVM) of immature oocytes under optimal conditions. During this process, the accumulation of reactive oxygen species (ROS) can damage gametes and embryos. The isoflavones genistein (GNT) and daidzein (DAID), present in the diet, act as antioxidants in different biological processes. Therefore, the aim of this work was to evaluate their effects during IVM. Immature cumulus oocyte complexes (COCs) were obtained from heifers and matured with different concentrations of GNT and DAID (0.1, 1, 10µM). The rate of cumulus expansion was evaluated by recording the areas of COCs at baseline and 22 h of IVM, and a similar expansion was observed in the different treatments. After IVM, oocytes were stained with Hoëscht. The proportion of metaphase II (MII) oocytes was similar between the treatments with GNT and DAID at 0.1 and 1µM, and decreased with the 10µM concentration. The 1µM concentration was selected for gene expression and in vitro fertilization (IVF) trials. In cumulus cells recovered after treatment of COCs with 1% hyaluronidase, the expression of different genes was assessed by RT-PCR. Those related to the cell cycle (CCND1 and CCNB1), showed a decrease in expression with both molecules. The BCL2/BAX (survival/apoptosis) ratio increased with DAID, and genes encoding SOD1 and CAT (antioxidant enzymes) decreased in expression after treatment. After IVF, presumptive zygotes were fixed and stained with Hoëscht. Increased sperm adhesion to the zona pellucida (ZP) was observed in oocytes matured with 1µM GNT. In summary, GNT and DAID, at concentrations lower than 10µM, do not affect oocyte maturation but enhance sperm adhesion to ZP. Moreover, in cumulus cells they influence the expression of genes involved in cell cycle regulation and antioxidant enzymes.

A26

QUANTITATIVE DETERMINATION OF MELATONIN IN PLANTS

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Melatonin is a molecule of PM 232.18 g/mol, to which numerous biological activities are attributed. Its effects in animals have been widely studied, observing its influence on the regulation of circadian cycles. Various and varied functions are attributed to it that affect different stages of plant growth and development. While studies on functionality are varied, the quantitative determination of melatonin in plants is not. The methods currently used are rapid and non-specific, such as ELISA, or with high sensitivity, but with very specific analytical equipment such as UPLC coupled with MS-Orbitrap mass spectrometer. In this work, a simple, rapid and specific analysis method was developed to quantify melatonin, applicable to the determination of melatonin in plants. A liquid chromatograph Shimadzu Nexera XR coupled to a mass spectrometer ABSciex TRIPLE QUAD 4500 was used. For the separation, a C18 column and acid solutions of water HPLC quality and ultragradient acetonitrile was used. A certified melatonin standard was used for the development of the method. Ion transitions m/z 233.1 to 174.1 and 233.1 to 159.1, respectively, were used for quantification and qualification. For a first evaluation of the method in plants, lemon

verbena (*Aloysia citriodora*) was used. Analytical curves were constructed using solutions of the standard in solvent and matrix matched solutions of lemon verbena at five concentration levels of 0.10, 0.25, 0.50, 0.75 and 1.00µg/mL. Results and discussion: The analytical curves gave an r2 >0.95. The recovery percentage at 0.5µg/g was greater than 82%. The detection limit was 0.01 µg/g. The sensitivity, repeatability and specificity of the developed method make it ideal for the determination of melatonin in plants.

A27

POLYMORPHISM RS6311 OF THE 5-HTR2A GENE AND ITS RELATIONSHIP WITH FASTING BLOOD GLUCOSE LEVELS AND OBESITY IN TYPE 2 DIABETES PATIENTS FROM JUJUY

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Type 2 Diabetes Mellitus (DM2) is a chronic disease that, in addition to causing metabolic alterations, predisposes individuals to anxiety, depression, and sleep disorders, all of which share significantly lower serotonin (5HT) levels. The serotoninergic system consists of a set of transporters and receptors with varying affinities, which can be targeted in treatments to regulate blood glucose level and body weight due to the anorexigenic effect of 5HT. The aim of this study was to analyze the frequency distribution of rs6311 polymorphism, regulator of the activity of the promoter of 5-HTR2A gene, which codes for the serotonin receptor, and to observe whether there is a relationship with blood glucose levels and body mass index in DM2 patients. The study sample consisted of 404 adult DM2 patients (119 men and 285 women) from the province of Jujuy, for whom we have DNA samples and access to controls of their biochemical parameters. PCR-RFLP was used to obtain the genotypic frequencies, which were as follows: GA: 65%, GG: 22%, AA: 13% (allele frequencies G: 45.5%, A: 54.5%). Deviation from Hardy-Weinberg equilibrium was observed, with a x^2 value of 36.9. Significant relationships were found between genotypes and fasting blood glucose levels ($p=0.04$) and the prevalence of obesity ($p=0.008$) through ANOVA and x^2 tests, respectively. LSD mean comparison analysis showed that heterozygous individuals have significantly lower blood glucose levels than the rest and in turn this genotype reports a lower prevalence of obesity. The high frequency of AG aligns with findings from other studies conducted in Argentina and Europe. Possible monoallelic differential expression, due to potentially methylated target sites within rs6311 (genomic imprinting), or alternative splicing mechanisms modulated by rs6311, could explain the relationship between the AG genotype, with lower glucose levels, and the prevalence of obesity.

A28

RS36232792 POLYMORPHISM OF THE SOD1 GENE AND ITS RELATIONSHIPWITH SLEEP ALTERATIONS IN TYPE 2 DIABETES PATIENTS IN THE PROVINCE OF JUJUY

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Metabolic alterations in type 2 diabetes mellitus (DM2) increase the production of reactiveoxygen species (ROS), a harmful condition for the organism as it oxidizes lipids, increasing their atherogenic effect and cardiovascular risk. Sleep boosts the body's antioxidant defenses; during the waking state they accumulate (ROS), and are subsequently removed during the sleep process.Therefore, sleep alterations (SA) are associated with elevated ROS levels. This situation isenhanced in DM2 patients due to AS inherent to the pathology. The control of intracellular ROSlevels is carried out by antioxidant enzymes such as Superoxide Dismutase 1 (SOD1).rs36232792 is a polymorphism consisting of a 50bp insertion/deletion in the gene promoter.The deletion reduces the synthesis of the enzyme, affecting the control of ROS levels. In thiswork, preliminary results of a study on the frequency of rs36232792 polymorphism and itsassociation with AS in DM2 patients from Jujuy are reported. The study includes 283 adultDM2 patients (82 men and 201 women) from Jujuy, whose rest habits

were characterized through surveys, from which a description of self-reported SA was obtained. Allelic and genotypic frequency were calculated by PCR. A higher representation of the Ins allele (77.3%) concerning Del (22.7%) was observed in the sample, with the Ins genotype predominating (55.48%) over Ins/Del (40.63%) and Del (3.89%).). A deviation from the Hardy-Weinberg equilibrium was observed (x2= 4.2). ANOVA and LSD tests were performed and it was observed that there is a significant difference ($p<0.05$) between the SOD1 genotypes in relation to hours of sleep, with Del genotype reporting less sleeping hours (Del=5.73 vs Ins= 6.99). The association of poor rest observed in DM2 patients with rs36232792 Del genotype in the SOD1 gene would boost the production of ROS, increasing cardiovascular risk. Evidence of this relationship raises the need to promote healthy sleep guidelines to improve the life quality of DM2 patients.

