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(Asociación de Biología de Tucumán)

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LECTURES

A1

“Miguel Lillo” Lecture

LONG-TERM INTERACTIONS OF MARINE MAMMALS WITH THE HUMAN SPECIES IN ATLANTIC PATAGONIA, IN A CONTEXT OF CLIMATE CHANGE

Crespo EA

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Marine mammals are among the top predators in the ocean. The Argentine Sea is home to the South American sea lion, the South American fur seal, the southern right whale, the southern elephant seal, and other species of whales and dolphins. These species were hunted by native peoples that populated the coast until the Europeans colonized South America. Since then, they have been intensively exploited by the English, French, Dutch, Portuguese, Belgian, and Spanish, and later by the Argentines (between the 17th and 20th centuries). Marine mammal population reductions caused imbalances in the structure of the ecosystem. Protection reached the right whale in the 1920s and for the rest in the 1960s. Signs of recovery were only detected in the 1990s for right whales and sea lions, and in the 21st century for fur seals. However, the ecosystem was no longer the same. During the 1960s, at the time the exploitation of marine mammal's ceased, incidental mortality appeared as a new problem for coastal species. Different types of fishing gear were implemented at sea. High seas fisheries in the 1980s, particularly bottom trawling, removed huge amounts of biomass from the ocean and produced remarkable changes in the marine community. Many commercial species extracted by fishing are mostly prey of mammals and birds. Sea lions have increased their population to one third of the original K and right whales to one tenth; that of fur seals and elephant remain unknown. The biomass released by the reduction of sea lions triggered the population growth of penguins, other birds, and dolphins. During the 1990s, right whales have evidenced density-dependence through an increased mortality rate and a declining rate of increase, and sea lions a reduction in body size. The increase in pinniped populations possibly triggered the increase in killer whales' population. Regarding the changes that have been detected linked to climate change, few have been documented in the populations that live in the waters of the Southwestern Atlantic, mostly related to the Antarctic Circumpolar Ocean. Antarctic krill growth and indirectly on krill-dependent predators are negatively related with temperature, with biomass reflecting variability in oceanographic conditions. Positive temperature anomalies in the tropical Pacific and the Georgia Islands showed that there are strong links between krill biomass during the previous winter period and reduced reproductive performance of Antarctic fur seals and gentoo penguins. There is a strong relationship between the reproductive success of right whales and SST anomalies in the South Georgia Islands in the fall of the previous year. Regarding the future of these high trophic level predators, it is pending to find an agreement, in the near future, that will make possible to find a sustainable use of fishery resources in terms of the amount of extractable biomass and the maintenance of top predator populations in a long run balance.

A2

Opening Lecture

INTESTINE AS A KEY ORGAN IN IMMUNE FUNCTION AND HOST HEALTH

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The intestinal ecosystem is a complex net of interactions between procaryotic and eucaryotic cells that coexist in this microenvironment as the microbiota and epithelial and immune cells associated with the intestine. The intestinal microbiota is important to provide energy in the form of short chain fatty acids, vitamins K and B, and for the development and function of the immune system. There are evidences that an appropriate intestinal microbiota is essential to improve the immune system and maintain a balanced immune function, avoiding exaggerated responses to luminal antigens. The metabolites initiate a network of signals that go from the intestinal epithelial cell to the mucosa-associated immune cells, which, in turn, initiate a network of signals to activate not only the immune response on mucosa sites but also the systemic response. The epithelial cells from the intestine are structured as a single layer interfacing between the external environment and inner host tissues. The microbiota stimulates the maturation and functionality of the immune cells through their metabolites. The interplay between immune response and intestinal microbiota composition is critical to maintain mucosal immune tolerance. The signals through the intestinal epithelial cells induce activation of the immune cells from the *lamina propria* and those distant from the intestine to maintain a mucosa and systemic immune response. The microbiota is responsible of the homeostasis at the intestinal mucosa against antigens from the intestinal lumen due to the barrier effect. These microorganisms are fundamental for the maturation and activity of the innate immune response mediated by macrophages (MQ), dendritic cells (DC), and from the systemic immunity through lymphocytes T and B, as well as the oral-tolerance mechanisms, through the regulatory cells (T_{regs}). The intestine produces the 70% of the antibodies able to be produced by all the immune system. The intestinal microenvironment is able to influence other organs, as the

intestine–brain axis through the network of signals induced. The good composition of the intestinal ecosystem is important to favor the health and the wellness of the host.

SYMPOSIUM: “EVOLUTIONARY BIOLOGY AND BIODIVERSITY”

A3

A MACROEVOLUTIONARY PERSPECTIVE OF BIODIVERSITY

Arcucci AB

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Biodiversity studies develop, in general, by levels from molecules to ecosystems or vice versa, considering species as main unit of these studies. Definitions and metrics more usually used in biodiversity are referred to species numbers in some space and time. But we know species and biodiversity change spatially and through time. The description, understanding, and interpretation of these variations needs a different view that consider pattern and processes in big areas and continents and the planet itself and through big periods of time in different groups of organisms. This is the approach that macroevolution uses to understand historic biodiversity in the planet. The recent vision alone does not allow to answer certain questions because, in local scale, is impossible to detect general patterns or its main causes. Macroevolutionary studies, including different geological periods and phylogenetic relationships between lineages, allow to analyze the generation and extinction of species or groups of species in long periods of time and follow the evolutionary history of its characteristics. The combination of the macroevolutionary approach and the recent one suggests that the spatial or temporal patterns of biodiversity could be the result of the influence of the past and present climate in different regions modulating the processes of generation and loss of species. The global environmental crisis that we suffer already, in big part caused by human activities, demand to biologists and other professions to have a wider view of biodiversity and its features that could be useful to understand causes of actual patterns and what changes them.

A4

DIVERSITY OF THE SOIL FUNGAL POPULATION OF THE HORTICULTURE MODULE (FCA-ZAVALLA-SANTA FE) ASSOCIATED WITH *Cucurbita* FRUIT ROT

Peruzzo A

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The cultivation of Cucurbitaceae constitutes an attractive activity for the farmer due to the value of consumption and permanent economic income of the product obtained. However, plants and fruits are susceptible to attack by pathogens, causing yield losses. The objective of the work was to survey the fungal population associated with *Cucurbita* fruits in the Horticultural Module of the Faculty of Agricultural Sciences and characterize the resistance/susceptibility of three genotypes of *C. moschata*. The plant material used was implanted in the years 2019–2020 and 2020–2021 in the Horticultural Production lot (33°01'S – 60°53'W) including defined cultivars and wild populations of *Cucurbita*. Surveys were carried out during the fruit formation stage, applying Koch postulates to isolate pathogens from symptomatic tissues. The genera *Fusarium* (51.3%), *Pythium* (17.7%), *Aspergillus* (13.9%), *Alternaria* (13.2%), *Rhizopus* (10.3%), *Phyllosticta* (5.6%), *Phytophthora* (3.8%), *Epicoccum* (3.7%), *Myrothecium* (2.8%), *Phialophora* (2.8%), *Sclerotium* (1.9%), and *Phomopsis* (0.9%) were morphologically identified. Then, 15 isolates of the *Fusarium* genus were selected to inoculate 15-days seedlings (N = 6) of each genotype of *C. moschata* under study (CmA, CmB, and Cm12), with irrigation of 10 mL of conidial suspension (10⁶ conidia/mL). The incidence of the disease was calculated as percentage of diseased seedlings and its reaction was defined: resistant (< 20%), moderately resistant (21–50 %), moderately susceptible (51–70 %) and susceptible (> 71%). Plant genotypes showed differential behavior. Based on those results, a sub-group of five isolates (*F. equiseti*, *F. verticilloides*, *F. oxysporum*, *F. polyphialidium*, and *F. culmorum*) were selected to inoculate mature fruits (N = 5/isolate) by making a wound (0.8 cm in diameter and 0.5 cm deep) at a distance of 1 cm from the peduncle, after disinfection of the bark with 70% ethanol. An agar plug of 0.6 cm in diameter covered with mycelium was inserted in each wound and was sealed with petroleum jelly. The fruits were placed in a growth chamber (25°C, photoperiod 16/8 h) and were evaluated for 30 days. The CmB genotype expressed the best behaviour against the inoculated isolates, while the Cm12 was the most susceptible. The present work provided a significant advance in the practice of management and improvement of *C. moschata* since *Fusarium* is a natural inhabitant of the soil.

A5

HOW DO WE CONSERVE OUR BIODIVERSITY IN THE CURRENT CONTEXT?

Bo RF

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In recent years, from different areas, we are aware of the urgent need to conserve our biodiversity. Many biologists, knowing the dramatic consequences of this significant loss, working scientifically on various biotic groups (at different organismic levels) and/or ecological entities (at different spatial and temporal scales), were trying to assess the magnitude of the situation and its possible consequences and trends, through classical and/or novel approaches. Many ecologists pretend to know the main contributing factors of this phenomenon and the degree of association between the deterioration of our biodiversity and the modalities, magnitudes, and speeds with which various human activities are currently carried out. In the last decades, the already unobjectionable “Climate Change” has been strengthened by the strong pressures of the global socio-economic situation, favored, paradoxically, by the access to technological developments that allow them a high transformation capacity. Aware of the challenge involved, it is proposed to discuss: (a) if we really understand each other when we speak of terms such as “conservation” and “biodiversity,” and if we should incorporate other concepts; (b) given the complexity of the “current context”, if we can identify priority aspects and address them from our profession, without ignoring the other social actors involved; and (c) what specific technical proposals could be applied. It is proposed that: we need to have a broader and more inclusive vision which, in addition to describing the situation status, allows us to advance in “how”, eventually, we can reverse it, and, for this, it is necessary: (d) to propose operationally appropriate conceptual and methodological approaches, favoring those that are based, in addition to the analysis of the “diversity” of components, on the evaluation of the integrity (structure and functioning), the health condition and the resilience of the socio-ecosystem considered; and (e) starting from an adequate inventory, select and apply indicators that evaluate both the “status” and the possible “progress” resulting from the specific actions proposed. For these, it is essential to: (f) define the most appropriate levels or scales to be considered in the unavoidable processes of participatory environmental planning and land-use management.

A6

FROM ZOONOSIS-ASSOCIATED RODENTS TO ENDANGERED SPECIES: A HISTORY OF MULTIDISCIPLINARY APPROACHES

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Our early research focused on the phylogeography of zoonotic reservoir rodent species, providing insights into the degree of historical and current contact between populations with and without circulation of human pathogenic viruses. These studies require a large number of samples, with a very wide geographical coverage. Thus, during samplings, we detected that sometimes the taxonomic identification of the collected specimens, based on external phenotypic characters, did not coincide with the molecular classification. Moreover, virologists had taught us that different viral genotypes were generally associated with a single rodent reservoir species. This led us to delve into the world of Molecular Systematics and Biogeography to find out which species acted as a reservoir for different viruses and what their geographical distribution was, which is essential to implement prevention actions. In this way, we contributed to the knowledge about the evolutionary histories of species of the genus *Calomys* (*C. laucha*, *C. musculinus*, *C. fecundus*, *C. venustus*, *C. callosus*, and *C. callidus*) and *Oligoryzomys* (*O. flavescens*, *O. occidentalis*, *O. longicaudatus*, and *O. brendae*). In addition, to gain a more complete understanding of species diversity in different geographic regions, we needed tools such as ecological niche modelling. Also, by combining taxonomic information confirmed with molecular techniques and their respective potential distributions, we were able to build more accurate species distribution maps. With this knowledge, we recently began to enter the world of Conservation Genetics. Thus, we have started to work with the populations of Córdoba and La Rioja of the endangered Chacoan peccary (*Parachoerus wagneri*). By collecting samples of skulls, hides, and teeth, we are studying these populations that would be isolated from the rest of the populations of the species. With the contribution of Population Genetics and ecological niche modelling, we will try to determine whether this isolation is historical (due to climatic changes in the last thousands of years) or recent (due to recent climatic changes, or changes in land use). In summary, over time, we were able to combine different approaches to contribute to the knowledge of Evolutionary Biology and Biodiversity and Conservation of mammals in our country.

A7

MAMMALIAN DOMESTICATION: TRAJECTORIES OF CRANIAL DEVELOPMENT ACROSS PHYLOGENY

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It is known that domestication can modify postnatal growth by artificial selection of specific characters. In this study, the skull shape of 1128 mammal specimens, was analyzed using 14 linear measurements and comparing 13 species, including wild versus domesticated forms. Among the wild species, such as wild boar, rabbit, and wolf, the highest proportion of allometric growth was observed, which partly explained the great morphological diversity of the domesticated forms (breeds) of these species. Wild species more commonly exhibited isometric growth compared to its domesticated counterparts. Multivariate comparisons showed that dogs and llamas exhibited the greatest differences in growth trajectories relative to their wild counterparts. The fewest differences were recorded in the domestic pig-wild boar pairs, camels, and horses. Bivariate analyzes revealed that most of the domesticated forms had different growth trajectories than their respective wild counterparts with respect to growth slopes. In pigs and camels, the slopes were shared although the intercepts were different. Trajectory extension was observed in most domesticated herbivores, while the opposite pattern was observed in carnivorous forms. However, there is no single, universal, and global pattern of pedomorphosis or any other type of heterochrony behind the morphological diversification that accompanies the domestication process.

ORAL COMMUNICATIONS

A8

PHYSIOLOGICAL RESPONSE OF TOMATO AND BASIL TO FERTILIZATION WITH *Bacillus velezensis* MICROCAPSULES: PRELIMINARY STUDIES

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Microencapsulation is a packaging technology that allows physical isolation of PGPRs. However, the effectiveness of microencapsulated biofertilizers on plant physiology has been understudied. The objective was to evaluate the physiological response of tomato “Platense italiano” and basil “Genovese gigante” to the application of *Bacillus velezensis*-based biofertilizer formulated as microcapsules of 2% alginate and 0.1 M CaCl₂. Four fertilization models were evaluated: urea (doses: 40 kg/ha for basil and 20 kg/ha for tomato), two *B. velezensis*-based biofertilizers with 10⁹ CFU/mL (doses for both species: 2 mL/pta of liquid formulated and 5 g/pta of microcapsules), and the unfertilized control. Height, phenology, chlorophyll content, leaf area, leaf expansion rate, total biomass, and assimilate partition patterns (biomass distribution by vegetative organs, aerial–root biomass ratio, specific leaf area and leaf area ratio) were recorded. All the variables presented significant differences ($P < 0.0001$). The biological models showed similar performance between them in both species and superior compared to other treatments, improving all growth and development traits. Both biofertilizers increased the total biomass (38% in basil and 23% in tomato). The assimilate partition patterns were more homogeneous in biofertilizer treatments. Urea fertilization increased chlorophyll concentration, aerial–root biomass ratio, and leaf area ratio. Therefore, the application of microencapsulates improved plant productivity in both crops. The formulation in microcapsules showed a response of a similar magnitude to the liquid formulation evidencing its effectiveness.