A29

EVALUATION OF THE ANTIMICROBIAL POTENTIAL OF COPPER (II) COORDINATION COMPOUNDS AND CO-ADJUVANTS WITH NATURAL COMPOUNDS

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Metal complexes have been used for many years for therapeutic purposes. Currently, there are a large number of organometallic compounds, whose medicinal applications include varioustreatments in isolation or adjuvanted with natural products such as the sesquiterpene lactone cnicin obtained from the *Centaurea diffusa weed* that grows in the center and north of the country. The objective of the present work was to evaluate the potential antimicrobial activity of Cu (II) complexes (C), its free ligands (L), and coadjuvants with cnicin (Cn) against strains of *E. coli* isolated from small ruminants. The ligands used were: betaine hydrochloride, N-acetylmethionine, phenanthroline, and niacinamide, and their complexes formed by the addition of $CuCl_2$ and $Cu(NO_3)_2$. The treatments were also used in combination with cnicin in a binary manner L-Cn or C-Cn at concentrations of 15, 7.5, and 3.75 mg/mL, while Cn was used in a single concentration of 250µg/mL. The antimicrobial activity was evaluated by the *spot* technique against 10 strains of *Escherichia coli* (10^6 CFU/mL) of veterinary isolation in APG agar medium (1%). The antibiotic ampicillin (15µg/mL) was used as a control (+). In addition, the maintenance of respiratory activity was determined using resazurin. The results indicated that phenanthroline, $CuCl_2$, $Cu(NO_3)_2$, inhibited 100% of strains tested at concentrations $\geq$ 3.75 mg/mL, while niacinamide was only at 30% and betaine hydrochloride at 20%.This activity was decreased, in all cases, by the addition of Cn. The Cu(II) complexes modified, in different ways, the antimicrobial activity in relation to the free ligands. Changes in respiratory activity were observed in comparison to controls. The results obtained would open a possible therapeutic alternative for livestock infectious diseases.

A30

COMPARATIVE STUDY AND CHARACTERIZATION OF A MURINE EXPERIMENTAL MODEL OF ARTHRITIS USING ONE OR TWO DOSES OF CHICKEN TYPE II COLLAGEN

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Rheumatoid arthritis is a progressive and chronic process characterized by systemic and local inflammation, which generates damage, articular destruction, and pain. We wanted to evaluate and comparatively characterize a model of collagen-induced arthritis (CIA) after one or two injections of chicken type II collagen (CII). For such purpose, 12-week-old C57BL6 mice received an intradermal tail injection with Freund's complete adjuvant and purified CII (ACF+CII). At 14 days (d) a group of mice received a second injection of an emulsion of incomplete Freund's adjuvant and purified CII (AIF+CII). The experiments

included mice injected with saline solution as controls (C). CIA development was evaluated at 31 and 45 days post first injection (dpfi) by: a) swelling of legs and ankles (expressed in mm); b) body weight and peripheral blood: c) leukocyte and platelets counts; d) neutrophil peroxidase (Px) and e) serum antiCII IgG (IgG, IgG1, IgG2a). One and two injections of CII induced significant swelling of the ankles, but only mice from the ACF+CII group demonstrated significant swelling of the paws (right paw 31 dpfi, C=2.18±0.17mm, ACF+CII=2.98±0.50mm, AIF+CII=2.59±0.27mm, C vs ACF +CII $p<0.001$, ANOVA). Both CIA groups, had elevated anti-CII IgG levels (serum dilution 1/500, OD 450 nm at 31 dpfi, C=0.14±0.04, ACF+CII=0.45±0.05, AIF+CII=0.41±0.03, C vs ACF+CII $p<0.0001$, C vs AIF+CII $p<0.0001$, ANOVA) and anti-CII IgG1 and IgG2a subtypes, increased neutrophils, decreased Px, and total leukocyte and lymphocyte counts with respect to C without significant alterations in body weight and platelet counts. We conclude that a single injection of ACF+CII is enough to induce CIA, demonstrated by clinical parameters and increased anti-CII IgG and subtypes, among other parameters. The smaller number of injections reduces animal suffering and allows a better evaluation of the alterations caused by CIA.

A31

ICHTHYOFAUNA OF RÍO GRANDE SUB-BASIN, JUJUY PROVINCE

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Located in the province of Jujuy, the Rio Grande sub-basin is part of the upper basin of the Bermejo River. It belongs to the Eastern Paranoplatense ichthyoregion and to the Yungas ecoregion; characterized by being one of the regions with the greatest biodiversity and a marked climatic seasonality. Seasonal sampling was carried out in December 2019, and March, May, August and November 2022 to learn about the ichthyofauna of this place. 12 points were counted: seven in lotic environments: Río Grande, Río Yala, Río Reyes, Río Perico, Río de las Pavas and Río Los Alisos; Arroyo Pircas and five lentic systems: La Ciénaga and Las Maderas dams; Lagunas Rodeo, Desaguadero and Comedero. The latter three belong to the Potrero de Yala Provincial Park. The fish were caught using different fishing gears: electric fishing, trawls and skimming nets. A total of 20 fish species belonging to seven Orders were registered (Siluriformes, Characiformes, Cyprinodontiformes, Atheriniformes, Cichliformes, Salmoniformes and Centrachiformes). Two species of Cyprinodontiformes, seven species of Siluriformes and seven species of Characiformes, the last two orders being the most represented. Four species introduced for sport fishing and fish farming were collected. Two of them being transplanted: the silverside, *Odontesthes bonariensis* (Cuvier & Valenciennes, 1835) and the small-mouth local perch, *Percichthys trucha* (Cuvier & Valenciennes, 1840) and two invasive exotic species: Nile tilapia, *Oreochromis niloticus* (Linnaeus, 1758) and the rainbow trout *Oncorhynchus mykiss* (Walbaum, 1792). The latter was not caught but observed at the fish farming station located in the provincial park. The most diverse lotic environments were Rio de las Pavas (13 sp.) and Rio Reyes (8 sp.), and the lentics: La Ciénaga Dam (8 sp.) and Las Maderas (9 sp.). The species identified in the sub-basin of Río Grande confirm the great biodiversity of the ecoregion; in turn, the knowledge of the ichthyofauna of the Potrero de Yala Provincial Park and of this region is expanded, since it is located in the productive area of the province.

A32

CHEMICAL PROFILE OF "MARAVILLA" AND ITS MEDICAL POTENTIAL

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Flourensia fiebrigii S.F. Blake (Asteraceae) popularly known as "Maravilla" is a species that grows in high altitude areas in the northwestern of Argentina, and it is characterized by presenting resinous exudates and yellow capitula. Among its biological properties, antibacterial, anti-inflammatory and antirheumatic activities were previously reported. The objective of this work was to investigate the volatile and non-volatile chemical profile, as well as their antipathogenic and antioxidant properties, of 8 extracts with different polarities, obtained from leaves, flowers and roots of a chemotype that grows in the Cañón del Ocre, La Rioja, Argentina. The obtained extracts were analyzed by GC-MS and UHPLC-MS/MS techniques. GC-MS profile revealed the presence of encecalin in the ethereal extract from flowers, and this benzopyran together with sitosterol were identified in the ethereal exudate of the leaves (EXF). The main compounds identified by UHPLC-MS/MS in both extracts were: limocitrin, (2*Z*)-4,6-dihydroxy-2-[(4-hydroxy-3,5-dimethoxyphenyl)methylidene]-1-benzofuran-3-one, isobavachin, naringenin and sternbin. All samples from the aerial parts showed a significant activity against pathogenic biofilms of indigenous and ATCC bacteria, particularly EXF at 50 µg/mL reduced 99.7-99.9% the *Pseudomonas aeruginosa* biofilms and between 74.7-93.2% those of *Staphylococcus aureus*. A fact to highlight is that the phytoextracts did not affect the growth of nutraceutical bacteria of the genus *Lactobacillus*, suggesting a clear selective action. Regarding the antioxidant activity, determined by different methods, EXF showed the highest capacity to eliminate reactive species. This study provides useful information about the potential of this chemotype in health.

A33

MONITORING A MODEL OF BACTERIOSIS INFECTION IN SEEDS OF *PHASEOLUS VULGARIS* L.

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In epidemiology, development of models is essential for diseases description and to improve treatment strategies. Bean (*Phaseolus vulgaris* L.) is a traditional crop in Argentina Norwest which is affected by bacteriosis caused by bacteria, from genus *Xanthomonas*. These bacteria appear and persist mainly in seeds. In this work, we proposed to design an infection model in bean seeds to analyze development of bacterial blight symptoms, microbial population counts and bofilm production using *X. fuscans* (XF) 190 (INTA-SALTA) strain. Beans variety TUCS10 (EEAOC) were disinfected (NaClO 0.05%), injured with sterile needle (isolated puncture), immersed in XF suspension (10^6 CFU/ml) and kept for 21 days and monitored by photography. At regular intervals (72h) samples (n=4) were taken for their immersion in APG medium and plated for counting of viable cells in two systems: 1) control, 2) treatment with cnicin [CN] (sesquiterpenic lactone, 250 µg/ml) which is a natural molecule with antimicrobial activity. In addition, biofilm formation was monitored by crystal violet staining.Results indicated that bacterial injuries on seeds were detected after 14-21 days of incubation, with exception of those treated with CN. Initial cell populations were ≈8 x10^6 - 2x10^7 CFU/ml. After 21 days cell populations in infected seeds increased up to 1-2 x 10^{10} CFU/ml. Addition of CN maintained cell populations at 10^6-10^7 CFU/mL at 7 days, 10^3-10^4 CFU/mL at 14 days and no viable cells detected at 21 days. Biofilm formation was significantly lower in those CN-treated seeds. Results obtained would allow optimizing reproducibility conditions in the design of strategies to control bacteriosis in a preventive scheme in bean seeds.

A34

IN VITRO CONTROL OF *XANTHOMONAS IN VITRO* USING HYDROALCOHOLIC EXTRACT OF *CENTAUREA DIFFUSA*

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Among numerous phytosanitary problems affecting some traditional Argentina Northwest crops such as beans, *Prunus* and walnut are diseases caused by bacteria, especially bacterial blight. Being one of main strategies for its management to use high-

cost resistant seeds, which directs studies to search therapeutic alternatives such as extracts obtained from plants with antimicrobial activity being the weed *Centaurea diffusa* (Cd) an example which grows in center and north of Argentina. Nowadays, the main difficulty is to obtain low-cost extracts with biological activity. The objective of this present work was to evaluate antimicrobial activity of hydroalcoholic extracts of Cd (EHC) on different isolated of *Xanthomonas* species. Aerial parts of Cd were kept in ethanol (70%) during 14 days without shaking (5% w/v) and concentrated by rotary evaporator to dryness. Mean aqueous dilutions 2500 to 500 µg/mL were prepared at final concentrations in APG agar medium (1%) where bacteria were inoculated (10 µL, 10^6 CFU/ml). $CuSO_4$ 2.4 mM (SC) and cnicin 250 µg/mL [(CN), which proved to be the main antimicrobial molecule in Cd], were used as controls. Finally, ECH-$CuSO_4$ combinations were considered. *Screening* results indicated that most of tested strains did not develop at concentrations ≥1500 µg/mL EHC. Addition of a mixture [1] ECH-SC (500 µg/mL-1.2 mM) achieved a similar inhibitory pattern. *X. axonopodis* 168 strain was selected to analyze kinetic profile after application of 1500 µg/mL ECH and the mixture [1]. Final cell population was ≈1x10^9 CFU/mL at 72 h, while the application of ECH maintained cell population at 10^6 CFU/mL during 24 h, no viable cells being detected after 48 h. On the other hand, mixture [1] inhibited microbial development from 24 h onwards.
Results obtained allow us to propose ECH as a product with potential to develop low-cost eco-friendly strategies to prevent bacterial blight appearance.

A35

ENZYMATIC ACTIVITY AND STABILITY ASSESSMENT OF BACTERIAL β-MANNANASES

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β-mannanases have various applications in industrial processes, such as pulp and paper biobleaching, biofuel production, detergent production, pharmaceuticals, food and animal feed, among others. Although several alkaline and/or thermostable mannanases have been reported in recent decades, there is still a need to isolate new enzymes that meet industrial requirements for stability and efficiency. Objectives: To characterise enzymatic extracts rich in β-mannanases obtained from five strains of the genus *Bacillus* Methodology: The optimal temperature and pH of the enzyme extracts were evaluated by factorial designs, measuring mannanase activity as a response, by the DNS method. To study thermal and pH stability, the extracts were pre-incubated at different pH and temperatures for 1h to 24h, and subsequently residual enzyme activity was calculated at the optimum conditions determined. In addition, the effect of adding different additives to the reaction mixture was tested. The hydrolysis products generated by these enzymes from mannan were analyzed by TLC. Results: The studied mannanases showed an optimal temperature of 55°C, with an optimal pH of 6.00 - 6.20. They were stable at 40-60°C for 24h, with less than 50% loss of activity, and retained activity under alkaline-neutral pH conditions. Furthermore, mannanase activities of the enzymatic extracts were scarcely affected by most of the mono- and divalent cations as well as the surfactants tested. By utilizing TLC, *7 spots* were detected, which would correspond to mannooligosaccharides with a degree of polymerization between 2 and 5 mannose units. Conclusion: The evaluated mannanases showed interesting properties for industrial applications, such as wide ranges of stability at pH and temperature, robustness to additives commonly used in formulations and/or present as contaminants, and effectiveness in the generation of oligosaccharides with potential prebiotic activity.

A36

STUDY OF THE ANGIOGENIC EFFECTS OF BIOACTIVE GLASS MICROPARTICLES IN THE SiO_2-CaO-P_2O_5 SYSTEM DOPED WITH FLUORIDE

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Recent studies have demonstrated that fluoride (F) at low concentrations stimulates the *in vitro* secretion of growth factors with pro-angiogenic activity and plays a role during *in vivo* angiogenesis. The aim of the present study was to evaluate the angiogenic effects of the ionic dissolution products (IDP) released from bioactive glass (BG) microparticles in the SiO_2-CaO-P_2O_5 system and SiO_2-CaO-P_2O_5 doped with 0.5 wt% of CaF_2 using zebrafish embryos (*Danio rerio*) as an alternative research organism to traditional vertebrate animals used for evaluating the angiogenic response to different agents. The IDPs were obtained by incubating microparticles (250 µm) of BGs in embryonic medium (EM) at 37°C for 72 h. Dechorionated and depigmented embryos at 48 hpf were used. Forty-five embryos per treatment were incubated for 24 h at 28.5°C in 5 mL of EM, EM supplemented with basic fibroblast growth factor (EM + bFGF), EM enriched with the IDP from BG without fluoride (EM + BG-F), and EM enriched with the IDP from BG with fluoride (EM + BG+F). Three repetitions were performed with n=15 embryos per treatment. They were anesthetized with tricaine, rapidly cooled for euthanasia, and processed for subsequent analysis of the sub intestinal vascular plexus (SVP) through histochemical detection of alkaline phosphatase. The IDPs from BG+F demonstrated angiogenic capability, as evidenced by a statistically significant increase ($p<0.05$) in the number of compartments in the SVP and newly formed vascular sprouts. Based on this finding, the IDPs from BG in the SiO_2-CaO-P_2O_5 system doped with 0.5 wt% of CaF_2 could have potential applications as inorganic angiogenic agents in different regenerative medicine strategies that require a high degree of vascularization.

A37

PHYSICOCHEMICAL AND MICROBIOLOGICAL PARAMETERS OF THE WATER IN ARROYO TAFÍ, TAFÍ VIEJO – TUCUMÁN

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Tafí Viejo, the third most densely populated city in Tucumán with significant socioeconomic and urban development, aligns with Sustainable Development Goal (SDG) 11, to address the lack of monitoring using geo-environmental metrics to support a comprehensive and sustainable planning. Considering that one of the water supply sources for the community of Tafí Viejo is the Arroyo Tafí, this study analysed the physicochemical and microbiological parameters of the water. The actions are aligned with the targets of SDG 4 and SDG 6, as well as axes 2, 3, and 6 of the Institutional Strategic Plan of the National University of Tucumán. Eight monitoring campaigns were conducted in 2022 at four sampling points. The results indicate that the water temperature ranged from 9.5 to 20.8°C, pH from 7.45 to 8.46, and EC from 236 to 458 µS/cm. OD levels varied from 4.4 to 9.1 mg/L, and the ambient temperature fluctuated between 10 and 29.9°C. Additionally, the DBO5 was ≤ 5 mg/L, nitrates ranged from 0 to 146 mg/L, phosphates from 0 to 1.97 mg/L, and turbidity from 0.15 to 12.00 NTU. Fecal coliforms varied between 0 and 469 NMP/100 mL. The evaluated physicochemical parameters remained within the reference range values established by Resolution No. 30-2009 of the Secretariat of Environment of Tucumán. However, during September campaign, it was observed that the microbiological parameters exceeded the limits set for waters intended for bathing, water sports, and direct human contact activities. This result suggests the presence of fecal contamination from sources such as livestock and human excreta. In view of these findings, it is concluded that the water from the Arroyo Tafí could be used for recreational and

irrigation purposes, provided appropriate treatment measures are implemented. Furthermore, it is suitable to be made potable for human consumption.