A9

CARCASS AND MEAT PRODUCTION IN WHOLE AND CASTRATED CATTLE

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Bovine has a high environmental impact due to its inefficiency; it is mitigated by increasing production by testicular effect. Carcass and meat production of 60 whole males (Wh) and castrated (Ca) of 5 biotypes was evaluated. The rearing was in pastures and fattening in a corral based on corn silage; in finishing, live weight (LW), age (A) and their quotient, which is the Growth Index (GI), were obtained. In five slaughters, weight (CW), yield (Y) and length (L) of carcass (C), and Compactness Index of C (CIR), which is the ratio of CW and L,

were determined. C was deboned in commercial cuts, obtaining: weight (KG) and percentages (%) of meat (M), and excess fat (F); the Net Increase of C (NIC) and Net Increase of M (NIM) of the ratio between CW and A, and KGM and A, respectively; and the Production Coefficient of M (PCoefM) which is the product of Y by %M over 100. The design was Completely Randomized, using ANOVA and Duncan test with INFOSTAT program. The results were for Ca and Wh: LW 402.2 ± 20.7 and 418.2 ± 37.6 kg, CW 228.8 ± 18.2 and 239.2 ± 24.8 kg, A 693.9 ± 28.1 and 724.3 ± 20.9 days and CIR 1.80 ± 0.26 and 1.93 ± 0.17 kg/cm ($P < 0.05$); Y 56.82 ± 2.19 and 57.18 ± 2.55 % and L 129.7 ± 0.21 and 123.7 ± 0.05 cm ($P > 0.05$); KGM 98.2 ± 7.7 and 104.0 ± 11.3 kg, %M 86.37 ± 1.33 and 87.43 ± 1.26 %, KGF 5.62 ± 1.71 and 4.10 ± 0.91 kg and %F 4.91 ± 1.29 and 3.47 ± 0.79 % ($P < 0.05$); GI 0.581 ± 0.050 and 0.578 ± 0.055 kg/d, NIC 0.330 ± 0.030 and 0.331 ± 0.037 kg/d, NIM 0.142 ± 0.011 and 0.144 ± 0.017 kg/d; and PCoefM 0.581 ± 0.050 and 0.578 ± 0.055 % ($P > 0.05$). Wh had higher LW, CW, CIR, KGM, %M, and A; and lower KGF and %F; other data without differences. Wh is an efficiency alternative in meat production.

A10

INFLUENCE OF MORPHOMETRIC MEASUREMENTS ON LIVE WEIGHT IN NOA CREOLE GOATS

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Morphometric measurements have been used for the racial characterization of goats, as well as to estimate live weight. The objective of the work is to know the influence of the thoracic perimeter (PT), body length (LC), height at the withers (ALC), and height at the rump (ALG), in the live weight (LW), of the NOA Creole goats, as well as the association between them. We worked with 35 goats, between 2 and 30 months of age. The following were measured: PV, PT, LC, ALC, ALG, Sex (Sx), and age (Ed). To determine their influence on live weight, a mixed linear model was used that included PT, LC, ALC, ALG, Sx, Ed as fixed effects, and individuals and error as random components of the model. The criteria for selecting the model that best explains the data were: the adjusted coefficient of determination (R2aj) and the Akaike information criterion (AIC). The degree of association of the morphometric measurements was estimated using Pearson's correlation. The data were analyzed with the RStudio program. The influence of thoracic perimeter ($P < 0.001$) and body length ($P < 0.001$) on body weight was observed. Of the factors considered in the model, the one that explained to a greater extent the body weight, was the thoracic perimeter, followed by the length of the body. The correlations of the measures: PT, ALG, ALC, and LC with body weight were: 0.90, 0.85, 0.81, and 0.78, respectively, significant at $P < 0.01$. Although the morphometric measurements studied are associated with live weight, based on the proposed linear model, it is concluded that in NOA creole goats, those that explain it are PT and LC.

A11

DEVELOPMENT AND CHARACTERIZATION OF LIPOSOMES CARRIERS OF PEANUT TEGUMENT EXTRACT AS POTENTIAL COMPONENT OF PHYTOPHARMACEUTICALS OR FUNCTIONAL FOODS

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Peanut (*Arachis hypogaea* L.) is used for direct consumption and manufacturing food products. Argentina is one of the main world producers. Large amounts of tegument are obtained from the production of blanched peanuts as industrial waste. Bioactivities have been demonstrated for the tegument. The objective was to develop and characterize a supramolecular system that incorporates tegument ethanolic extract (TEE). From the tegument, the TEE was obtained by alcoholic extraction. Multilamellar vesicles were obtained by vigorous stirring of soy lecithin (2 mg/mL) and TEE (0.5 mg/mL) in water. Then, they were subjected to extrusion (pore 200 nm) obtaining unilamellar vesicles (UV). TEE and UV were characterized by dynamic light scattering (DLS) and spectrophotometry. The cytotoxicity of UV and TEE was evaluated at 48 h on Vero cells by Neutral Red uptake. The antioxidant capacity was studied by the FRAP technique and total phenols by Folin-Ciocalteu. Statistical analysis was performed. TEE has maximum absorption at 280 nm and emission at 315 nm, allowing monitoring of encapsulation. DLS measurements indicate stable UV formation. Cytotoxicity studies indicated that UV did not present toxic effects. UV showed less toxicity than TEE. The Folin-Ciocalteu results indicated that the phenols present in TEEs are partly incorporated into UVs. FRAP indicated that both TEE and UV have antioxidant capacity, being slightly higher for TEE. In conclusion, it was possible to obtain a nanostructured system containing TEE, with antioxidant capacity, high content of polyphenols and absence of cytotoxicity.

A12

CIGARETTE BUTTS MYCOREMEDIATION

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Cigarette butts have proven toxicity and really high daily production, being an Urban Solid Residue (USR) lacking any disposal regulation as well as any treatment to minimize their environmental impact. In this work, the capability of six fungal strains to bioremediate this residue has been studied by using solid substrate cultivation. Cultures were performed in the butts collection bottles (~240 butts/container), inoculating with liquid cultures of each fungi previously grown in CYM (100 mL, 7 days/200 rpm/30°C) and incubating ~4 months under natural temperature, light, and humidity (summer circadian variations: 25–32°C, ~12 h nat. light, MRH 48%). Four out of six tested fungi colonized this waste and evidenced variable mycelial development (with naked eye, magnifying glass, or microscope). Other ones showed no or truncated growth, probably due to the fungal inability to efficiently reduce waste toxicity. The most promising cultures not only colonized the substrate but also showed ~60% butts volume reduction (respect to the initial filling volume), showing a possible mineralization process, and some displayed fructification. By means of acute toxicity bioassays with *Allium cepa*, the effect of 1 g of treated residue was compared to the untreated counterpart. Samples exposed to the toxic residue showed >70% average root growth inhibition with respect to the negative control (water), whilst fungal treated butts led to 15–0% inhibition, thus witnessing the mycoremediation efficiency.

A13

ANTI-INFLAMMATORY EFFECT OF A POSTBIOTIC FORMULATION IN AN UVEITIS MODEL

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Uveitis, an intraocular inflammatory disease, is a common cause of vision loss. Its treatment includes the use of corticosteroids, but their side effects highlight the need for new therapeutic approaches. Previous *in vitro* studies demonstrated that a postbiotic formulation of *Lactiplantibacillus plantarum* CRL 759 generated in Sorensen Buffer (SB) (POF-759) was able to decrease the production of pro-inflammatory cytokines. The aim of this study was to investigate the effect of POF-759 in a murine model of endotoxin-induced uveitis. *L. plantarum* was incubated in SB at 37°C, 5% CO₂. POF-759 was obtained by filtration on 0.22-µm membranes. To induce uveitis, 130 µg LPS was injected into C57BL/6 mice. Prednisolone (P) was used as anti-inflammatory control. Mice were divided into seven groups: LPS (LPS injection + SB drops), LPS + POF-759 (LPS injection + POF-759 drops), LPS + P (LPS injection + P drops), and control groups treated with PBS, SB, POF-759 or P, and a PBS injection. The mice were sacrificed 24 h after stimulation. The ocular inflammation was assessed by slit lamp microscopy and clinical scores were determined. From each mouse, one eye was used for collecting aqueous humor (AqH) and determine inflammatory parameters, and the other was enucleated for histopathological evaluation. Clinical score of mice treated with POF-759 was significantly lower than the LPS group. POF-759 caused a marked decrease in leukocyte infiltration of the eyes and reduced TNF-α (55%), IL-6 (58%), and protein (49%) concentration in AqH, compared to the LPS group. POF-759 showed a significant anti-inflammatory effect; therefore, it could be proposed as a potential adjuvant therapeutic agent for ocular inflammation.

A14

SIGHTING AND ANALYSIS OF THE FEEDING OF TWO *Asio* SPECIES IN URBAN AREAS OF TUCUMÁN PROVINCE, ARGENTINA

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With the advance of urbanization, the environment has suffered the reduction of natural green spaces. This has led some species of birds to move to more suitable areas or reduce their population, and, in other cases, they manage to adapt successfully, obtaining a benefit from them, as is the case of some species of owls. The objective of this work is to study the presence of two species of owls: *Asio stygius* and *Asio clamator* in urban areas of the province of Tucumán. Those were monitored, collected, and analyzed their pellets to determine the prey items consumed. Between 2016 and 2021, the following were detected: a specimen of *Asios stygius* in the Botanical Garden of the Miguel Foundation, where 20 pellets were collected; another specimen of *Asio stygius* in the Cementerio del Oeste, finding 21 pellets, both areas in San Miguel de Tucumán; and, in 2021, two specimens of *Asio clamator* were observed in Percy Hill Park, Yerba Buena department, collecting 12 pellets. Among the items determined are the birds of the families Emberizidae, Furnariidae, Mimidae, Tyrannidae, Columbidae, preferred by *A. stygius*, being 100% of its diet and rodents (family Muridae) the favorites of *A. clamator* consumed by 83%. From what has been observed and analyzed, it could be said that their food preferences are different, and their areas of action would not

overlap, so they could be in the same place without competition. The raptors are natural biological controllers of the population growth of certain species of animals; for this reason, the presence of owls in these areas is of great importance.

POSTER PRESENTATIONS

A15

WATER QUALITY PARAMETERS OF THE LOS ALISOS RIVER SUPPLYING THE COMMUNITY OF LAS CARRERAS

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Las Carreras is a dispersed rural town in Tafí del Valle, Tucumán. The present work aims to analyze physicochemical and microbiological parameters that define the water quality of the Los Alisos River that supplies the community of Las Carreras. Campaigns were conducted during 2018 (August, October, November, and December) and 2019 (April, May, June, and September) at five sampling points: School N°22, decanter, grate, nearby river, and distant river. Water temperature, pH, electrical conductivity, and dissolved oxygen were measured with a Water Quality Meter, and ambient temperature, with a digital thermometer. The organic load was determined by the 5-day Biochemical Oxygen Demand (BOD) test, fecal coliforms with the most probable number method, phosphate and nitrates with calorimetry and turbidity by nephelometry. The results showed that the physicochemical parameters remain within the reference range established by the Argentine Food Code (AFC), except for turbidity in the November 2018 campaign. This increase in turbidity can be explained by precipitation that occurred days prior to the campaign, causing sediment to enter the river. The microbiological parameters exceeded the limit set by the AFC, inferring their presence to fecal contamination from livestock and human excreta. The water of Las Carreras is not suitable for human consumption and can be used for recreational purposes, irrigation and drinking water treatment.

A16

APPLICATION OF A WATER QUALITY INDEX TO MONITOR THE WATER SUPPLY TO LAS CARRERAS POPULATION

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Natural and anthropogenic pollution of water sources limits their use, mainly for human consumption. The Water Quality Index (WQI) is a diagnostic tool that guarantees its integral evaluation, fundamentally for taking actions in its management and control. The aim of this work is to monitor the water quality of the Los Alisos River using the WQI of the National Sanitation Foundation of the United States (NSF-WQI) for the characterization of the water resource that supplies the population of Las Carreras, Tafí del Valle, Tucumán. Five sampling points were selected between Los Alisos River and School N°22, and eight campaigns were conducted during 2018 and 2019. The WQI test v1.0@ program was used to calculate the NSF-WQI. The analysis of the data obtained showed that the water resource evidenced deterioration, presenting quality between good and fair. This result is associated with two variables of high incidence in the value of the NSF-WQI, pathogens and the presence of particulate matter. The importance of monitoring the chlorination treatment in the drinking water treatment system and the need to inform the local authorities of Las Carreras in order to take the necessary precautions to minimize the impact on health. Moreover, it is also very important to intensify community awareness about the care and conservation of good water quality.

A17

CLINICAL AND EPIDEMIOLOGICAL STUDY OF CRIPTOCOCCOSIS IN TUCUMÁN: RESULTS OF SEVEN YEARS, 2015-2022

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Criptococcosis is a mycosis produced by the fungi of genus *Cryptococcus*. This fungal opportunistic disease initiated at the respiratory level and has a great tropism for the central nervous system (CNS). Despite its seriousness, it is not considered as obligatory of notification until this year; therefore, there is information about its incidence. This work aimed to describe the most relevant characteristics of

Criptococcosis diagnosed between July/2015 and July/2022 in the Mycology–Tucumán Division. The process of a cross section allowed an observational description study of Criptococcosis cases diagnosed during the last 7 years. Data were supplied from the records of the Mycology Division. Eighty-two cases of Criptococcosis were diagnosed by isolation/detection of capsular Ag from 130 samples. Demographic data indicated that 72% of the subjects were men and 28% were women aged between 12 to 71 years, six were minors. The prevalent risk factor was HIV infection 54 (65.8%), 16 (19.5%) non-HIV had comorbidity such as diabetes, sick autoimmune and/or oncohematological. 51.2% of the patients died. In 89 samples [63 CSF; 11 strains; 10 blood cultures; 4 respiratory and 1 skin biopsy] it was isolated *Cryptococcus neoformans* var. *grubii*. Most of the patients were HIV-positive men between 30 and 40 years old, whose clinical manifestation was meningoencephalitis and with fatal ending. Therefore, Criptococcosis should be considered as a sentinel marker for HIV infection despite this current diagnostic methods, it is a belated discovery reflected in isolates samples from CSF.