A38

WATER QUALITY INDEX OF ARROYO TAFÍ, TAFÍ VIEJO-TUCUMÁN

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One of the water sources that supply the community of Tafí Viejo, in Tucumán province, is Arroyo Tafí. The Water Quality Index (WQI) is a diagnostic tool that allows the implementation of measures to manage and supervise water sources. The aim of this study is to determine the WQI of Arroyo Tafí. Throughout the year 2022, water monitoring of Arroyo Tafí was conducted over eight campaigns, covering the northwest section and four sampling points. The Water Quality Index from the National Sanitation Foundation of the United States (WQI-NSF) was determined using the WQI Test Program v1.0®. The results demonstrated consistent water quality across all sampling points, with values of 59.43±6.52, 58.79±0.63, and 59.16±4.52 for points 1, 2, and 3 respectively, with no statistically significant differences among them (p>0.05). Regular water samples were not obtained for point 4, so the WQI-NSF is not reported for this point. The obtained values categorize the quality of the water resource as 'medium', indicating moderately contaminated water, not suitable for human consumption. It is inferred that this quality could be associated with high levels of turbidity, nitrates, and fecal coliforms. Therefore, the increase in these parameters could come from sediment runoff, natural basin erosion, and the presence of fecal contamination from livestock and human excreta. Our project, aligned with Sustainable Development Goals (SDG) 4 and 6, and in agreement with axes 2, 3, and 6 of the Institutional Strategic Plan of the National University of Tucumán, supports the sustainable city program promoted by the municipality of Tafí Viejo. The WQI, as a geo-environmental metric, represents one of the specific actions being undertaken in the municipality, aligning with the goals of SDG11.

A39

TESTICLE INNERVATION OF *LEPTODACTYLUS CHAQUENSIS*: INMUNOHISTOCHEMICAL DETERMINATIONS

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The innervation of the male reproductive system has been studied in different animal species, including humans. However, knowledge of the testis innervation is scarce and highly variable in both mammals and amphibians. The mains of this work was to determine the presence and type of innervation of the *L. chaquensis* testicle, an anuran amphibian characteristic of the NOA, considering that the nervous system could participate in the control of gonadal functions. The testes, obtained from adult male specimens collected during reproductive period, were processed using the routine histological technique for: a-staining with Hematoxylin-Eosin, b-immunohistochemical analysis with monoclonal antibodies: anti-peripherin, anti-neuropeptide Y (anti-NPY) and anti-tyrosinehydroxylase (anti-TYRH). Sections observations and analysis were made with a Zeiss Axiolab optical microscope. The observations reveal that *L. chaquensis* testes are poorly innervated and present positive immunostaining for peripherin in the albuginean tunicas (TA), in axons close to the efferent duct and blood vessels. Labeling with anti-NPY reveals reactivity in nerve fibers located in the TA and near blood vessels, while labeling with anti-TYRH is manifested in the TA and seminiferous tubules wall. These results show for the first time the innervation of *L. chaquensis* testes and immunostaining would indicate that they are adrenergic and peptidergic autonomic fibers. More and depth study is proposed in order to elucidate the participation of the nervous system in gonadal function regulation.

A40

ELASTIC POLYMERS IN THE EGGSHELL OF *Salvator merianae* (SQUAMATA: TEIIDAE)

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Amniotic eggs and their constituent biomaterials are products of an accumulated history of interactions between organisms, environment, and selective pressures. Although the eggshell is key to embryonic survival, we still lack critical data on its structural and functional composition, especially in reptiles. Previous studies determined the conformation of the eggshell of Salvator merianae as a multifunctional fibrillar macro system. In the present work, we identified at the morphological and vibrational multiscale level, tensile biopolymers in the recently oviposited eggshells of this reptile. Indeed, shell sections stained with indigo orcein-picrocarmine showed a positive reaction for elastic fibers, oriented parallel to the egg surface. Likewise, Raman spectroscopic analysis sampled at seven points at different depths of the shell revealed a high molecular complexity characterized by a relatively high proportion of elastin in the outer section. The presence of exceptional elastic polypeptides for their reversible deformation and high resilience to stretching suggests an elastomeric behavior of the Salvator merianae eggshell. In this context, the possibility of studying during incubation the interactions of fibrillar polymers, and their mechanical behavior, would allow us to suggest the eggshell as a biological model to study biomaterials inspired by natural proteins.

A41

FIBRILLAR POLYMERES IN THE EGG SHELL OF *SALVATOR MERIANAE*: SPECTRAL MODIFICATIONS DURING EMBRYONIC DEVELOPMENT

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The eggshell is a multifunctional structure in which protein polymers and ceramics coexist in combination to produce materials with extraordinary functional versatility. Previous morphological and molecular results have shown that the eggshell of the deposed egg of the black-headed iguana *Salvator merianae* constitutes an extraordinarily diverse system of fibrillar biopolymers. Furthermore, in terms of abundance, we show that keratin is the most ubiquitous biopolymer in the eggshell of this lizard. In this context, in the present work, we analyze the spectral changes in the bands representing the secondary structure as well as that of the disulfide bridges (SS) of keratin, during embryonic development with confocal Raman microscopy. Comparison of shell spectra with 4 and 8 weeks of incubation showed amplitude and intensity modifications in the vibrations corresponding to α-helix conformations (1652 cm^{-1}); β-sheet (1669 cm^{-1}); β-turn (1685 cm^{-1}) and random coils (1638 cm^{-1}). Similar alterations were observed in the band at 499 cm^{-1}, characteristic of SS bonds. From a biological perspective, the observed vibrational changes would allow us to interpret the remarkable mechanical resistance to the volumetric alterations of the egg caused by embryonic growth. In the field of biopolymers, there is a special interest in studying fibrillar proteins such as keratin because of their intrinsic capacity to self-assemble and associate with other polymers to generate elastic matrices. The particularities of the *Salvator merianae* shell as a dynamic molecular system offer a biological model for the study of functional biomaterials.

A42

SERUM CALCIUM LEVELS IN POST-PARTUM SOWS WITH SUPPLEMENTATION

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Analyze efficacy of an organic supplement at in physiological stage, it was proposed to determine if there is hypocalcemia after calving and if it is a problem on the farm, as well as to analyze the effectiveness of the calcium gluconate solution that was used. Blood samples were taken from jugular vein in 48 sows of different parities between 65 and 70 days of gestation to determine serum calcium levels. Twelve sows from that farm were separated for intramuscular administration of calcium gluconate 20 cc of 23% solution and sample collection 24 hours post-partum. Calcium levels determined were 8.803 ± 0.448 mg/dL, a value below normal range (9 - 13 mg/dL), as it is a time of high demand from females for colostrum and milk production. Meanwhile, the average calcium value of the supplemented sows was 11.152 ± 1.163 mg/dL, demonstrating correction of circulating calcium in the study category. This is reflected in the improvement in production, where fewer piglets were born dead, which without treatment was 10 – 15 % and with treatment dropped to 6 – 8 % on the commercial farm.Serum calcium results show differences from obtained values on farm prior to application of calcium gluconate. To improve the design of model, test will have to be carried out with animals from an experimental station, in order to perform more sampling numbers and in order to study effect reported in the bibliography with this type of treatment. The uterus of breeding sows should also be tested histopathologically.