A18

PROOXIDANT–ANTIOXIDANT STATE IN HUMAN FOLLICULAR FLUID: AGE-DEPENDENT CHANGES

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Follicular fluid (FF) is the biological microenvironment of developing oocyte; its modifications could affect the maturation oocyte capacity, quality, early embryo development, and implantation. Women are born with a finite follicle count which decreases over the years. Also, FF imbalance in the reactive oxygen species production could condition the reproductive results. The objective of this work was to evaluate the age influence on prooxidant–antioxidant markers in the follicular fluid of patients undergoing *in vitro* fertilization treatment. For this purpose, sixty-seven women, between 23 and 44 years old, divided into two groups: A < 37 and B ≥ 37 years old, were studied. We determined in FF, by spectrophotometric techniques: (a) concentration of malondialdehyde (MDA) as an oxidative damage marker; (b) antioxidant defenses: superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx). Statistical analyses were performed using InfoStat software and were considered significant at $P < 0.05$. Group B showed MDA levels significantly higher compared to group A. SOD and GPx were similar in the groups studied; however, CAT levels were significantly lower in group B. Depending on the number of oocytes recovered, the highest redox imbalance was detected at a higher oocyte number. These findings show from the 37 years old, reproductive aging is associated with changes prooxidant–antioxidant state in FF, with deterioration in depurative response of these reactive species.

A19

PHYTORREMEDIAION OF IBUPROFEN WITH *Salvinia minima*

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In recent years, the study of so-called emerging pollutants (EP) has become relevant. These include drugs for human and veterinary use, microplastics, nanoparticles, hygiene products, etc., that reach the environment through effluents without specific pretreatment. Among the most consumed drugs is ibuprofen (IBU), which has a very stable chemical structure, so it is eliminated in the urine, almost unchanged. The main victims of the EP are fish and the surrounding flora; however, there are few studies on the effect of EP on the physiology of plants with potential use in phytoremediation. The objective of the work was to evaluate the removal capacity of commercial IBU by *Salvinia minima* and the evaluation of damage indicator parameters. Plants were grown in a solution of 4 mg/L of IBU, and trays were also placed without the addition of plants, to detect drug photodegradation. At 7 days, the plants were photographed, weighed, and samples were collected for malondialdehyde (MDA) determination as a damage parameter. The results showed that the photodegradation of IBU was 13.5%, while the removal in the presence of plants was greater than 90%. These results demonstrate the high efficiency of *S. minima* as a remedial species. The general appearance of the plants did not show macroscopic damage, and the quantified damage parameters did not show significant differences with respect to the control, indicating that *S. minima* would be a species tolerant to the presence of IBU. Thus, the combination of tolerance and high removal capacity make *S. minima* an excellent candidate for the treatment of effluents with high IBU content.

A20

EVALUATION OF THE EFFICIENCY OF TREATMENTS APPLIED TO VINASSE TO OPTIMIZE THE PHYTORREMIATION PROCESS

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During the process of obtaining ethanol, a residual liquid called vinasse is generated, whose physical-chemical characteristics make it a potential contaminant to the water resources where it is dumped. For this reason, it is important to investigate for treatments to reduce its contaminant load, allowing its subsequent use and/or discharge. The combination of clean technologies, such as adsorption mediated by agro-industrial waste and phytoremediation, is an alternative with a great potential to improve the effluent quality. The objective of this work was to evaluate the effect of different bioadsorption schemes in vinasse, on the phytoremediation process with the species *Salvinia rotundifolia*. For the bioadsorption process, lemon and peanut shells, pretreated with NaOH and HCl, was combined in a batch system. Then, a known weight of plants was placed in plastic containers with treated and untreated vinasse for 10 days. Soluble phenols (CP), sucrose, reducing sugars, conductivity, and pH of the vinasse were quantified before and after the phytoremediation process. The treatment with pH adjusted to 6 turned out to be the most efficient, since it decreased the content of sugars and the conductivity in the effluent, without causing the death of the plant. The CP did not decrease significantly, and the pH increased, in the presence of the plant. Thus, we can infer that the use of plant biomass modified with NaOH in a basic medium can be a viable alternative for the primary treatment of vinasse, since it improves the characteristics of the effluent, making it more suitable for phytoremediation.

A21

ASSOCIATIVE CHRONOBIOLOGICAL STUDY BETWEEN WELL-BEING AND ALTITUDINAL GRADIENT IN ECOREGIONS OF JUJUY'S PROVINCE, IN THE WINTER SEASON

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Jujuy province has four differentiated ecoregions due to the altitudinal and topographic gradient, with an approximate range of 400–6000 meters above sea level, generating a variety of environments to which the human populations distributed in it are exposed. This work aimed to study the association between the altitude variable and the well-being, in three of the most representative populations of the upper ecoregions in the winter season (2021–2022), hypothesizing that altitude influences the well-being of people. For this purpose, 70 individuals of neutral chronotype were studied, generating a four-dimensional profile (physical health, mental health, social relations, and environment) and two items on the perception of life's quality and personal health, through the standardized questionnaire WHOQOL-BREF (W-B) for showing psychometric resolution in previous research. The statistical analysis consisted of simple correlation and linear regression. The results of the analysis presented a clear association between the analyzed variables (altitude and mean W-F values, well-being) showing, for Pearson's simple linear correlation coefficient $t = -0.977$, and for the coefficient of determination (R^2) = 0.955. The trend for the four-dimensional profile from the rest of the variables studied accompanies these results, adjusting to expected according to chronobiological models. Therefore, there is a clear association with the altitude profile. The data from the next summer season will be completing this chronobiological study.

A22

IMPACT OF YACON ROOT FLOUR ON ADIPOSE TISSUE REMODELING IN OBESE RATS

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New lifestyles and eating habits have increased the global prevalence of obesity, leading to the search for therapeutic alternatives to reduce its impact on health. Currently, functional foods are considered a non-pharmacological alternative to prevent or treat obesity. We analyzed the effects of *Smallanthus sonchifolius* (yacon) meal rich in fructooligosaccharides and phenolic compounds, on hypoxia, oxidative stress, inflammation, and white adipose tissue (WAT) differentiation in HFD-fed rats. We compared these effects with the consumption of agave inulin, to characterize the prebiotic potential of yacon flour. We observed that the consumption of yacon flour limits the visceral WAT expansion and negatively regulates the expression of the transcription factor inducible by hypoxia-1 α (HIF-1 α). It also increases the antioxidant system, attenuates lipid peroxidation, reduces the expression of the proinflammatory genes MCP-1, TNF- α , IL-1 β and IL-6, and TGF- β 1, and increases the expression of the anti-inflammatory IL-10, in visceral WAT. Furthermore, the flour downregulates Wnt5a and upregulates Wnt3a and SLC2A4 expressions in visceral WAT. Inulin consumption enhances visceral WAT remodeling, reducing oxidative stress and inflammation. Our data indicate that yacon supplementation, unlike inulin, produces a selective reduction of HIF-1 α and

improves WAT remodeling. Our findings highlight the efficacy of yacon as a non-pharmacological alternative to improve visceral WAT dysfunction and reduce alterations associated with diet-induced obesity.

A23

IMPACT OF HOME VEGETABLE GARDEN DEVELOPMENT IN “17 DE OCTUBRE” NEIGHBORHOOD SALTA-CAPITAL, ON HEALTHY CONSUMPTION HABITS OF FRUITS AND VEGETABLES

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There is interest in studying potential risks in residual pesticides in food, which enter in the system mainly by their agricultural applications. SENASA (2017) reported that a large amount of fruit and vegetable (F&V) consumed is contaminated with pesticides. The aim of this work was to assess the effect of home vegetable gardens (HVG), regarding the healthy consumption of F&V of residents in sectors under the Primary Health Care (PHC) program coverage in “17 de Octubre” neighborhood, Salta-Capital. A food survey was elaborated under the “24-hour recall”. Fourteen heads of the household who live in houses, with and without HVG, were surveyed through non-probabilistic sampling. The number of F&V units consumed, type of pest control, knowledge of the head of the households about the presence of contaminants in commercially purchased F&V, and experiences associated with the presence of HVG were quantified. Residents with HVG (5.8 ± 0.6 pcs) consumed a significantly greater amount ($P = 0.03$) of F&V than those without HVG (3.9 ± 0.8). Regarding household with HVG, 85.7% consumed all produced F&V, 78.6% were aware of the possible existence of pesticides in F&V bought in the store, and 35.7% carried out any type of pest control. Psychological well-being was the main experience associated with producing their own F&V in HVG. In the “17 de Octubre” neighborhood, inhabitants of houses with HVG consumed a greater amount of F&V. It was possible to demonstrate that the construction of HVG had a positive influence on psychological well-being, hence the importance of PHC in the promotion of this initiative.

A24

CYTOTOXICITY AND GENOTOXICITY STUDIES OF CIGARETTE BUTTS BY USING *Allium cepa* BIOASSAYS

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Cigarette butts are currently the most abundant form of anthropogenic waste on the planet. These contain both microplastics and toxic compounds present in tobacco, in cigarettes, or produced during combustion. Among them, we can highlight the presence of insecticides, heavy metals, and different carcinogens such as nitrosamines, polycyclic aromatic hydrocarbons, BTEX, phenols, and carboxylic compounds. Although these are known to be highly polluting wastes that persist in the environment, their impact remains quite unknown. The present study intended to analyze the cytotoxicity and genotoxicity of cigarette butts by using the *Allium cepa* test. The following experimental groups were defined: negative control (tap water, pH = 7.0), positive control (3% DMSO), and water containing butts in two different concentrations (0.5 and 1 g/250 mL). Average root growth inhibition, mitotic index (MI), mitosis phase length, and the presence of chromosomal aberrations in the root apical meristem after 72 h of exposure were evaluated. Results showed a growth inhibition of 58 and 70 % with 0.5 and 1 g of butts, respectively. Moreover, it could be observed an increase in MI for butts-exposed roots as compared to both controls, with a particularly longer prophase time. Regarding the chromosomal aberrations found, it could be mentioned astral anaphases, sticky metaphases, chromosome bonds in anaphase and telophase, and laggard chromosomes, among the main ones. These findings demonstrate the extremely toxic nature of this waste, highlighting the imperative need for a responsible disposal that incorporates detoxification treatments.

A25

Smallanthus sonchifolius (YACON) FLOUR AMELIORATES HIGH-FAT DIET-INDUCED NON-ALCOHOLIC FATTY LIVER DISEASE

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Non-alcoholic fatty liver disease (NAFLD), a component of the cardiometabolic syndrome, has emerged as one of the most common etiologies of chronic liver disease which is strongly associated with obesity and characterized by an irregular deposition of triglycerides in hepatocytes and increased oxidative stress. Current management is rooted in attenuating the risk factors such as gradual weight loss through

lifestyle modifications with a focus on nutrition and exercise. The roots of *Smallanthus sonchifolius* (yacon) have shown benefits for glucose control and body weight in obese rats. The present study was designed to investigate the efficacy of yacon flour in the treatment of high-fat diet (HFD)-induced NAFLD in rats. Male Wistar rats were fed a standard diet (CD) or HFD for 12 weeks and then were divided into the following groups: CD, HFD, and HFD plus yacon (680 mg/kg/bw, HFDY), for 8 continuous weeks. NAFLD was examined in terms of body weight, lipid profiles, liver function markers, and histology. Our results showed that yacon flour supplementation significantly reduced HFD-induced body weight, hyperlipidemia, and intrahepatic lipid accumulation ($P < 0.05$). Yacon also restored normal oxidative stress by reducing lipid peroxidation ($P < 0.05$) and improving the antioxidant capacity in both serum and liver of HFD-fed obese rats. Furthermore, flour intake could effectively alleviate liver injury by reducing hepatocyte ballooning and the signs of inflammation. Our study indicated that yacon flour may be an effective dietary supplement for protecting the liver against the metabolic impact of HFD-feeding and preventing the progression of NAFLD by regulating lipid metabolism and reducing inflammation and oxidative stress.

A26

STUDY OF THE SEASONAL VARIATION OF THE GLYCEMIC PROFILE IN TYPE 2 DIABETIC PATIENTS

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Seasonal variation in human glycemic profile was reported in the Northern Hemisphere, with increased values in winter. Factors such as an unhealthy diet, a sedentary lifestyle, low temperature, and solar radiation all increase the glycemic profile. This profile is a follow-up marker in type 2 diabetic patients (T2D); therefore, characterizing this fluctuation is important for their therapeutic management. There are no previous reports for Argentina, so the aim of this work was to characterize the glycemic profile in T2D patients to determine if there is a seasonal variation. A group of 466 patients from Jujuy (35–90 years), 138 men and 328 women, participated in the study. From their medical records, fasting blood glucose (GF) and glycosylated hemoglobin (HbA1c) were analyzed for the period 2015–2019. The characterization of environmental conditions in the province of Jujuy was carried out using data from the National Meteorological Service. Nutritional habits and physical activity were obtained through surveys. Descriptive and inferential statistics based on Infostat, Sigma Plot, and Excel were used to analyze the data. Seasonal variation was analyzed with MLGM ($P < 0.05$). Increased GF (1.43 vs. 1.38 g/L) and HbA1c (7.77 vs. 7.71 %) were observed in winter, but only GF was statistically significant. These increases coincide with low solar radiation and winter temperature but not with physical activity and vegetable consumption, which were insufficient throughout the year. On the other hand, monthly peaks were observed in the glycemic profile coinciding with local festivities. These results show the need to adjust preventive guidelines or pharmacological therapy to the mentioned events.

A27

BLOOD COUNT BEHAVIOR IN ADULT FEMALE DOGS WITH A PYOMETRA AND BREAST TUMOR DIAGNOSIS IN PATIENTS OF THE VETERINARY HOSPITAL OF THE NATIONAL UNIVERSITY OF TUCUMÁN

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The most common hormonal pathologies developed in adult female dogs are pyometra and breast tumors. It is necessary to study the incidence of these pathologies to create prevention strategies. Likewise, knowing the blood count behavior is a useful tool for a correct clinical follow-up of these patients. The purpose of this work is (1) to analyze the incidence of these pathologies in adult female dogs diagnosed in the Veterinary Hospital of the National University of Tucumán, and (2) to evaluate the blood count and plasma proteins of these patients. The metrology used included carrying out the blood count and plasma proteins dosage by refractometry of patients attended during 2018–2022. We analyzed the blood count of 28 pyometra and 57 breast tumors of a total of 389 samples. The results show a strong connection between the age of the patients and the diagnosis of these pathologies. The hematocrit suffers important alterations in breast tumor cases, while in pyometra they are usually within the reference values. Plasma proteins increase moderately in cases of pyometra compared to that of breast tumors. Both clinical presentations have leukocytosis and left-shift neutrophilia, although pyometra course with more extreme values than breast tumors. The results obtained constitute the first approach to the study of hormonal pathologies in the canine population in the province and could be useful to devise and encourage public prevention policies.