A43

MACROMINERALS IN PREPARTUM AND POSPARTUM OF PRODUCTIVE SOWS FROM A FARM IN ENTRE RÍOS

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Swine sector in recent years has become competitive to achieve profitable production. Where minerals must be provided taking into account requirements as productivity increases, their nutritional needs increase and their body reserves decrease; during critical stages of peripartum. Was examined serum of sows to determine status of calcium, magnesium and phosphorus in: a)-prepartum and b)-postpartum in a Entre Ríos commercial farm. Working blood was taken without anticoagulants: a) n=12 and b) n= 12, from 1 to 5 deliveries (with 1 to 3 animals in each category). Based on their nutritional requirements, diet was formulated with corn, soybean expeller and an inorganic vitamin-mineral nucleus. Serum concentrations of calcium (Ca), phosphorus (P), and magnesium (Mg) were quantified by colorimetric methods (commercial kits). ANOVA analysis was performed with Minitab software. Mean values and standard deviations were for Ca (mg/dL): a) 8.44 ± 0.83 - b) 10.47 ± 2.6; in P (mmol/L): a) 0.67 ± 0.07 - b) 0.69 ± 0.07 and Mg (mg/dL): a) 2.47 ± 0.28 - b) 2.38 ± 0.14. Average values of calcium and magnesium were within the reference range and a significant difference ($P < 0.05$) was observed only in the case of calcium, being the values in prepartum lower than postpartum; this mineral is important for milk synthesis in sows. Phosphorus averages were observed below the recommended reference range, which could be attributed to restrictive diets with low phosphorus content or an interferent (synergism / antagonism). With determination of other metabolites of lipid and protein profile, will be complemented these results obtained, for evaluation of metabolic profile in general, and food samples will be analyzed.

A44

COMPARATIVE ANTIBACTERIAL ACTIVITY OF EXTRACTS OF *LARREA DIVARICATA* AND *L. CUNEIFOLIA* ON *ESCHERICHIA COLI* ISOLATED FROM SHEEP

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Sheep production is an important area within agricultural system of Argentina. It is focused on food and textile precursors production for internal and external consumption. However, it is affected by diseases such as infectious gastroenteritis in suckling lambs caused by *E. coli* and other enteropathogens. Antibiotics application is a strategy to control bacteria with potential consequences related to microbial resistance and negative impact on environment. Thus, development of new sustainable practices is required. One possibility is to use extracts from *Larrea divaricata* (LD) and *Larrea cuneifolia* (LC), plants from the Argentina Northwest (NOA) with background of antimicrobial activity. Objective: to study comparatively antibacterial activity of NOA LD and LC extracts against *E. coli* strains. Materials and methods: alcoholic extracts (96°) were prepared from aerial parts of plants collected in Ampimpa (A), El Desmonte (D) and San Rafael (S). Antibacterial activity was tested by spot diffusion to determine minimum inhibitory dose (MID). Moreover, individual swimming motility (swimming), group swimming motility (swarming), and respiratory activity [AR-(resazurin, 570 nm)] were determined. Results: All extracts inhibited *E. coli* strains with MID values in range ≈8 - 34 µg/mL. For LC and LD, S extract was the only with > activity. LC and LD extracts restricted similarly individual and group motility of strains with percentage inhibition values between 59-82% and 64-84%, respectively. Application of both extracts reduces RA significantly. Conclusion: It is proposed to continue with analysis of extracts composition to study presence of specific molecules related with differences in response observed, focusing on search for a sustainable eco-friendly antimicrobial product for sheep livestock systems.

A45

EVALUATION OF TEMPERATE MAIZE HYBRIDS (*Zea mays* L.) ON EARLY SOWING DATES IN MONTEROS-TUCUMÁN

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Maize cultivation plays an important role in the NOA region. In Tucumán, in the non-saline depressed plain area, there is the possibility of early planting. The objective of this work was to evaluate temperate hybrids (H) in early planting dates. The trials were carried out in a property located in La Isla, Monteros, Tucumán. Yield (YD), prolificacy (PRO), weight of a thousand seeds (W1000) and stem break in percentage (%SB), were evaluated of 5 temperate hybrids from the company Association Cooperative Argentinas, ACA484VT3PRO (H1), ACA476VT3PRO (H2); ACA490VIP3 (H3); ACA473VT3PRO (H4), ACA482VT3PRO (H5) and F2 seed of the hybrid DK 77-10VT3PRO (H6) as control. There were 4 sowing dates (SD), September 6, 2022 (1stSD), September 23, 2022 (2ndSD), October 8, 2022 (3rdSD) and October 22, 2022 (4thSD), rainfall. Plots with 2 rows of 5 meters, 50 cm between rows. The design was completely randomized blocks, with 3 repetitions. The ANOVA for YD, PRO, W1000 and %SB, showed a highly significant difference for H ($p<0.0001$) and for SD ($p<0.0001$; $p<0.0002$; $p<0.0026$; $p< 0.0001$) and there was H*SD interaction for %SB ($p<0.0001$). In YD the H1 (5,409.91 kg.ha^{-1}) and H2 (5,146.73 kg.ha^{-1}) and the 2ndSD (5,060.46 kg.ha^{-1}), were the best performers. In PRO, the H2 (1.16 ears.plant^{-1}) and H1 (1.03 ears.plant^{-1}) and the 1stSD (1.06 ears.plant^{-1}) and 2ndSD (1.01 ears.plant^{-1}), had the highest value. In W1000 the H5 (288.99 gr.) and the 2ndSD and 1stSD (270.97 and 255.97 gr.) were the ones that presented the highest values. In %SB, the H1 and H2 (59.42 and

70.21%) and the 1stSD (31.76%) were the worst performers. The YD, despite being a dry season, averaged 4,301.18 kg.ha^{-1}. The highest YD was in the 2ndSD, would be explained by the higher rainfall received during the critical period, between the 15 days before and after flowering, where the YD is defined in maize.

A46

SEED-BORNE TRANSMISSION OF WHEAT STREAK MOSAIC VIRUS (WSMV) IN INFECTED WHEAT PLOTS

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Wheat streak mosaic virus (WSMV) is the causal agent of one of the most destructive viral diseases in wheat, with high prevalence, incidence and severity. This virus also infects corn, barley, oats, triticale, among others. Its transmission is mainly through its vector, Aceria tosichella Keifer, (Wheat Curl Mite WCM). In turn, different studies have determined that WSMV is also transmitted by seed at very low frequencies (0.5 to 1.5%), depending on virus isolation and host cultivar. This last form of spread is relevant in countries where the virus has not yet been detected. The objective of this work was to determine the presence of WSMV in wheat seeds from 3 plots totally affected by the virus. The samples were from the province of Buenos Aires, one from the town of Pergamino (Maitén variety) and the other two from the town of Tres Arroyos (Baguette 802 variety). Approximately 2000 seeds of each cultivar were sown and 1500 seedlings were randomly sampled at third leaf stage, constructing 100 groups of 15 seedlings each, except in the case of one of the samples from Tres Arroyos, where 87 groups were made. Viral detection was performed by DAS-ELISA serological test, using specific commercial sera. The 287 groups of seedlings tested were negative for WSMV. This result demonstrates the low seed transmission of this local virus isolate in these 3 cultivars. However, it is important to continue with this type of analysis considering the reported antecedents and the significance in terms of exports and disease management.

A47

SILVER NANOPARTICLES: A PROMISING APPROACH TO CONTROL LEMONS FUNGAL ROTTENNESS

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Lemon production in Tucumán is a great economic activity, but suffers important losses due to postharvest fungal diseases, such as green, blue, and sour rottenness caused by *Penicillium digitatum* (PDS), *P. italicum* (PIS) and *Geotrichum citri-aurantii* (GC), respectively. To control these rottennesses, fungicides have been used but their continuous application has led to resistance. So, new alternative methods are required. Nanoparticles have been reported as potential antimicrobials due to their high surface-to-volume ratio, which enhances their interaction with microorganisms. In this study, we investigated the antifungal action of silver nanoparticles (NPs-Ag) as a novel alternative for controlling local isolates of fungal pathogens for lemons. NPs-Ag were synthesized by chemically proceed and characterized using several analytical methods. To evaluate antifungal activity, conidial suspensions of PDS, PIS, and GC, adjusted to 10^6 CFU/mL, were exposed to different

concentrations of NPs-Ag. The minimum fungicidal concentration was 10 µg/mL, after 24h incubation. To study action mechanism, the membrane permeability, reactive oxygen species (ROS) production and conidia cellular ultrastructure were determinated. It was demonstrated that NPs-Ag permeabilizes the plasma membrane and disrupt cellular organization. Furthermore, the NPs-Ag cytotoxicity was evaluated using the nematode *C. elegans*. It was shown that they do not affect survival up to 96 hours, although a reduction in reproduction with a decrease in egg deposition was observed. Additionally, when the NPs-Ag in vivo action was assay on artificially infected lemons, 1000 µg/mL of NPs-Ag could be reduced the mold incidence. These results present a promising approach to NPs-Ag application to control fungal postharvest diseases on lemons.

A48

ANTIMICROBIAL ACTIVITY OF *ROSMARINUS OFFICINALIS* EXTRACTS AND IN COMBINATION WITH QUATERNARY AMMONIUM DISINFECTANTS

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Bacterial resistance to antibiotic and biocides such as disinfectants is a public health problem, especially in hospital infections. Plants as well as their derived products could be an interesting alternative to this problem. Aims of this study were to evaluate the antibacterial activity of extracts and essential oil of *Rosmarinus officinalis* (*Ro*) (Lamiaceae) against standard reference and clinical isolates strains: *Escherichia coli, Staphylococcus aureus, Enterococcus faecalis*, and *Pseudomonas aeruginosa* (*Pa*).taken from Avellaneda Hospital and test the biocidal action of mixtures of Ro extracts with quaternary ammonium compounds (QAC) which are commonly used as disinfectant in the hospital,were tested. The extracts were obtained by maceration of fresh plant material with hot water (W), ethanol:water (EW) and, acetone:water (AW) and the essential oil (EO) by hydrodistillation. Antimicrobial activity was evaluated using the disk diffusion technique and the Minimum Inhibitory Concentration (MIC) was determined by the microbroth dilution technique. Also, 1:1 mixtures of the disinfectant with AW and EO extracts against all bacteria analyzed. Extracts and essential oil have shown activity against all the tested microorganisms. AW extract and EO were the most effective extracts against *S. aureus* ATCC 25922 with mean MICs of 250 y 125 ppm, respectively. Additionally, AW was more active against clinically isolates strains, being more effective on *Pa* with a MIC = 500 ppm. The incorporation of AW and EO to the disinfectant halved the MIC on *Pa*, observing a probable synergism of the mixture. Studies will continue in the intensive care units of the extracts and their mixtures with QAC to search for bio disinfectants that contribute to the control of infections in the hospital environment.

A49

METABOLITES RECOVERED FROM ANDEAN TUBERS` PEELS AND THEIR EFFECTS ON BIOFILM DEVELOPMENT

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Oxalis tuberosa Mol., “pink goose” (Oxalidaceae), *Ullucus tuberosus* Caldas, “smooth” (Basellaceae) and *Solanum tuberosum* L. subsp. *andigena* var. red and forty miskila (Solanaceae) are Andean tubers revalued for their nutritional contributions. The objective of the present study was to obtain metabolites of diverse polarity from *peels* of tubers selected according to their histochemical profiles and evaluate their action on biofilm production, using a liquid microtechnique and electron microscopy (EM). Studies of action selectivity against pathogenic and saprophytic bacteria were addressed. Full aqueous extracts and ethyl acetate sub-extracts were obtained from periderm tissues (assayed at concentrations between 25-100 µg/mL). The effects of

phytoextracts on bacterial growth and biofilms were determined by a liquid microplate method. To investigate biofilm developed by *Lacticaseibacillus paracasei* CO-01, isolated from healthy sheep, a technique with static support was standardized by ME. Pathogenic bacteria were: *Escherichia coli* ATCC 35218, *Salmonella enterica* ATCC140285, *E. coli* O157 H12 (EC-8), *S. corvalis* (SF-2), *S. cerro* (SF-16) and the saprophytes: *Lactobacillus acidophilus* ATCC 5212, *L. plantarum* ATCC 10241 and *L. paracasei* CO-01. Metabolite pool from *peels* showed a differential action, stimulating the biofilm production in saprophytic species, mainly in *L. paracasei* CO-01 between 23-74%, according to the phytoextract. EM showed a close correlation with the results in the microplates, determining a cellular and biofilm increase in both tests. In pathogenic bacteria, none natural products promoted these parameters, which suggests a selectivity of action of the metabolites extracted and functionally characterized by UV spectroscopy such as coumarins and flavonoids. This result is consistent with the original histochemical profile. The advances obtained encourage us to address the design of formulations with beneficial sheep bacteria added with metabolites from the peels of Andean tubers with possible applications in health.

A50

ANTIMICROBIAL RESISTANCE PROFILE IN ENTEROBACTERIA (ETB) ISOLATED FROM OUTPATIENT URINE CULTURES IN A TUCUMAN HOSPITAL, FROM 2019 TO 2022

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Urinary tract infections (UTI) are one of the primary reasons for medical consultations. The inappropriate use of antibiotics (ATB) can lead to the selection of resistant strains and treatment failure. In this study, resistance in ETB to first-line ATB for UTI outpatients was analyzed. A retrospective descriptive study was conducted on 21,126 samples analyzed between 01/01/19 and 12/31/22. 3,288 tested positive for ETB. Three age groups were considered for the analysis: pediatrics (0-15 years), adults (16-49 years), and older people (≥ 50 years). The annual resistance percentages (R) for each ATB from 2019 to 2022 were as follows: ampicillin (AMP): 68, 64, 67, 66; ampicillin-sulbactam (AMS): 21, 18, 14, 26; cephalexin (CFL): 21, 15, 17, 14; cefuroxime (CXM): 19, 14, 16, 14; trimethoprim-sulfamethoxazole (TMS): 44, 41, 43, 43; ciprofloxacin (CIP): 29, 21, 31, 33; nitrofurantoin (FT): 3, 3, 2, 2. Additionally, the following resistance percentages were determined in 949 isolates: amikacin (AN): 2, 0, 2, 0; fosfomycin (FOS): 1, 4, 2, 1; gentamicin (GEN): 32, 22, 23, 11. Resistance mechanisms included extended-spectrum beta-lactamases (ESBL) at 18, 14, 16, 14% and carbapenemase production at 0.2, 0.2, 0.3, 0.1%. In pediatrics, ESBL represented ≤ 15% of positive cases, whereas in older people, it ranged from 34 to 20%. Resistance to GEN in pediatrics was between 32-6%, and for older people ranged from 42-18%, with the lowest percentages in both groups in the year 2022. Resistance to CIP in pediatrics ranged from 11-14%, and for seniors, it ranged from 51-60%. There was no significant difference in the resistance to first-line ATB year by year, but high levels of resistance suggested that the first-choice treatment for UTI should not be AMP or TMS for all age groups and not CIP for older people. Seniors also exhibited higher resistance to GEN and the presence of ESBL. Good sensitivity was observed for FT, FOS, and AN. AN remained a good therapeutic alternative. FOS was added as a first-line ATB in 2022 but should be reserved for complicated UTI with multi-resistant pathogens. This study represents an important tool for updating local guidelines for UTI treatment in outpatient settings.