A28

DIAGNOSIS OF HEPATOZOON AND EHRLICHIOSIS THROUGH ROUTINE BLOOD COUNT IN CANINE PATIENTS OF THE VETERINARY HOSPITAL OF THE UNT

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Hemoparasitic diseases are among the most common pathologies in dogs. General signs include fever, anemia, thrombocytopenia, hepatosplenomegaly, and eventually pancytopenia in chronic cases. Against clinical suspicion, the diagnosis is confirmed by evaluating the presence of these parasites in a capillary blood smear or a phlogistic smear from the hematocrit. Nevertheless, occasionally it is possible to diagnose through peripheric blood smears. The purpose of this study was to evaluate how the blood count presents itself in these patients. The methodology used included blood count and plasma protein dosage with refractometry. During 2019 and 2021, we identified, in routine blood counts, 14 canine patients hemo-parasitized, 9 with *Hepatozoon canis* and 9 with *Ehrlichia canis*. The results show a decreased hematocrit. Total proteins are slightly over the reference range in cases of *Hepatozoon* compared to *Ehrlichia*. Total leukocyte values stay in reference in most cases, but most of them have alterations in the leukocyte formula presenting neutrophilia without great changes in lymphocytes. Although the probability of diagnosing through peripheric blood smears is low, routine blood count can be a useful tool for the detection of these forms of parasites, especially in cases where there is not a previous clinical suspicion.

A29

ROOT ARCHITECTURE CHANGES OF TOMATO AND BASIL INDUCED BY TWO *Bacillus velezensis* FORMULATIONS

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Root architecture is critical in the processes of resource uptake and resilience against stress conditions. The changes induced by the application of different formulations of rhizobacteria on root morphology remain understudied. Thus, the objective was to evaluate the changes in the root architecture of tomato "Platense italiano" and basil "Genovese gigante" induced by the application of biofertilizers in liquid and microcapsule formulations of *Bacillus velezensis*. Four fertilization models were evaluated: urea (doses: 40 kg/ha for basil and 20 kg/ha for tomato), two *B. velezensis*-based biofertilizers with 10⁹ CFU/mL (doses for both species: 2 mL/pta of liquid formulations and 5 g/pta of microcapsules) and the unfertilized control. After 35 days, images of the roots were obtained with a scanner. Next, the number of tips, total length, depth, width, perimeter, volume, and surface area of the root system were measured using the *RhizoVision* software. All the variables showed significant differences, except the perimeter in basil and the width in tomato. The biological models showed similar performance of them in both species and were superior compared to other treatments. In this regard, the biofertilizers in tomato plants increased all the parameters studied highlighting the volume (111%), surface area (68%), length (38%), and the number of tips (32%). In basil, biological models increased the number of tips (1300%), volume (265%), and surface area (189%). In this species, the superior effect of microencapsulation is underlined. Therefore, the biological models induced a greater branching of the root system, which increased the number and length of lateral roots, their volume, and the surface area.

A30

KETOGENIC DIET EFFECT ON TIBIA RATS LONGITUDINAL GROWTH. HISTOMORPHOMETRIC STUDY

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There is copious literature showing that the ketogenic diet (high-fat, low-carbohydrate) is a treatment option for epilepsy in humans and in experimental rodent models. Given that they are long-term treatments in children with active bone growth, the objective of this work was to experimentally analyze histomorphometric parameters in rats that define longitudinal growth of the bones and the fat content of the bone marrow. For this purpose, 21-day-old Wistar rats were assigned to one of the following groups: control (regular diet) and experimental (ketogenic diet *ad libitum*). Body weight and the amount of food consumed were periodically determined. At 30 days, ketonemia was determined, and the animals were euthanized. The tibias were dissected and fixed in 10% formalin, the soft tissues were removed, and their lengths were recorded. Then, the tibias were decalcified in 10% EDTA and processed for paraffin embedding. Sections of the proximal metaphysis were made and stained with H-E. The following parameters were determined: tibial length (TL), epiphyseal growth plate thickness, hypertrophic cartilage thickness, bone volume, trabecular thickness, number of trabeculae, trabecular separation, and number of adipocytes/mm². Body weight at the end of the experiment in controls (C) 179 ± 1 g, experimental (E) 128 ± 11 g; *P* < 0.05. Ketonemia: C, 0.29 ± 0.042 mmol/L; E, 1.89 ± 0.7 mmol/L; *P* < 0.05. TL: C, 35 ± 1 mm; E, 31 ± 1 mm; *P* < 0.05. The amount of food consumed was

lower in the experimental group. No significant differences were observed between the histomorphometric parameters of the groups studied. We conclude that the ketogenic diet used alters the longitudinal growth of the tibia.

A31

ODONTOGENESIS IMPAIRMENT CAUSED BY KETOGENIC DIET. HISTOMORPHOMETRIC STUDY

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A ketogenic diet is a treatment option for epilepsy. In many cases, this diet is administered to children who are in the full formation of their teeth. The purpose of this work was to study and experience the effects of a ketogenic diet on the enamel organ and on the volume of dentin secreted by odontoblasts using continuously erupting rat incisors as an experimental model. 21-day-old Wistar rats were assigned to one of the following groups: control (C) (regular diet) and experimental (E) (ketogenic diet) for 30 days. Body weight and amount of food consumed were recorded periodically. Ketonemia was determined and then euthanasia was performed. The mandibles were resected, separated in the midline, decalcified in EDTA, and processed for light microscopy. Oriented histological sections of the continuously erupting rat incisors at the level of the mesial root of the first molar were obtained and stained with H&E. This section allows access to the maturation zone of the amelogenesis process, where the enamel is totally decalcified. In the selected sections, the following parameters were determined: dentin volume (DV), ameloblast height (AH), and reduced epithelial thickness of the enamel organ (RET). Data were analyzed with the Mann–Whitney’s test. Results. Body weight at the end of the experiment: C, 179 ± 1 g; E, 128 ± 11 g; $P < 0.05$. Ketonemia: C, 0.29 ± 0.042 mmol/L; E, 1.89 ± 0.7 mmol/L; $P < 0.05$. DV: C, 1.3 ± 0.4 mm²; E, 0.75 ± 0.24 mm²; $P < 0.05$. RET: C, 0.11 ± 0.07 mm; E, 0.07 ± 0.02 mm; $P < 0.05$. No significant differences were observed in the height of the ameloblasts. These results allow us to conclude that the ketogenic diet negatively affects odontogenesis.

A32

HISTOLOGY OF THE DIGESTIVE TUBE IN FEMALES OF *Leptodactylus latinasus* (ANURA-LEPTODACTYLIDAE) DURING THE REPRODUCTIVE PERIOD

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The reproduction of anurans requires energy reserves that ensure their viability over time. The digestive tube metabolizes the necessary food for the supply of energy ensuring the species’ survival. The objective is to histologically analyze the cellular–tissue structures of the digestive tract in females of *L. latinasus*, in the reproductive period, in order to relate their development and activity. The samples were processed with the routine histological technique, the cuts were colored with hematoxylin–eosin, Mallory’s trichrome stain, Periodic Acid–Schiff, and Alcian Blue (pH 0.5 and 2.5). The esophagus presents a ciliated cylindrical pseudostratified epithelium with goblet cells with acidic glycoconjugates and a muscular tunic, formed of two internal circular and external longitudinal layers. The stomach has a simple mucosecretory epithelium; the tubular glands of the lamina propria possess basophilic main cells, acidophilic parietal and mucous cells with neutral glycosaminoglycans, in the middle region, the muscle of the mucosa presents a layer with oblique orientation. The increase in thickness of the muscular layer, mainly of the inner layer, stands out. The small intestine has long, branching villi, absorbent cells, and goblet cells with carboxylated, phosphated, and sialylated acid glycoconjugates, which are organized in a fibrillary way towards the lumen of the organ are observed in the epithelium. The large intestine has abundant goblet cells. The muscular layer of the intestine is thin. The histological analysis determined that the general structure and functional status of the organs have a positive relationship with the period analyzed.

A33

SECRETORY RESPONSE OF THE AMPHIBIAN TESTIS TO ELECTRICAL STIMULATION: PRELIMINARY STUDIES

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The secretory function of *Leptodactylus chaquensis* testis, testosterone (T) and 17 β -estradiol (E2), was evaluated after electrical stimulation of the gonad. For this, testes of specimens captured during the reproductive period were used under experimental conditions *in situ*. The gonads of the same specimen were used: one as a control and the other was stimulated with electrical impulse (intensity, 7 mA; frequency, 10 Hz; duration, 1 min) applied at the hilum region of the organ. Subsequently, both gonads were dissected and incubated individually in

Ringer–Tris at 25 ± 1 °C for 30 and 60 min. Hormone dosage was performed by electrochemiluminescence from the supernatant obtained by centrifugation of the incubation medium. The results show, at 60 min of incubation, a significant increase ($P < 0.05$) in the concentration of T, but not of E2 ($P \geq 0.05$), compared to the control. Taking into account that the response to electrical stimulation could be due to the activation of nerves that enter the gonads through the hilum, the secretory response to autonomic drugs: adrenaline (A) and acetylcholine (Ach) was analyzed *in vitro*. For this, whole testes were incubated in Ringer–Tris containing A or Ach (1.10^{-5} – 1.10^{-9} M) at 25 ± 1 °C for 60 min. The results indicate that only Ach, in a dose-dependent manner (greater effect 1.10^{-7} M), significantly increases the secretion of T ($P < 0.001$) and E2 ($P < 0.05$) compared to the control. Based on these preliminary observations, the possible involvement of the nervous system in the control of endocrine activity in *L. chaquensis* testes is suggested. Future studies will allow us to corroborate the observed results and its implication in the reproductive physiology of the species.

A34

ANALYSIS OF THE MORPHOLOGY AND SECRETION OF THE SILK GLAND DURING POST-EMBRYONIC DEVELOPMENT OF *Phyllocnistis citrella* (LEPIDOPTERA, GRACILLARIIDAE)

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Phyllocnistis citrella is one of the main citrus pests. During the larval stage, it feeds voraciously on the epidermis of young leaves, assimilating nutrients that favor the development of organs and systems, such as the silk gland. The feeding of the larvae causes damage to the leaves enable the infection and the development of citrus canker. The objective is to analyze the histomorphology and histochemistry of the silk gland and its secretion, directly related to the quality of the silk that forms the pupal chamber. Larvae, prepupae, and pupae were obtained from leaves collected at a lemon field. They were fixed in Bouin's solution and preserved in N-butyllic. The sections were stained with hematoxylin–eosine, Mallory's trichrome, Periodic Acid–Schiff (PAS)–hematoxylin, Alcian Blue (pH 2.5)–PAS and mercury bromophenol blue. The silk gland is present from the first larval stage. Morphologically this gland can be divided in distal and middle secretory regions and one proximal or excretory duct. Between the middle and distal region, a cell complex with particular cytological characteristics was observed. At the end of larval development both, thinning of the epithelium of the distal region and secretion with intense positive reaction for proteins and low for carbohydrates and acid mucopolysaccharides were observed. In the pupa, the epithelium of the distal region loses its cellular boundaries and presents phagocytic cells. In *Phyllocnistis citrella*, during post-embryonic development, this gland undergoes the phases of development, secretion, regression and degenerative.

A35

TOTAL CARBOHYDRATE CONTENT OF MILK FROM BATS WITH DIFFERENT EATING HABITS

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Bats constitute a very diverse group by the number of species, diets, habitat, reproductive cycles and in their body size (from 2 to 1200 g). Generally, the composition of milk is influenced by the type of diet, where some components, such as carbohydrates and lipids, are more affected than others. The aim of this work was to determine the total content of carbohydrates and compare their concentration in the milk of two species of bats, the insectivorous *Tadarida brasiliensis* (Molossidae) and the frugivorous *Sturnira lilium* (Phyllostomidae). Milk samples from 10 individuals of each species were analyzed. The Anthrone method was used with modifications and adaptations to micro volumes due to the low volume of the milk sample obtained from each specimen. The results obtained were: 38.19 ± 9.5 mg/mL (N = 10) for the insectivorous and 62.56 ± 11 mg/mL (N=10) of total carbohydrates for the frugivorous. Results are very interesting from the physiological point of view. The milk of frugivorous bats provides the high content of carbohydrates as the main energy resource for breeding, while that the milk of insectivorous bats uses another resource for this purpose, probably lipids, since the content of carbohydrates is low. In brief, the milk of both species responds to the energy requirements of their offspring using different compounds from the diet.

A36

PRELIMINARY RESULTS ON THE CHARACTERIZATION OF BLOOD CELLS OF *Jenynsia* GENUS

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The genus *Jenynsia* is distributed in South America, from Rio de Janeiro (Brazil) to Río Negro (Argentina), from coastal areas to mountain areas. In fishes, blood parameters indicate their physiological status, which in turn serve for the evaluation and control of infectious

diseases, nutritional status, toxic effects, and other stressors. The aim of this study was to obtain knowledge about the hematology of fishes from the *Jenynsia* genus. In 2022, adult individuals of *J. luxata* and *J. lineata* were captured. They were kept alive under laboratory conditions until processing. To obtain blood samples, the fishes were anesthetized with MS222, and an arterial puncture was performed on the hemal arch. Blood smears of each species were made (N = 10), stained with May-Grünwald Giemsa and observed under an optical microscope. The morphological features of blood cells were described according to the observations made by light microscope. The leucocyte differential count was determined by the proportion of leucocyte types per 100 white blood cells counted. Erythrocytes (E), thrombocytes (T), and four types of leukocytes: lymphocytes (L), monocytes (M), heterophils (H), and eosinophils (E) were distinguished and characterized. Some erythrocyte dyscrasias were evidenced, due to dimensional and/or morphological variations. The mean WBC differential count obtained was: H (32%), E (4%), L (38%), M (14%), and T (12%). It is the first time that blood cells of the genus *Jenynsia* have been described. Although this is a preliminary study and other analysis variables will be added later, it provides valuable tools to interpret the physiological state of these fish.

A37

EFFECT OF *Zuccagnia punctata* EXTRACT IN AN HYPERCHOLESTEROLEMIC ASSOCIATED WITH INSULIN RESISTANCE RABBIT MODEL

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Zuccagnia punctata is an Argentine endemic shrub with numerous beneficial properties. A flavonoid-rich *Zuccagnia punctata* (ZpE) extract has been found beneficial on hypercholesterolemia-induced alterations of lipid profile, oxidative status, and intima/media ratio. The objective of this work was to determine the effect of ZpE on a rabbit model of hypercholesterolemia associated with insulin resistance. Male rabbits were separated into six groups fed with: control diet, diet rich in fat at 18%, and 0.3% cholesterol (MD), MD with oral administration of 2.5, 5, or 10 mg/day of ZpE, and DM with oral administration of 2.5 mg/day of ezetimibe (intestinal cholesterol transporter inhibitor). After 6 weeks, total cholesterol (TC) and insulin sensitivity test were evaluated. Oxidative stress was determined by measuring thiobarbituric acid reactive substances (TBARS) in serum and liver. Morphohistological studies included determination of sudanophilic area and intima/media ratio of aortic arteries. MD increased TC values and induced insulin resistance. Only treatment with ezetimibe normalized TC, but it worsened the insulin resistance. MD increased TBARS and treatment with ZpE and not with ezetimibe reached TBARS to CD values, to the observed antioxidant effect of the extract. Treatment with ZpE and ezetimibe improved MD-induced increase of sudanophilic area and intima/media ratio. We conclude that ZpE failed to reduce TC values in this experimental model. Considering that insulin resistance is associated with increased synthesis and decreased absorption of cholesterol, this would be the reason for the lack of effect of ZpE. However, ZpE showed protective effects on blood vessels by preventing the formation of atherosclerotic plaque because of its antioxidant properties.