A51

LACTIC ACID BACTERIA FROM ARGENTINE FERMENTED FOODS: ISOLATION AND CHARACTERIZATION FOR THEIR POTENTIAL USE AS IMMUNOBIOTICS

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Immunobiotics are live microorganisms that, when administered in adequate quantities, confer health benefits to the host through of immunity modulation. The objective of this study was to isolate, characterize and evaluate the potential of lactic acid bacteria (BL) isolated from fermented foods as potential immunobiotics. Native fermented products were randomly collected from different food matrices from Tucumán. Sixteen samples were taken and cultured on Man, Rogosa and Sharpe

agar. 30 isolates were obtained and phenotypically characterized by evaluating their hemolytic capacity, EPS production and antimicrobial compound production (anti-listeria), growth morphology, Gram staining and catalase test. Six isolates were selected because they presented the following desired characteristics: Gram+, catalase+, non-hemolytic bacilli and able to produce anti-listeria metabolites. Then, safety and immunobiotic potential of the selected strains were then evaluated. Different groups of 6-week-old Swiss mice were fed with each of the isolated bacilli (10^8 CFU/ml/day) for 7 days. On the eighth day, both treated and untreated control mice were evaluated for hepato/splechnomegaly and phagocytic activity of peritoneal macrophages by flow cytometry. The results showed that none of the bacilli studied induced hepato/splechnomegaly. More importantly, the phagocytic capacity of peritoneal macrophages was significantly higher in mice preemptively treated with two strains of bacilli (SC1 and SC6) compared to the control group ($p<0.05$). The results obtained allowed us to select two strains of *Lactobacillus* spp. with immunobiotic potential. Further studies are necessary to identify the strain species of interest and delve into their role in preventing infections caused by the consumption of food.

A52

PHYTOSANITARY POTENTIAL OF A *Larrea cuneifolia* EXTRACT AGAINST *Fusarium* SPECIES RESPONSIBLE OF EAR ROT DISEASES

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Fusarium species, especially *F. verticillioides* and *F. graminearum*, cause cereal diseases, and contaminate grains with mycotoxins dangerous to human and animal health. Actually, the chemical products used against these fungi present a limited effectiveness and pose risks to the environment. New harmless and envronmentally friendly antifungals are needed. Objectives: determine the phytotoxicity and genotoxicity of a leaf ethanolic extract of *L. cuneifolia* (ELC), and calculate its antifungal selectivity index (IS). Methodology: The 50% inhibitory concentration of root elongation (CILr50) of ELC was determined using the *Allium cepa* toxicity test. The 50% inhibitory concentration of mycelial growth (IC50) of ELC was determined by the macrodilution test against both *Fusarium* species. $IS=CILr_{50}/CI_{50}$ was calculated. Results: ELC, obtained with a yield of 31% w/w, presented a CILr50=1225 ppm, being 5 times less toxic than the positive control (CILr50 of $K_2Cr_2O_7$=225 ppm). Microscopic analyses indicated that extract concentrations lower than 750 ppm neither reduced the root length nor generated mitotic alterations. The CILr50 is several times higher than the antifungal IC50 determined on *F. graminearum sensu stricto* (IC50=150 ppm) and *F. verticilliodes* (IC50=230 ppm), resulting in IS values equal to 7.87 and 4.97, respectively. Discussion: The IS values indicate that ELC has a selective antifungal activity due to the high concentrations required to produce adverse effects on *Allium cepa* cells. Conclusion: The ethanolic extract of *L. cuneifolia* was not phytotoxic to *A. cepa* at the concentration at which it exerted antifungal activity, demonstrating its promise as a phytosanitary agent.

A53

APPLICATION OF THE BIOFUNGICIDE PSP2 FOR THE CONTROL OF POSTHARVEST ROT IN LEMONS

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Argentina is the eighth largest citrus producer in the world and the world's leading producer of lemons. An important limitation in the citrus industry is the management of postharvest fungal diseases that generate large economic losses, mainly green and

sour rots, caused by *Penicillium digitatum* (PD) and *Geotrichum citri-aurantii* (GC), respectively. This forces the application of synthetic fungicide treatments in citrus packing houses, whose use is increasingly restricted due to toxic effects on human and environmental health. In this context, it is necessary to find new alternatives for the control of these pathogens that are compatible with sustainable crop management. The ITANOA working group has developed a biofungicide called PSP2 from strawberry leaves (*Fragaria x ananassa*), which are crop harvest waste, through a simple and economical process that does not involve the use of toxic solvents. The objective of this work was to evaluate the effect of PSP2 on the *in vitro* and *in vivo* control of phytopathogenic fungi that cause rotting in lemon. *In vitro* inhibition assays using the agar diffusion technique indicated that the minimum inhibitory concentration is 0.05 and 0.025 g dry weight/ml of PSP2 for PD and GC, respectively. Trials were carried out on fruit with a curative application scheme consisting of the application of PSP2 (0.1 g dry weight/ml) 20 hours after inoculation with each pathogen, and an effectiveness of 60% for PD and 50% for GC was observed. These results demonstrate that PSP2 could be used as an alternative for the management of postharvest diseases of lemon, within a framework of sustainability that in turn favors the circular economy.

A54

IMPACT OF A YACON-BASED SYMBIOTIC CHEESE ON THE CARDIOMETABOLIC PROFILE OF OBESE RATS

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Overweight and obesity are accompanied by a set of cardiometabolic risk factors such as abdominal fat, abnormal glucose homeostasis, dyslipidemia and hypertension. Despite the wide range of treatments, dietary intervention remains key for the prevention and treatment of these metabolic disorders. In this work, a symbiotic cheese was made from goat milk enriched with *Smallanthus sonchifolius* (yacon) root flour and its functional properties were evaluated in an obese rodent model. In cheese making we use commercial dairy cultures (FD-DVS-YC-X16-YO-FLEX, Chr. Hansen, Denmark) as starters and yacon flour at a concentration of 20% (w/v). The composition and antiradical activity of the cheese were determined. Male Wistar rats were fed a standard diet (CD) or a high-fat diet (HFD) for 12 weeks. The animals were then divided into a CD, HFD, HFD plus goat cheese (HFD-GC) and HFD plus goat cheese + yacon (HFD-GCY) group. After 8 weeks of consumption, morphometric, biochemical and oxidative stress parameters were measured. The GCY had higher nutritional values and good organoleptic acceptance. Periodic consumption of GCY did not produce significant changes in body weight ($p>0.05$) or in visceral fat pockets ($p>0.05$), although a decreasing trend was observed. GCY supplementation reduced serum levels of triglycerides, LDL-c and increased HDL-c. ($p<0.05$), improving the cardiac risk factor and the atherogenic index ($p<0.05$). GCY reduced lipid peroxidation and protected systemic oxidative status by increasing serum levels of reduced glutathione in obese rats ($p<0.05$). It also improved basal blood glucose levels and insulin sensitivity ($p<0.05$). Taken together, our data suggest that GCY has high nutritional value and protective effects on cardiometabolic risk in obesity.

A55

BENEFICIAL EFFECTS OF *SOROCEA BOMPLANDII* IN THE MANAGEMENT OF METABOLIC ALTERATIONS LINKED TO AGING

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Aging is a risk factor for the development of chronic metabolic disorders such as obesity, type 2 diabetes, and cardiovascular diseases. Alterations in lipid and sugar homeostasis, together with oxidative stress, are important mechanisms of cellular senescence. The inhibition of digestive enzymes such as α-amylase and pancreatic lipase constitutes a promising therapeutic strategy for the management of these disorders. The objective of this work was to evaluate the antioxidant capacity and hypoglycemic and hypolipidemic potential of *Sorocea bomplandii leaves*, *in vitro* and *in vivo*. Leaf extracts were obtained by aqueous extraction (infusion/decoction), the yield, and total content of phenols, and flavonoids were calculated and preliminary phytochemical screening was performed. The DPPH antioxidant activity and the inhibitory activity of the extracts on the enzymes α-amylase and pancreatic lipase were determined using acarbose and orlistat as positive controls, respectively. Oral lipid and glucose tolerance tests were performed in Wistar rats. The results demonstrated that the aqueous extracts of *S. bomplandii* are rich in phenolic compounds and flavonoids and possess strong DPPH antioxidant activity. An inhibition of α-amylase and pancreatic lipase activity is evident by the decoction of *S. bomplandii*, in a dose-dependent manner. Both aqueous extracts showed a significant anti-hyperglycemic effect ($p \leq 0.05$) in normal rats with transient hyperglycemia, however, they did not modify basal glycemia. A significant lipid-lowering effect will also be observed through the lipid test ($p \leq 0.05$). Acute and subacute toxicity studies revealed the safety of its consumption. The leaves of *S. bomplandii* have a high antioxidant power with the potential to reduce caloric intake, and their use is promising to mitigate the metabolic effects produced by aging.