A38

HYPERTRIGLYCERIDEMIC WAIST PHENOTYPE AND RISK OF CHRONIC KIDNEY DISEASE

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Progression of chronic kidney disease (CKD), asymptomatic in early stages, is associated with cardiovascular and metabolic risk factors. Waist circumference and triglycerides elevation define the hyper triglyceridemic waist (HGW) phenotype, an indicator of visceral adiposity, adipose tissue dysfunction and cardiovascular disease, a major cause of morbidity and mortality in renal patients. The purpose of this work was to analyze FCH as a predictor of metabolic and cardiovascular risk in a cohort at risk of CKD. Methodology: In a descriptive cross-sectional study, 194 volunteers aged from 20 to 70 years with a hypertension history, diabetes and excess weight were evaluated. Waist circumference, weight-height, and blood pressure were measured. In serum samples, chemical and lipid profile was analyzed; glomerular filtration rate was estimated with CKD-EPI-creatinine. In isolated urine, albuminuria-creatininuria ratio was evaluated and risk of CKD progression was staged according to KDIGO 2012. HCF and the atherogenic index, total cholesterol/c-HDL cholesterol (AI), were analyzed. In the population evaluated, 27% were staged at risk of CKD progression. In the population at risk, 37% of women and 27% of male volunteers presented altered FCH. AI was analyzed in patients with altered FCH, showing correlation with triglycerides in female population ($p = 0.10$). Therefore, FCH and AI are accessible biochemical-clinical predictors that allow evaluating lipid metabolism and cardiovascular compromise in patients at CKD risk.

A39

ADVANCES IN THE STUDY OF FOLATE AS A POTENTIAL MODULATOR OF OVIDUCTAL FUNCTION: NEW EVIDENCES AT MOLECULAR LEVEL

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Numerous studies have shown that folate has important reproductive implications in mammals during post-implantation embryonic and fetal development. However, little is known about its action in the oviduct, the organ that provides the first maternal environment that interacts with the embryo. In previous studies, we demonstrated the presence of folate in oviductal fluid (OF) and the expression of folate receptors in bovine oviductal epithelial cells (BOECs). In addition, folate concentration in OF decreases during the post-ovulatory stage, while the expression of its receptor FOLR1 increases in BOECs of the isthmus. These facts allow us to suggest that, after ovulation, the demand for folate increases in the anatomical region of the oviduct that will make contact with the embryo. Considering these findings, the aim of the present study was to determine whether BOECs contains the molecular components necessary to metabolize and use this micronutrient. To achieve this, gene expression pattern of enzymes related to folate cycle was assessed using RT-qPCR in different reproductive tissues and BOECs obtained ex vivo and cultured in vitro. The results revealed the gene expression of the three main enzymes involved in folate metabolism (DHFR, MTHFR, and MTR) in the BOECs, showing in some cases regional and cycle-dependent changes. The oviduct shows the highest expression levels compared to other reproductive tissues (uterus and ovary) and BOECs maintain gene expression of the enzymes under in vitro culture conditions. These results indicate that BOECs have the machinery to metabolize folate. Therefore, it is interesting to further investigate the impact of this “epi-nutrient” in the oviductal context.

A40

REDOX AND INFLAMMATORY PROFILE IN ADULTS WITH NEWLY DIAGNOSIS ACUTE MYELOID LEUKEMIA

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Acute myeloid leukemia (AML) is one of the most frequently hematologic malignancies in older adults. Aging is a heterogeneous process that alters physical function and conditions the response to treatment. The purpose of this study was to evaluate the redox and systemic inflammatory state of patients with AML according to the age of pathology presentation. For this purpose, between 2017 and 2022, 54 patients with AML debut were studied and separated according to age into two groups A < 60 (N = 39) and B ≥ 60 years (N = 15). We determined, in serum, by spectrophotometric methods: (a) concentration of malondialdehyde (MDA); (b) proinflammatory cytokines: interleukin 6 (IL-6) and tumor necrosis factor alpha (TNF-α); and (c) antioxidant defenses: catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), and glutathione (GSH). Comparative analysis was performed by the Mann–Whitney *U*-test. Lipid peroxidation was significantly higher in group B (MDA μmol/mL: A = 1.17 ± 0.16; B = 2.50 ± 0.64), whereas antioxidant defenses did not exhibit a differential behavior according to age. Also, IL-6 concentration was significantly higher in group B compared to group A (IL-6 pg/mL: A = 11.91 ± 2.70; B = 73.62 ± 42). These results show a state of oxidative damage and deregulated production of IL-6 in older adults with AML newly diagnosis, that could contribute to physical deterioration and a poor response to treatment.

A41

IN VIVO DETECTION OF MESSENGER ARN MOLECULES USING CRISPR TECHNOLOGY

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Embryonic development is a complex, strictly regulated and coordinated process that allows each cell and tissue to grow correctly and form a complete organism. This process begins long before fertilization, more precisely during oogenesis, where an accumulation of messenger RNA (mRNA), proteins, and mitochondria are precisely located in the oocyte cytoplasm. This enrichment of “maternal content” is critical for the mature oocyte to be fertilized and the resulting zygote to develop correctly. The accumulated maternal transcripts are located in precise and determined sites within the cytoplasm. The correct production, assembly and location of mRNAs are key events required for a normal development. In this work, we develop a tool based on CRISPR technology to *in vivo* visualize mRNA. We used a hybrid Cas13 protein that has its nucleic acid cleavage sites inactivated by mutation fused in-frame to a reporter protein. By abrogating the cleavage sites and preserving the nucleic acid binding sites it is possible to use the Cas13 protein to visualize messenger RNAs *in vivo* directly in the developing embryo in real time. We designed guide RNAs against the selected genes to use with the mutated Cas13 enzyme and then microinjected them in early staged *Xenopus* embryos. We detected fluorescence in the primordial germ cells corresponding to the RNA helicase mov10 expression domain and also in the neural plate and neural folds, corresponding to the transcription factor Yy1 expression

domain. This innovative technique allows a genuine and reliable analysis of what happens in a dynamic and complex environment such as a living cell and particularly a developing embryo.

A42

DEVELOPMENT OF A MOLECULAR TOOL TO STUDY THE FUNCTION OF ANTI-TUMOR GENES

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Complex genetic changes occur during embryonic development that in a strictly coordinated manner promote the correct formation of an embryo. Studying these genetic mechanisms is a huge experimental challenge. Notably, tumor suppressor proteins are expressed during embryonic development. These proteins regulate different cell growth mechanisms and alterations in their function promoting tumors development and malformations. The Bap1 protein is involved in tumor suppression mechanisms and is mutated in some of the most lethal cancers, such as melanomas. Bap1 selectively associates with the transcription factor Yin Yang1 (YY1), and both are part of an epigenetic repressor complex involved in transcriptional regulation. To carry out this work, we designed a molecular tool capable of selectively knocking down the function of Yy1 in the context of a developing embryo. This tool, based on genome editing techniques, allows the change of gene function *in vivo*. To perform this loss-of-function strategy, we analyzed the *Xenopus* Yy1 gene sequence and then compared it with its orthologous gene in humans using bioinformatic methods. We designed specific guide RNAs for Yy1 and together with a Cas13 nuclease we were able to degrade the messenger RNA of the target gene. Yy1 loss-of-function produces changes in neural plate morphology, a reduction of neural crest and cranial sensory placodes cells that will give rise to the eye, and also mal formation in the craniofacial morphology of developing embryos. The use of these kinds of tools is essential not only to understand how these regulatory proteins normally work, but also to understand what happens in a pathological context.

A43

EFFECT OF INOCULANTS ON pH IN YACÓN SILAGE (*Smallanthus sonchifolius*)

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Yacón (*Smallanthus sonchifolius*) is an Andean plant whose tubers are used for human consumption due to their high content of fructo-oligosaccharides. The aerial part can be preserved as silage and be used as a food reserve for production animals. The pH measurement allows controlling the fermentation process. This can be accelerated by inoculants (microorganisms that produce a directed fermentation to lower the pH and preserve the forage over the time). The objective was to determine the stability of Yacón silage with different commercial inoculants at different doses, taking pH as a parameter. The silages were made with the aerial part of the post-harvest plant in a state of 10% flowering, with 67% humidity, chopped 1 cm, and placed in PVC microsilos 10 cm of diameter × 20 cm of height. In each microsilo, 1 kg of green matter (GM) was added with a compaction of 637 kg/m³. The design was completely randomized, and five treatments with four repetitions were carried out: T1, without inoculant; T2, Basilaje® Inoculant 250 g/Tn MV; T3, Basilaje® 500 g/Tn MV; T4, Bermix Plus® 250 g/Tn MV; and T5, Bermix Plus® 500 g/Tn MV. The pH was measured at 0, 1, 5, 10, 20, and 40 days. A decrease in pH was observed in all the silos from the fifth day, with greater significance in T3. At day 10, T3 reached the highest pH drop and at day 20 both Basilaje and Bermix stabilized at similar pH between 4.49 and 4.84. Finally, on day 40, both the control silo T1 and T4 and T5 reached a pH between 4.34 and 4.50, while T2 and T3 obtained a pH between 4.92 and 5.18. In conclusion, all treatments reached acceptable pH at day 40, varying the acidification rate among them.

A44

ASSESSMENT OF NEUTRAL DETERGENT FIBER, ACID DETERGENT FIBER, ESTIMATION OF DIGESTIBILITY AND METABOLIZABLE ENERGY IN *Sorghum vulgare* AS A FEEDING BASE IN *Lama glama*

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The breeding of llamas is an important economic activity in the North of Argentina. The Andean people can obtain fiber and meat from these animals, allowing economic and social development. To achieve an economically and sustainable animal production, the feeding base must cover the animals' requirements. Sorghum (*Sorghum vulgare*) is characterized by being resistant to drought and having good palatability and digestibility. Our objective was to evaluate forage sorghum as a food base for llamas. We worked with sorghum plants planted during the summer period in the FAZ-UNT, located at the *pedemonte* of Tucumán. Sorghum sampling was carried out on leaves

and the entire plant. The samples were dried in a stove at 70°C for 3 days, and ground in a hammer grinder with 0.5-mm sieves. We determined, by triplicate, neutral detergent fiber (NDF), acid detergent fiber (ADF), using the Ankom Technology, dry matter Digestibility (DMD); by predictive equation from ADF of Rohweder; and the metabolizable energy (ME) was estimated according to the AFRC pattern. The results were the following: Leaves: NDF = 63.77 $\sigma \pm 0.44$ %; ADF = 41.46 $\sigma \pm 0.08$ %; DMD = 56.38 $\sigma \pm 0.074$ %; ME = 2.03 $\sigma \pm 0.002$ Mcal/kg. Wholeplants: NDF = 72.93 $\sigma \pm 1.94$ %; ADF = 53.95 $\sigma \pm 1.87$ %; DMD = 46.87 $\sigma \pm 1.46$ %; ME = 1.68 $\sigma \pm 0.002$ Mcal/kg. Considering that a llama that weighs 115 kg needs 2.53 Mcal/day to cover its ME maintenance requirement, and the sorghum would provide a ME of 1.68 Mcal/kg DM, we conclude that the animal would need to consume 1.5 kg DM in order to satisfy its maintenance needs.

A45

EFFECT OF THE INOCULATION OF FERULOYL ESTERASE PRODUCING-*Lactobacillus johnsonii* STRAINS ON NUTRITIONAL AND FERMENTATIVE PARAMETERS OF CORN STOVER MINI SILOS

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The potential benefits of using feruloyl esterase producing (FAE⁺)-lactic acid bacteria (LAB) as silage inoculants involve improved digestibility and fermentation, but results have been inconsistent among trials. In this work, we aimed to address the effects of the inoculation of three moderate to high FAE⁺ *Lactobacillus johnsonii* strains (ETC150, ETC175, and ETC187), originally isolated from caprine feces, in corn stover mini silos. Silages were inoculated (3×10⁵ CFU g/forage, or sterile diluent, UN group), vacuum-sealed and incubated for 300 days. Results showed a lower crude protein content in ETC175-inoculated silos when compared to UN, which is a detrimental effect. Besides, significantly lower acetate concentrations were detected in ETC150 and ETC187 groups when compared to UN, indicating that these homolactic LAB could dominate the fermentation process. Nevertheless, significant nutritional variations in the fiber fraction were not detected. It is possible that these LAB can effectively alter these parameters by combined inoculation with silage-native strains or fibrolytic enzymes.

A46

STUDY OF THE TOXICOLOGICAL EFFECTS OF A NEW FLUORIDE-DOPED BIOACTIVE GLASS ON ZEBRAFISH EMBRYOS (*Danio rerio*)

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Zebrafish embryos have proven to be an effective model to study the cytotoxic, embryotoxic, and genotoxic effects of pharmacological compounds and biomaterials *in vivo*. The present study aimed to evaluate the toxicological effects of ionic dissolution products (IDPs) released from the bioactive glass (BG) of the SiO₂-CaO-P₂O₅ and fluoride-doped SiO₂-CaO-P₂O₅ system on zebrafish embryos. The IDPs were obtained by incubation of 1% w/v of BG particles (< 5 μ m) in embryonic medium (EM) at 37°C for 72 h. Soluble ions were determined by ICP-MS. For the toxicity test, embryos during the cleavage period (2–8 cells) were incubated at 28.5°C in 6-well plates containing 5 mL of EM or IDP-enriched EM. Two repetitions with 30 embryos per treatment were performed. Embryonic and/or larval development was monitored every 24 h and the survival percentage was recorded at 120 hpf. The larvae were anesthetized with tricaine, then subjected to rapid cooling for euthanasia by immersion in a water bath at 2–4 °C and fixed in 4% paraformaldehyde for subsequent evaluation of the external morphological characters. In all cases, embryonic and larval development was normal, showing diagnostic morphological characteristics for each incubation time. The survival of embryos incubated in EM and of those treated with the IDPs of the BG was 100%. The results obtained demonstrate the biocompatibility of the IDPs released from the microparticles of the BG under study.

A47

IN VITRO EVALUATION OF TOLERANCE TO WATER DEFICIT OF PLANT GROWTH-PROMOTING BACTERIAS

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Diverse communities of microorganisms that promote plant growth exist in soil and are called plant growth-promoting rhizobacteria (PGPR), which can be used as biofertilizers. The efficacy and efficiency of biofertilizers depends on the ability of microorganisms to survive, compete with native microflora, and colonize the rhizosphere of crops. Growth and development of bacteria are affected by several extrinsic physical factors. When soil water conditions are restricted, microorganisms modify their metabolism to overcome the stress situation. The objective was to select PGPR strains based on their tolerance to water deficit. Fifteen strains of the genera *Bacillus* and *Pseudomonas* were grown in trypticase soy broth, and six water potentials were adjusted (-0.05, -0.15, -0.30, -0.49, -0.73, and -1.03 MPa) with the addition of different concentrations of polyethylene glycol (PEG 6000). The PGPRs were incubated at 28–30 °C under continuous agitation (120 rpm) for 24 h. Growth was estimated by measuring optical density at 600 nm. Strains whose growth was sustained at -0.73 MPa (25% PEG 6000) were considered stress-tolerant microorganisms. From the total strains evaluated, six from the *Bacillus* genus, and two from the *Pseudomonas* genus presented better performance since growth was maintained in a number of 10⁷ CFU/mL, which guarantees a minimum concentration for the promotion of growth in the soil and for use as biofertilizers.

A48

OPTIMIZATION OF CONDITIONS FOR THE INDUCTION OF EMBRYOGENIC STRUCTURES IN OLIVE TREE (*Olea europaea* L.)

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In somatic embryogenesis protocols, induction is a limiting stage. In olive, the formation of somatic embryos has two steps: (1) “induction”, achieved with high concentrations of auxins and cytokinins, and (2) “expression” that occurs with lower concentrations of growth regulators. Besides hormones, light incidence is an important factor in morphogenesis. Therefore, it is critical to determine the appropriate time to transfer explants from the induction medium to the expression medium. The objective of this work was to evaluate the response of olive explants to different incubation times and light conditions. For this purpose, radicles of the cultivars “Picual” and “Arbequina” were grown under dark or light conditions with a 14-h photoperiod. In the first stage, embryo induction culture medium was used (IE1: 25 µM IBA, 2.5 µM 2IP), followed by transfer to IE1d culture medium (0.25 µM IBA, 0.5 µM 2IP, 0.44 µM BAP) at 15, 21, 28, and 35 days. Fresh callus weight, embryo and root formation were evaluated. Significant differences were observed between the four times and two light conditions for the three variables evaluated. The fresh weight of the callus increased with time, reaching the highest value at 35 days. The highest number of embryos was obtained at 15 and 21 days, while the number of roots decreased with time. In all cases the results were obtained under light conditions; on the contrary, in darkness the values are lower. These data allow inferring that the optimum time for induction of embryogenic structures in the cultivars analyzed is between 15 and 21 days under light conditions.

A49

USE OF IMMOBILIZED LIPASE IN SYNTHESIS OF METRONIDAZOLE DERIVATIVES

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Use of enzymes in the pharmaceutical industry has increased for several reasons, among them, we can highlight their excellent selectivity, significant reduction in the use of reagents and solvents, and the possibility of obtaining products that are not easily synthesized by classical chemical methods. Immobilized *Candida antarctica* lipase (CALB, Novozym 435®) exhibits great stability and capacity for esterification and transesterification reactions in non-aqueous media. In this work, esterification of metronidazole (MTZ) with octanoic and nonanoic acids (C8 and C9) was carried out using CALB in order to obtain active ester derivatives of metronidazole. The octanoic and nonanoic acid esters were obtained with metronidazole in hexane, CALB, and the respective acid. The mixture was stirred at 300 rpm and 50°C. The progress of the reaction was monitored by TLC, while the isolation, identification and purity of the reaction products was performed by CC, GC-MS, and NMR using 1D and 2D experiments (COSY, HSQC, and HMBC). We obtained the octanoic and nonanoic esters of MTZ with yields between 85% and 93%. In both compounds, the mass spectra showed the molecular ion and a base peak at m/z 126 corresponding to the loss of entire side chain. The use of enzymes in synthesis of pharmacologically active derivatives is fully justified due to the ease isolation of products, the absence of toxic reagents and the lower costs derived from enzyme recovery.

A50

ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES OF *Juglans australis* WALNUT SHELL EXTRACT

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In Argentina occurs a native walnut, *Juglans australis*. The bioactive molecules were investigated in the commercial walnut *J. regia*, and no research has been reported on native walnut. This work analyzed the antimicrobial and antioxidant properties of native walnuts shells extracts compared to their commercial counterpart. Samples of shell walnuts were collected in Ancasti, Catamarca. The shells were cleaned and ground into small particles. Solvent extraction was performed using methanol, hexane, and ethyl acetate. The total phenolic content (TPC) and the extracts' antioxidant activity were analyzed using the DPPH and FRAP tests to measure the antiradical and reducing power, respectively. In addition, the antibacterial activity was evaluated against Gram-positive and Gram-negative phytopathogenic bacteria (*Erwinia amylovora* and *Clavibacter* sp.), and the minimum inhibitory concentration (MIC) was carried out using the broth microdilution method. The best performance in phenolic content and the higher reducer activity were observed in the methanolic extract of *J. australis* (121 mg GAE/g dry shell and 58.6 mmol Trolox/100 g dry shell, respectively). However, the best antiradical activity was observed in the methanolic extract of *J. regia* (11.5 mmol Trolox/100 g dry shell). This result denotes a difference in the profile of the phenolic compounds. The MIC was 10 mg/mL for both species for methanolic and ethyl acetate extracts and were able to inhibit the growth of Gram-positive and Gram-negative phytopathogens.

A51

LEMON EXTRACTS WITH NEUROPROTECTIVE PROPERTIES: ADDING VALUE TO A LOCAL INDUSTRY PRODUCT

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Parkinson's disease (PD) is a neurodegenerative pathology caused by neuronal cells damage, in many cases induced by abnormal aggregation of the protein α -Synuclein (α S). To date, there are only palliative treatments for PD, so to research towards new neuroprotective agents is crucial. Flavonoids, low molecular weight molecules produced by almost all vascular plants, have interesting pharmacological properties (antioxidant, anti-inflammatory, antimicrobial, etc.) that position them in a promising field for the formulation of neuroprotective products. Therefore, the objective of this work was to evaluate the capacity of lemons' extracts rich in flavonoids obtained from the local industry to inhibit α S protein aggregation. Each extract was physicochemical characterized, and it was determined the inhibition of *in vitro* α S aggregation, using the fluorescent probe Th T in addition with the Congo Red colorimetric method. Moreover, cell viability was evaluated in the eukaryotic cell line of human neuroblastoma SH-SY5Y using the MTT method. Results showed that the extracts are not toxic under the conditions tested. In addition, two extracts were able to inhibit α S aggregation, being one of them the most effective up to a concentration of 10 μ g/mL. These findings promote continuing with the characterization of the neuroprotective properties of the extracts, with the goal of giving added value to a product of the local industry.

A52

INHIBITORY ACTIVITY OF EXTRACT OF *Heliotropium curassavicum* FROM TUCUMÁN AIMED TO DEVELOP A BIOPRODUCT FOR ANIMAL PRODUCTION

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Exploitation of small ruminants in Argentina is an important economic activity (15% in the province of Tucumán). Among the main factors that affect it are the infectious processes mainly caused by *Escherichia coli* (EC). *Heliotropium* genus belongs to the Boraginaceae family and has a remarkable history of potentially useful biological activities for the design of a biocontrol product. Thus, we aimed to evaluate the antimicrobial activity of a fraction enriched in alkaloids of *H. curassavicum* from Tapia (Burruyacú) over native EC from goats (C1), 5 EC from lambs and EC ATCC 25922 as a control. In addition, on *Listeria monocytogenes* (LM) and *L. innocua* (LI). Fractions (15 μ L) at a final concentration of 6000 μ g/mL were applied (spot) on cultures (10⁶ CFU/mL) of EC, LM, and LI on BHI agar plates to evaluate the inhibitory effect individually or in combination with sodium benzoate (SB). Extraction yield was 0.013% considering dry weight of plant and alkaloids presence was confirmed by qualitative techniques. Antimicrobial activity was observed mainly in EC C1 and ATCC 25922, being EC strains from lambs the most resistant. The combination of vegetal fraction with SB allowed to reduce chemical preservative

concentration from 0.1% to 0.07% against LM and LI. Promising combinations could be selected in the search of active fractions to develop a biocontroller feed additive to prevent infectious diseases in small ruminants.

A53

SHEEP BACTERIA WITH DETOXIFYING FUNCTIONALITY

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During the first 60 days of life, sheep are very vulnerable to intestinal pathologies caused by an alteration of their microbiome. Previous studies demonstrated a bacterial colonization from the first day of life, with small increases in Lactobacilli and Bifidobacteria that produce metabolites with pharmacological and nutraceutical potentialities of importance in health. This work aimed to study bacteria of ovine origin, identify them genotypically, and evaluate their detoxifying capacity. To do this, bacteria were isolated from fecal material of healthy animals. Genotypic identification was performed by 16S ribosomal RNA sequencing. The detoxifying capacity of the strains was evaluated against phenol and 4-hydroxyacetophenone (4-HAF). Solutions of phenol and 4-HAF (25–100 µg/mL) were added to the cultures, and they were incubated at 37 ± 1 °C under static conditions for 8 days. Then, they were centrifuged separating the supernatants and pellets. The remaining compounds were determined by chromatography and UV-spectroscopy, using phenol as standard. Traces of 4-HAF were quantified by GC-MS-SIM. The analysis of the genetic sequences allowed identifying *Lacticaseibacillus paracasei* CO01, *Enterococcus mundtii* CO11, *E. mundtii* CO33, and *E. hirae* CO51 in the feces. The chemical study revealed the absence of phenol in the post-treatment samples. *L. paracasei* CO01, with promising properties showed a detoxification percentage of 100% for 100 µg/mL of phenol and 99% for 4-HAF (25 µg/mL). These results encourage us to continue studies on the design of formulations with beneficial bacteria of ovine origin.

A54

FUNGAL FLORA IN SHEEP AND CORRALES

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A great variety of microorganisms is lodged in the ovine intestine and in its environment. There are ovine pathologies that are harmful to animals and humans. Therefore, it is necessary to ensure a good health status of the sheep. The objectives of this work were to know the mycotic flora in sheep wool and in its habitat and to determine the presence of pathogens. The soil and sheep wool samples were taken in a field located in Lechiguana, Piedra Grande, Concepción, Tucumán. The processing was carried out between April and June 2022 at the Department of Mycology. For the isolation of fungi, soil was weighed and processed using the successive dilution technique; wool samples were suspended in distilled water. Each dilution was seeded on a Potato Agar plate and incubated at 28°C for one week. The colonies that developed were spotted onto potato agar tubes. The phenotypic identification was made based on macro and microscopic characteristics. The following genera and species of filamentous fungi *Eutorium chevalieri*, *Scopulariopsis brevicaulis*, *Alternaria alternata*, *Aspergillus terreus*, *Fusarium solani*, *Fusarium oxysporum*, and, in wool, *Sagenomella* sp., *Eutorium chevalieri*, *Eutorium herbariourum*, *Curvularia lunata*, *Aspergillus terreus*, and *Fusarium solani*. All the isolated fungi are saprophytic, but they can cause affections in humans and animals by acting as opportunists, producing from keratitis, cutaneous and subcutaneous infections to hepatic, pulmonary, disseminated affections and peritonitis (except *Eurotium* and *Sagenomella*). For this reason, permanent sanitary control of animals and environments, such as the use of personal protective equipment, is important.

A55

Protalebrella brasiliensis DECREASES THE YIELD AND QUALITY OF ESSENTIAL OILS IN CROPS OF *Mentha spicata* L.

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In aromatic species, environmental conditions determine the production of essential oils, although the effect of pest insects has been little studied. *Mentha spicata* essential oils are highly demanded in the world market, and their quality is determined by their carvone content. The objective of this work was to evaluate the impact of the attack of *Protalebrella brasiliensis* on the yield of essential oils of *M. spicata* and their quality. The trial was carried out in the town of El Zanjón, Santiago del Estero, Argentina (27°45'S, 64°18'W), under irrigation. During the month of February 2021, healthy leaves and those attacked by *P. brasiliensis* were collected. The material was dried in an oven

at 40°C, and the essential oils were extracted by steam distillation. Its chemical composition was determined by gas chromatography and mass spectrometry. The results were analyzed with ANOVA and Tukey's test. In healthy leaves, the essential oil yield was 0.79%, while in those attacked by *P. brasiliensis*, it was reduced to 0.42%. In healthy leaves, the essential oils were composed of: carvone (59%), limonene (16.5%), α -pinene (16.5%), and myrcene (2.1%). In infected leaves, the concentration of these compounds varied significantly with respect to the healthy ones, and was 47.1%, 12.2%, 15.9%, and 9.3%, respectively. Based on our results, it is highlighted that *P. brasiliensis* decreases the yield of essential oils in *M. spicata* and its quality.

A56

PERFORMANCE OF TEMPERATE CORN IN EARLY SOWING DATES IN MONTEROS-TUCUMÁN

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In Tucumán, in the area of the depressed non-saline plain, there is the possibility of early sowings of maize. The objective of this work was to evaluate the behavior of temperate hybrids in early planting. The tests were carried out in Isla San José, Monteros-Tucumán. It was evaluated the performance yield (YD), prolificity (PRO), and percentage of stem break (%Q), of five temperate hybrids of KWS®: KM 4580VT3P (H1), KM 3916GLStack/VIP3 (H2), KM 4020GLStack/VIP3 (H3), KM 3821VIP3 (H4), and KM 4321HR/LCL/FULL (H5), in two sowing dates (FS), in the years (Y) 2020 and 2021. The most significant results were obtained in H, Y, FS and the FS*Y combinations; September 7, 2020 (1FS20) and September 6, 2021 (1FS21), and September 26, 2020 (2FS20) and September 30, 2021 (2FS21). It was planted in rainfed conditions; plots of 4 rows of 5 m, 70 cm between rows. The two central rows were harvested. Completely randomized block design. The ANOVA for YD showed significant differences in H ($P = 0.01$), Y ($P < 0.0001$), FS ($P < 0.004$), and interaction FS*Y ($P = 0.04$), for PRO FS *Y ($P = 0.01$) and %V in H ($P = 0.001$). The H1 (11,015.6 kg/ha) and Y 2020 (11,704.5 kg/ha) were the ones with the best YD, for FS*Y, the highest YD were 2FS20 and 2FS21 (12,639.0 and 7,579.0 kg/ha), in both Y. The highest PRO was 2FS20 (1.06 ears/plant). The worst performing H in %Q was H3 (5.8%). In conclusion, the temperate hybrids, in early plantings, in rainfed conditions, showed good YD, especially in the second 2FS. The highest YD were in 2020, and they are explained by opportune precipitations in the critical period of flowering.