A56

REVIEW ABOUT FRESHWATER MICROALGAE IN ARGENTINA. BIOPROSPECTIVE ADVANCES TO DEVELOP A PROMISING BIOCHEMICAL AND ENERGY RESERVE FOR THE FUTURE

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In the productive context of renewable technologies, microalgae are used for various biotechnological applications with utility in health, foods, bioremediation, and on pharmaceutical, agricultural, and biofuel industries. Therefore, its biotechnological development represents promising future prospects as sources of diverse biomasses to feed biorefineries. Although studies on biotechnology of argentine marine microalgae are being relieved, studies on freshwater microalgae remain mostly unexplored and unexploited, despite having great potential. Due to accelerated ecosystem changes, watersheds are losing their biodiversity, threatening the natural benefits for human development, as well as their genetic resources. For this reason, we consider it a priority to relieved knowledge about argentine freshwater microalgae, analyze bioprospective advances, and expose the need for future research to understand and value this microalgal biodiversity, as a potential biochemical and energy reserve for the future. Bibliographic search in Scopus, Google scholar and EBSCOhost. Period: 2000-2023; date: July 2023; Equation: "microalgae + fresh water + Argentina". Inclusion criterion [microalgae isolated/identified (I/I) from/in freshwater reservoirs of Argentina (FRA)]; Exclusion criteria: [1) if the place where I/I was not specified, 2) if they were not I/I from/in FRA, 3) I/I from/in Estuaries, 4) Antarctic microalgae]. N=44 reports were selected. Predominant areas: Ecophysiology (n:16), Ecotoxicology (8), and Cs. Environmental (6) (most cited species belong to Bacilliarophyta and Cyanophyta); There were 11 bioprospective studies on bioremediation, biochemistry and biotechnology (most cited species belong to Chlorophyta). The studies reported correspond mostly to the Central Region (20); Patagonian Region (13), NOA (7), Mesopotamia (6), NEA (1).These ovservations show the necessity of multidisciplinary and systematic studies on this field.-

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A MATHEMATICAL READING OF THE ACTION OF A DRUG IN THE DYNAMICS OF AN INFECTIOUS DISEASE

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The emergence and spread of infectious diseases have been a cause for concern due to their impact on the healthcare system and the social, political, and economic consequences. Scientific communities, in order to understand the spread dynamics of SARS-CoV-2 virus, relied on the compartmental and deterministic epidemiological model SIR (System of Nonlinear Differential Equations), which classifies the population into (S)usceptible, (I)nfected, and (R)ecovered compartments. The parameters of the model explained social isolation, transmissibility, spread, and mutations of the virus. With the emergence of vaccines, the SIR model was modified to incorporate the vaccinated population with corresponding parameters. The objective of this study is to analyze the dynamics of epidemiological models applied to COVID-19 and extend their use to other infectious diseases while evaluating the effectiveness of pharmacological treatments as an integral strategy. The adopted methodology is based on the conceptual construction of mathematical models within the field of health and the analysis of their essential interconnections. Qualitative theory of dynamical systems was used for this purpose. The computer simulation of the SIR model and its variations, the analysis of equilibrium point stability, and the examination of parameters such as the reproductive number, infection rates, recovery rates, natural mortality, and vaccination, all reveal a change in dynamics when considering the vaccinated population as an additional compartment. Additionally, the SIR models were used to study the spread and potential mitigation scenarios with pharmaceutical measures in infectious diseases such as measles, chickenpox, smallpox, HIV/AIDS, among others. In conclusion, the versatility of epidemiological models makes them applicable tools for a wide range of phenomena, provided we are able to interpret the parameters that comprise them adequately. This underscores the importance of knowledge exchange among researchers from different fields.

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ISOLATION OF GASTRIC VESICLES CONTAINING H^+/K^+ ATPase AND EVALUATION OF POTENTIAL INHIBITORS OBTAINED FROM BLUEBERRIES STEMS

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Gastric H^+/K^+-ATPase enzyme plays a pivotal role in the final step of gastric acid secretion, being the target of drugs used in the treatment of gastric ulcers. In previous studies we demonstrated an interesting gastroprotective activity of *Vaccinium myrtillus* L. (bilberry) stem polar extracts in rats. The current study aimed to evaluate the *in vitro* gastric H^+/K^+ ATPase enzyme inhibitory effect of bilberry stems polar extracts and different fractions obtained from them. The H^+/K^+-ATPase was isolated in microsomal vesicles from pig stomach mucosa. The 10% hydroethanolic (HET) and 10% hydroacetonic (HAC) bilberry stem extracts (30-1000µg/mL) presented inhibitory activity on the enzyme, with an IC_{50} of 507.466µg/mL and 610.030µg/mL, respectively. Omeprazole (50-400 µg/mL) was used as a positive control (IC50=202.928µg/mL). The HET and HAC extracts were partitioned with different increasing polarity solvents, obtaining the following fractions: hexanic, ethyl acetate, dichloromethane and a hydroalcoholic remnant. The enzymatic inhibitory activity of each fraction was evaluated at concentrations between 30-1000µg/mL, obtaining the highest effect in the ethyl acetate fraction of HET extract (IC_{50}=324.78µg/mL) and the hydroalcoholic remnant of HAC extract (IC_{50}=492.63µg/mL). This result is probably related to the amount of phenolic compounds determined in the quantitative phytochemical analysis. In conclusion, the extracts partitioning allowed us to concentrate the metabolites according to their polarity and enhance the inhibitory activity on the H^+/K^+-ATPase, highlighting that bilberry stems represent an important source of phytoconstituents with promising gastric antisecretory activity.

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COMPARATIVE STUDY OF THE STRUCTURAL, ELECTRONIC PROPERTIES AND REACTIVITIES OF GIBBERELLINS

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Gibberellins (GAs) are phytohormones that regulate or modulate multiple and varied responses in the growth and development of higher plants. They are a family of acidic tetracyclic diterpenes, whose basic structure consists of an *ent-gibberellane* ring. More than 130 GAs have been characterized, although only a few members have intrinsic ability to influence plant growth. Hydroxyl group's insertion at the C3 and C2 positions determines this biological activity. GAs carrying an OH group at the 3β position, such as GA1, GA3, GA4 and GA7, exhibit high biological activity. When they incorporate an OH group at the 2β position they become inactive, such as GA8. GAs are a valuable tool in crop yield and quality improvement programs (stimulation of stem growth, induction of fruit development, seed germination, etc.). The aim of this work was to evaluate the structural, electronic properties and reactivities of some structurally related GAs by means of a theoretical study. For this purpose, mechano-quantum calculations were performed using the Density Functional Theory with the B3LYP/6-31G(d) method. Geometric structures were optimized in both gas and liquid (water) phases; reactivity global descriptors were obtained from the energies of the boundary molecular orbitals and the local descriptors were obtained using the UCA-Fukui software. Comparative analysis of different descriptors shows a higher reactivity of GA3 and GA7. Considering the local descriptors, nucleophilic attack is recorded at the C1 or C2 positions of GA3, while for the rest of GAs it is at C7. Electrophilic attack factibility is only evident at C17 (carboxylic) for all the GAs studied. These results allow us to determine theoretically the electronic properties of these compounds. This knowledge could be used both for the synthesis of compounds of agricultural interest and as synthesis intermediates in organic chemistry.