A57

RABBIT MEAT AS A FUNCTIONAL FOOD RICH IN OMEGA-3 FATTY ACIDS: COMPARISON BETWEEN DIETS SUPPLEMENTED WITH OIL AND CHIA SEED

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The beneficial properties of omega 3 fatty acids (n-3) on different pathologies have been widely demonstrated. *Salvia hispanica* seed (chia) is one of the highest vegetal sources of n-3 as alpha linolenic acid (ALA) form. This work aimed to study whether diet supplementation with either chia oil or chia seed equivalent to a daily dose of 3.2 g ALA/day (7% total diary calories) would increase the nutritional value of rabbit meat as a "functional food" by including n-3. Rabbits were separated into three groups: fed with regular diet (CD), fed with CD supplemented with 3% chia oil (OCh), fed with CD supplemented with 6,64 g/100 of chia seed (SCh). After six weeks of feeding, animals were sacrificed, and gastrocnemius muscle was removed and stored in freezer at -20°C until fatty acid analysis by gas chromatography. A significant increase in ALA levels was observed in animals with OCh compared to those receiving CD and SCh (CD: 2.1 ± 0.2 vs. OCh: 12.6 ± 1.2 vs. SCh: 3.9 ± 0.9 , $P < 0.05$, one-way ANOVA). Likewise, inflammation biomarkers such as the n-6/n-3 ratio (CD: 15.2 ± 0.9 vs. OCh: 2.77 ± 0.38 vs. SCh: 9.6 ± 2.0) and the arachidonic acid/ALA ratio (CD: 3.4 ± 0.5 vs. OCh: 0.31 ± 0.03 vs. SCh: 1.7 ± 0.5) were significantly lower in animals supplemented with OCh than those of CD and SCh (one way ANOVA). Dietary supplementation with OCh increased the amount of n-3 in rabbit muscle improving the nutritional properties of meat and making it a potential functional food.

A58

PRODUCTION OF BLUEBERRY ANTHOCYANIN-RICH EXTRACT FOR ITS USE AS FUNCTIONAL FOOD

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Anthocyanins are flavonoids with antioxidant and anti-inflammatory properties. Blueberries are rich in these compounds, and their beneficial effects on several diseases have been demonstrated, so their use as a functional food is very promising. Anthocyanins have poor stability and are susceptible to harsh environmental conditions, such as oxygen, temperature, pH, and light. Thus, there is an increasing

interest in the food industry in developing processing methods for anthocyanin preservation. The objectives of this work were to develop an anthocyanin extraction method using regional blueberries and to analyze the protective effect of chia seed mucilage to avoid its degradation. Fresh fruits were homogenized to prepare an extract. Anthocyanin extraction was performed by using acidified either methanol or ethanol as solvents. Then, chia mucilage was obtained through two methods: centrifugation and sieving on a 40-mesh screen. Emulsions with different proportions of blueberry extract and chia mucilage were prepared (90–10% to 10–90% extract–mucilage). Anthocyanin concentration in the extract obtained with methanol (17.86 mg cyanidin-3-glucoside/mL) as solvent was similar to that obtained with ethanol (17.19 mg cyanidin-3-glucoside/mL). Regarding the extract–mucilage emulsions, the proportion 90–10 showed higher anthocyanin concentration than the extract (142.6 vs. 50.9 mg cyanidin-3-glucoside/mL). There were no differences between the solvents used during the anthocyanin extraction, and chia seed mucilage was able to preserve anthocyanin degradation.

A59

IN VITRO EVALUATION OF CNICIN ON VIABILITY AND BIOFILM PRODUCTION OF *Xanthomonas* sp. CAUSING BACTERIAL BLIGHT

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Among main diseases that affect bean cultivation worldwide, bacterial blight stands out. It is caused by *Xanthomonas axonopodis* (XA) and *X. fuscans* (XF), and it generates losses in production. Part of the infection cycle involves biofilm production as a strategy to improve adhesion and prevalence in infected tissues. Chemical traditional control is based on, among others, copper biocides administrations that generate residues and alter ecosystems. Thus, alternative strategies based on plant products become interesting. *In vitro* monitoring was performed to evaluate changes in viability and biofilm production on XA and XF strains from Tucumán and European Union after application of sesquiterpene lactone cnicin (Cn) isolated from *Centaurea diffusa* from Argentina. Viability and kinetics in biofilm production variations were evaluated after addition of 250 and 500 µg/mL of Cn on XA and XF cultures for 144 hours. Viability was monitored by plate count, live/dead test, and respiratory activity, while biofilm analysis was revealed using crystal violet. Application of Cn reduced cell population mainly with 500 µg/mL and diminished both number of observable not-damaged cells and respiratory capacity ≤50% inside mature biopolymer (72 h). Biofilm production was mainly modified with 500 µg/mL, depending also on each particular strain. It is proposed to use cnicin as a positive control to evaluate bio-controller capacity on viability and biofilm production of extracts obtained from *C. diffusa* enriched in this molecule.

A60

USEFULNESS OF DECOCTIONS AND TINCTURES OF *Larrea divaricata* IN THE CONTROL OF *Escherichia coli* RESPONSIBLE OF GASTROENTERITIS IN SMALL RUMINANTS

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Northwest Argentina participates in 31.5% of the national production of goats and sheep. Gastroenteritis originated in *Escherichia coli* infections is one of the main causes of losses in this activity. They are treated with antibiotics that are often ineffective, expensive, and induce the appearance of bacterial resistance. Antibacterial plant extracts might be an alternative to deal with gastroenteritis. This work aims to characterize decoctions and tinctures from *Larrea divaricata* by their dry matter yields, solubility of active ingredients in solvents [DMSO, water, or lactic acid–glucose–water mixture in a 5:3:1 v/w/v (NADEs)], and antibacterial effect over five strains of *E. coli*. The bacterial strains were isolated from lambs, and their sensitivity to plant extracts was tested by the agar diffusion method. Average yields of 14% and 27% were obtained for decoctions and tinctures, respectively. The extracts were solubilized in all solvents tested but not in water. Strains showed slight sensitivity to 75 and 100% ethanol and all concentrations of NADEs except ≤ 2.5%. At this concentration, extracts dissolved in NADEs generated inhibitory halos of 1–5 mm, when tested at 6400 µg/mL. The mentioned extracts and solvents assayed will be further investigated to develop an eco-friendly strategy to control enterobacteria population from intestinal tract of lambs.

A61

EVALUATION OF THE MEDICINAL PROPERTIES OF AQUEOUS EXTRACTS OF BARK OF *Alnus acuminata*

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Alnus acuminata ssp. *Arguta* (aliso) is a species that is distributed in the provinces of northwestern Argentina. Plasters of leaves and bark shredded together are used for rheumatic and muscular pain and wound healing in traditional medicine. The aim of the present work was to evaluate the antioxidant, antibacterial, anti-inflammatory, and analgesic properties of aqueous extracts from the bark of *Alnus acuminata*. Antioxidant activity was measured by using the DPPH methods *in vitro*, getting an IC₅₀ of 0.01343 mg/mL. Antibacterial activity was evaluated against *Staphylococcus aureus* (clinical strain) by the method for determining antimicrobial susceptibility by dilution, getting a CBM of 0.5mg/mL. In the *in vivo* studies, male Wistar rats between 8 and 12 weeks of age were used, and the concentration of extract evaluated was 300 mg/kg of weight po. The extracts showed a maximum inhibition of inflammation of 66.05% at two hours in the carrageenan-induced plantar edema test. Analgesic activity was evaluated using the tail dip test, formalin test, and abdominal contortion test. The extracts evaluated do not have central analgesic activity. They presented an analgesic activity in the late phase of the formalin test with 50% inhibition and a visceral analgesic activity of 62.84% in the acetic acid-induced abdominal contortions test. These results suggest the feasibility of the use of aqueous extract of aliso bark as an alternative preventive and/or therapeutic therapy.

A62

TOXICITY EVALUATION OF TWO POLAR LEAF EXTRACTS FROM *Acacia aroma*

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Acacia aroma Gillies ex Hook & Arn. (syn. *Vachellia aroma* Seigler and Ebinger, 2006) (Tusca) is a plant native to South America widely used for medicinal purposes. We recently described the antiulcer effect in rats of two tusca foliar extracts, the 10% hydroalcoholic (HA10%) and the 5% infusion (I5%). The aim of this work was to evaluate the *in vitro* cytotoxicity and *in vivo* sub-chronic toxicity of both, HA10% and I5%. *In vitro* assays were performed in LC5 lung cells by cell viability test using MTT, to determine the 50% lethal concentration (LC₅₀) of each extract. Sub-chronic toxicity tests were performed in Wistar rats, using an oral administration. The experimental groups (N = 6) included a normal control group (0.9% NaCl), six treated groups, three with HA10% (doses: 75, 150, and 300 mg/kg) and three with I5% (doses: 75, 150, and 300 mg/kg). Clinical indicators were evaluated during the 90 days of the treatment. At the end of the experimental period, biochemical (blood and urine) and histopathological parameters were determined in samples of stomach, liver, and kidney. Both extracts showed low *in vitro* cytotoxicity (LC₅₀ of 562.28 ± 28.11 µg/mL for HA10% and 966.78 ± 48.34 µg/mL for I5%). *In vivo*, clinical and behavioral indicators, body weight, food intake and biochemical parameters did not show significant difference ($P \geq 0.05$) with respect to the normal control group. No histopathological alterations were observed in the organs studied. These results indicate that the two tusca leaf extracts are safe at different doses, including effective anti-ulcer doses.

A63

SELF-MEDICATION WITH DIFFERENT DRUGS RELATED TO COVID IN FOUNT STUDENTS

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Self-medication in university students should be considered a problem because they believe they are capable of handling the issue when the process is mild or known, they use drugs that have already been prescribed. The present work contains results of the study of self-medication practices for the etiology and symptomatology of COVID, as well as the degree of general knowledge on the subject that this group has. The objective of this work was to reveal the habits of self-medication due to COVID, in FOUNT students. During June and July 2022, an anonymous survey was applied to 158 students of the 3rd, 4th, 5th years, and the PFO (compulsory final practice) of 10 questions on the concept of self-medication, type of medication, frequency, adverse effects, prospectus reading, sources of information and obtaining them. Of all the respondents, 59% were between 20 and 24 years old. Of the 84 who self-medicated for covid, 43% did so due to a positive diagnosis and prevention, 39% due to prevention, and 18% with a positive diagnosis. The most frequent symptoms were sore throat, headache, and tiredness. Medications consumed: paracetamol (76%), ibuprofen (42%), azithromycin (26%), dexamethasone (20%), and ivermectin (19%). 66% knew the effects. 86% requested information about the drug before consuming it. 63% consulted the pharmacist, 50% relatives. 96% bought it at the pharmacy. 76% went to the doctor when the symptoms persisted. 46% stopped self-medication when these disappeared. Although the majority considers self-medication a dangerous practice, students have the habit of self-medication and advise drugs that have been effective for them.

A64

ACUTE TOXICITY STUDY OF RED FRUITS CULTIVATED IN THE NOA THROUGH THE BIOASSAY OF *Artemia salina* L.

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Red fruits, known for their content in bioactive compounds, have antioxidant capacity superior to vitamins. It is important to determine the toxicity of their extracts to use them safely. The objective of the work is the study of acute toxicity of aqueous and hydroalcoholic extracts of red fruits grown in the NOA, by means of the *Artemia salina* cytotoxicity assay. Aqueous and hydroalcoholic extracts of the species *Morus nigra*, *Vaccinium corimbosum*, and *Myrtus communis* were produced. In vitro cytotoxicity was evaluated using the *Artemia salina* lethality test, determining the mean lethal concentration (LC₅₀). The concentrations of controls and extracts (1–1000 µg/mL) with artificial seawater. Experimental units consisting of 100 µL of each treatment and 10 nauplii. After 24 h, the total number of dead larvae was determined. The data were analyzed with Probit and the LC₅₀ was determined with a 95% confidence interval. The mean lethal concentration (LC₅₀) was calculated by linear interpolation of the percentage of mortality values, for each concentration, per experiment. Viability in the control group was 100%, with no changes in behavior observed. Extracts from the three species showed no cytotoxic activity, with LC₅₀ above 1000 µg/mL, the samples being considered non-toxic. The results obtained demonstrate the non-toxicity of the extracts under study and their potential, allowing the continuation of biological experiments to evaluate their pharmacological effects.

A65

ESSENTIAL OIL COMPOSITION AND A RARE BENZOFURAN DERIVATIVE FROM *Xenophyllum rosenii* (R.E. Fries) V.A. Funk

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The Andean Altiplano region, located in northwestern Argentina and southwestern Bolivia, features an arid, cold, high-altitude environment where around 500 plant species grow despite extreme desert conditions. Some of these species are used in traditional medicine. In this work, the essential oil (EO) composition and the components of the dichloromethane (DCM) extract of aerial parts (flowers, stems and leaves) of *Xenophyllum rosenii* (R.E. Fries) V. A. Funk (Senecioneae tribe; Asteraceae family) are reported for the first time. *X. rosenii* is a perennial, creeping, rhizomatous subshrub, with a fetid odor. The EO was obtained by steam water distillation and analyzed by gas chromatography coupled to a quadrupole mass spectrometer. (GC-MS). The yield in EO was 0.50% v/w; 79 compounds representing 97.2% of the oil were identified, the main components being: β-pinene (10.0%), β-phellandrene (2.4%), α-muurolene (4.3%), γ-cadinene (5.7%), δ-cadinene (16.5%), epi-α-cadinol (2.2%), and shyobunol (6.1%). The DCM extract was obtained by maceration at room temperature (12.0% yield), and processed by column chromatography to give the coumarin, scopoletin, and the benzofuran 7-methoxytremetone. The structure of the isolated compounds was confirmed by IR, UV, and NMR spectroscopy. These last two compounds are reported in *Xenophyllum* for the first time.

A66

INFLUENCE OF MANUFACTURING PROCESS IN NUTRACEUTICAL ACTIVITY OF CHAÑAR ARROPE

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Many native fruits and its derivatives from the Argentinian northwestern are included into the group of functional food. “Chañar” fruits (*Geoffroea decorticans*) have anti-tussive, expectorant, anti-inflammatory, and analgesic effects, and the “arropé” made with those fruits maintains some of those properties, while the anti-inflammatory activity is lost if the fruits are cooked. For this reason, it is necessary to standardize the chañar arropé manufacturing process to avoid differences in properties of final product. The main objective of this work was to evaluate anti-inflammatory and antioxidant activities of chañar arropé in different stages of its production (decoction). Arropé was made by cooking the fruits and taking samples each hour. To determine the anti-inflammatory activity, a carrageenan test was performed in male adults Wistar rats. Ibuprofen and aqueous extract of chañar fruits were used as positive controls. The antioxidant activity was determined using DPPH radical scavenging method. The sample obtained in the 3rd step of the process (three hours of decoction), produced a significant inhibition of inflammation ($P < 0.05$), two hours after the phlogistic agent was administrated, similar results were obtained for aqueous extract and ibuprofen. Regarding antioxidant activity, the sample analyzed kept an antioxidant activity similar of aqueous extract

(IC₅₀ = 1.11 ± 0.20 mg/mL). In conclusion, by reducing decoction time to 3 h, it is possible to keep all the pharmacological properties in aqueous extract, maintaining the consistency and taste of arropé.

A67

EVALUATING THE NEUROPROTECTIVE POTENTIAL OF A NOVEL TETRACYCLINE IN A NEW PARKINSON'S DISEASE CELL CULTURE MODEL

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Parkinson's Disease (PD), a chronic and progressive neurodegenerative disorder that affects millions of people worldwide, is characterized by the presence of toxic amyloid aggregates of the protein α -Synuclein (α S). To date, only symptomatic treatments have been developed. Different tetracyclines (minocycline, doxycycline, CMT-3, chlortetracycline, and demeclocycline) have been previously shown to possess neuroprotective properties in preclinical models. However, antibiotic activity prevents their repositioning for PD. Therefore, a set of modified tetracyclines that lack antimicrobial activity were designed. In the present work, we studied one of these derivatives, ChloRed2 (CR2). The safety profile of CR2 was determined in SH-SY5Y- α S-RFP cells, and its effect on parameters related to the pathogenicity of α S triggered by preformed amyloid fibrils of α S (PFF α S) was studied: (i) aggregation of endogenous α S; (ii) phosphorylation of α S at S129, (iii) nucleation in fibrils revealed by ThS, an amyloid-specific probe, (iv) number and function of lysosomes, and (v) oxidative stress. Results show that CR2 (i) does not alter cell viability, (ii) significantly decreases α S seeded aggregation, (iii) inhibits toxic α S phosphorylation, (iv) reduces PFF α S-induced lysosomal stress, and (v) prevents the formation of reactive oxygen species (measured by CellRoxTM fluorescent probe). These results position CR2 as a potential neuroprotective drug for PD and possibly other synucleinopathies.

A68

IN VITRO ANTIFUNGAL ACTIVITY OF *Zuccagnia punctata*: EFFECT ON *Verticillium dahliae*

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Olive tree (*Olea europaea L.*) is one of the most important crops in the agricultural industry in La Rioja province. *Verticillium dahliae* is a phytopathogen that affects the quality and yield of this crop. The objective of this work was to evaluate the antifungal activity of the essential oil (EO), ethanolic extract (EE) and chromatographic fractions (F1–11) of *Zuccagnia punctata*. The antifungal activity was evaluated by the percentage inhibition of *V. dahliae* spore germination and the results were expressed as MIC (minimum inhibitory concentration). The effect of different combinations of EO and EE on spore germination was also evaluated. In all tests the positive control was Benomil. Germination of *V. dahliae* spores was completely inhibited by EO (MIC = 3 mg/mL) and EE (MIC = 0.4 mg/mL) of *Z. punctata*. The EO/Benomil combination showed an indifference-type effect over the spore germination, while the EE/Benomil and EO/EE combinations showed an additive effect. Finally, fractions (F4–8) presented MIC of 0.8 mg/mL against *V. dahliae*. Thus, EO, as well as EE and EE, subfractions of *Z. punctata* were able to control *V. dahlia in vitro*, suggesting that *Z. punctata* would be a good candidate for verticillium wilt control in olive trees.

A69

PROBIOTICS STIMULATE ANTIGEN PRESENTING CELLS

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Macrophages (MQ) and dendritic cells (DC) are highly specialized antigen presenting cells (APC) responsible for triggering primary immune responses. These cells are able to detect microorganisms or their derived molecules through different receptors. Upon its meeting, APC starts a sequence of signals involving antigen presentation, co-stimulation, and cytokine secretion. Our aim was to analyze whether probiotics were capable of stimulating APC by inducing their activation and maturation. Murine peritoneal macrophages (10⁶ cells/mL) were stimulated *in vitro* with the intestinal fluids of mice fed for 7 or 5 days with *Lactobacillus casei* CRL 431 (Lc 431) or *L. paracasei* CNCM-1518 (Lp 1518), respectively, or a conventional diet. An increase in the population F4/80⁺ that express CD80 and CD86 were determined by flow cytometry and confocal microscopy analysis, upon stimulation with the intestinal fluids of mice fed with the probiotics. Additionally, MQ in the cell wall (Cw) of Lp 1518 showed an over expression of the co-stimulatory molecules. Similar results were observed on mice bone marrow derived DC. The CD11c⁺CD80⁺CD86⁺ population increased by stimulating them with the intestinal fluids of mice fed with probiotics, compared with those that received a conventional diet. Finally, cytokines secretion on the supernatant of MQ

and DC cultures showed increases on IL-6, IL-12, and TNF- α upon the stimuli with the Cw of Lc431, Lp1518 or the intestinal fluids of mice fed with probiotics. Interestingly, high levels of the regulatory cytokine IL-10 go together with the increase of the proinflammatory cytokines. These results pointed out the relevance of the probiotics as adjuvant, able to stimulate APC onto its activation and trigger an immune response.

A70

HUMAN BOCAVIRUS IN CHILDREN HOSPITALIZED FOR ACUTE RESPIRATORY INFECTION IN TUCUMÁN

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The role of human Bocavirus (HBoV) as a respiratory pathogen has not yet been fully elucidated due to its persistence for several months after acute infection. HBoV was detected in respiratory samples (RS) along with other viruses. The objective of this work was to evaluate the prevalence of HBoV in a cohort of children < 12 years of age, hospitalized with acute respiratory infection (ARI) in the RS health services of San Miguel de Tucumán, from March 2018 to May 2019, considering age, viral co-infections, and associated pathology. 234 respiratory samples (RS) were analyzed by immunofluorescence. They were positive for Respiratory Syncytial Virus (RSV) (35%), AdenoV (1.7%), Influenza A (1.3%), ParainfluenzaV (2.1%), and, by real-time RT-PCR, were positive for RhinoV (RVH) (35%). The detection of HBoV by real-time PCR in all the RMs showed that 28 (12%) of them were positive, 14 without co-infection and 14 with co-infections: RSV + HBoV (7), RSV + RVH + HBoV (1), and HRV + HBoV (6). The clinical entities associated with HBoV infection were bronchiolitis (BQL), obstructive bronchial syndrome (OBS), pneumonia and influenza-like illness (ILI). The age of the children infected by HBoV was ≤ 2 years, except for a 5-year-old boy and an 11-year-old girl. HBoV can be detected alone and in co-infection with other viruses in RS of children with ARI. HBoV was found as the only viral agent in 14 cases: associated with pneumonia in 3 cases, ILI: 1, BQL: 11, and SBO: 4. A significant fact resulting from this study is its association as the only virus in low ARI: pneumonia, SBO, and bronchiolitis. It is necessary to carry out new research with a larger number of patients to try to elucidate the cause-effect relationship between HBoV and ARI.

A71

DIVERSITY OF FISH IN SAN MIGUEL LAKE, 9 DE JULIO PARK, TUCUMÁN, ARGENTINA

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San Miguel Lake is located in “9 de Julio Park”; it is an urban lake of anthropogenic origin, and it is shallow and small in size, created for recreational and landscape purposes. These urban ecosystems contribute to increasing the quality of life and mitigating the urban climate, which is why they are important for the inhabitants of cities and tourism. From a functional point of view, they are different from common aquatic systems, so they have not been studied enough. They are vulnerable to human action, causing eutrophication processes and uncontrolled growth of phytoplankton and aquatic plants that affect water quality. In urban lakes, the presence of fish has a high environmental value and can function as a fishery, for which special management is required. To know the ichthyofauna of San Miguel Lake, a seasonal sampling was carried out: in May, August, and October of 2021, and in February 2022. The fishing gear used was electric fishing, combined with hand nets; 10-m long beach seine net and 5-m long and 1-m high gill net. A total of 1451 specimens corresponding to four orders and six families were collected. Species richness was twelve; Characiformes were the most representative order with seven species, followed by Cichliformes with two species, while Cyprinodontiformes and Synbranchiformes only one species of each was found. The presence and abundance of the different orders were variable during the sampling period. The occurrence of juveniles of all species was recorded, except for Synbranchiformes. The results of this monitoring are the first records of this urban environment, which are relevant for its revaluation and conservation.

A72

SEASONAL VARIATIONS IN THE PHYTOPLANKTON OF SAN MIGUEL LAKE (TUCUMÁN- ARGENTINA)

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Urban lakes increase the quality of life, mitigate the climate, and also provide spaces for recreational activities; they generate patches of habitat, provide nesting and feeding sites, and favor the conservation of local, regional and migratory fauna. These sites, considered urban

biodiversity hotspots, are affected by seasonal variability and human activities. The objective was to analyze the richness and density of the phytoplankton of Lake San Miguel, located in the 9 de Julio Park during autumn (May), winter (August) and spring (November) of 2021 and summer (February) of 2022. The collection of algal samples and their analysis were carried out according to conventional methods. 71 taxa were identified: 41 green algae, 16 diatoms, 10 blue-green algae, 3 euglenoids, and 1 dinoflagellate. Seasonal variations were reflected in the algal density values: the highest value was recorded in summer (142 ind/mL), and the lowest was detected in winter (100 ind/mL). Also, the dynamics and the phycofloristic composition reflected the seasonal effect. In autumn some exclusive taxa were: *Closterium calosporum*, *Coelastrum pseudomicroporum*, *Coenococcus planctonicus*, *Sphaerocystis schroeteri*, *Chroococcus turicenis*, and *Trachelomonas* sp., while in winter *Cladophora glomerata* was the exclusive species. *Closterium acerosum*, *C. lanceolatum*, *Pediastrum boryanum*, and *Gymnodinium* sp. were the exclusive taxa of summer. Since there are few studies of urban lakes in the NOA, this work allows to know the dynamics and structure of microalgae in an anthropized environment; it also broadens the taxonomic knowledge for the region and constitutes a key tool in the management and environmental monitoring of this particular type of lentic systems.

A73

UPDATE OF THE STATE OF KNOWLEDGE OF THE ODONATA ORDER IN THE PROVINCE OF CATAMARCA, ARGENTINA

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The state of knowledge of the Argentine odonatafauna is good, although there are areas with a low level of survey. In Catamarca, 36 species have been registered (grouped in 21 genera and eight families); four of them are endemic to Argentina. Due to the low number of surveys carried out, Catamarca is one of the provinces with the lowest level of odonatological knowledge in the country. This situation is mainly due to the scarcity of records. Based on recent samplings carried out in lotic and lentic environments of the Valle river basin and artificial wetlands of the department of La Paz, 14 species (grouped into 13 genera and three families) were recorded for the first time: *Phyllocycla argentina* (Gomphidae); *Brachymesia furcata*, *Brechmorhoga vivax*, *Erythemis plebeja*, *Erythrodiplax fusca*, *Erythrodiplax media*, *Miathyria marcella*, *Perithemis mooma*, and *Tramea binotata* (Libellulidae); *Acanthagrion floridense*, *Andinagrion garrisoni*, *Enallagma novaehispaniae*, *Ischnura capreolus*, and *Oxyagrion rubidum* (Coenagrionidae). Although these records represent an approximate increase of 40% of the specific richness at the provincial level, higher biodiversity values are expected for the Odonata order based on the environmental heterogeneity that characterizes the province. The material is deposited in the collection of the Cátedra de Diversidad Animal I (FACEN-UNCA).

A74

ASSEMBLY OF TERRESTRIAL HEXAPODS ON THE MARGINS OF EL SIMBOLAR STREAM

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The “El Simbolar” stream is located in Concepción, Capayán department, Catamarca. The marginal flora of the lower middle basin corresponds to the Chaco Serrano su-region with Yungas elements. Hexapods are the most diversified and abundant group among animals. They are found in all environments forming a substantial part of food chains. The objectives of this research were: to describe the assemblage of terrestrial hexapods associated with the banks of the “El Simbolar” stream, based on simple biological metrics and ecological indices and evaluate the state of conservation of the studied environment. Two sampling stations (E) of 50 m², were established. For the collection of the hexapods, 10 pitfall traps were placed, active for 28 days, renewed every seven days. Hexapods were determined by stereoscopic microscopy down to the lowest taxon possible to discern based on the available keys. In E-I 930 hexapods, from 37 taxa, were collected. The percentage composition of high-ranking taxa was: Insecta, 61.08%; Collembola, 21.5%; Isopod, 8.92%; Arachnida, 8.39%; and Chilopoda, 0.11%. The Shannon–Wiener diversity index (H') was = 2.80. Simpson Dominance (SD) was = 0.27. In E-II, 493 hexapods of 23 taxa were collected. The percentage composition of high-ranking taxa was: Insecta, 60.65%; Isopod, 15.82%; Collembola, 14.00%; Arachnida, 9.33%; and Chilopoda, 0.2%. H' = 2.71; DS = 0.26. Formicidae was dominant in both stations (48.92% and 46.86%, respectively). The Sorensen quantitative similarity coefficient was = 0.68, with 19 common taxa. The surveyed environments are in a good state of conservation.

A75

RICHNESS AND ABUNDANCE OF BIRDS IN WETLANDS OF JUJUY, ARGENTINA

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The province of Jujuy, due to its geographical characteristics and geological formations, has a great diversity of wetlands. Birds are important bioindicators of the quality of the environment, which is why the objective of the work was to study the bird community in different wetlands, both natural and artificial. Censuses of line transects, fixed radius point, and boat trips census were carried out in the four stations, from 2019 to 2022. The number of species (richness) and the number of individuals were recorded. Relative abundance (RA) and relative importance index (IR) were calculated. In 45 counts, 130 species of birds, both aquatic and forest and/or grassland, were identified. The greatest richness was recorded in the Las Maderas Dam (N = 69), followed by the Yala Lagoons (N = 53) and La Ciénaga Dam (N = 51) and with lower values the Río Grande (N = 29), Yala River (N = 25), Los Alisos Dam (N = 24), Perico River (N = 13), and Reyes River (N = 12). It should be noted that the greatest abundance was given in the Las Maderas Dam; *Phalacrocorax brasilianus* and *Dendrocygna viduata* were the dominant species. We also observe Nearctic–Neotropical, altitudinal and regional migratory species. It is worth mentioning the presence, in the Yala River, of *Merganetta armata* and *Cinclus schulzii*, considered indicators of the quality of mountain rivers. It is important that studies be continued to obtain a baseline that serves to propose management and conservation guidelines for the region.

A76

FLORISTIC COMPOSITION AND ECOLOGICAL ALTERATIONS IN AN AREA OF THE STREAM OF “EL SIMBOLAR” RIVERBANK, CONCEPCIÓN, CAPAYÁN (CATAMARCA, ARGENTINA)

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Riverbank vegetation constitutes an interphase between aquatic and terrestrial ecosystems; in turn, it provides several ecosystem services. The aim of this work was to determine the tree, bush, vine, and epiphytological arrangement of an area of the stream of “El Simbolar” riverbank, as well as factors that alter the integrity of the ecosystem. The sample site is located in the town of Concepción de Capayán, in “El Simbolar” stream (28°40'37.90"S; 66°03'17.57"O; 792 MAMSL), and it is shaped by the ecoregions of Chaco Serrano with characteristics of Yungas and Chaco Árido. Samplings were conducted using the Presence–Absence technique. For that, line transects were conducted, towards both margins of the stream, recording systematically the tree, bush, vine, and epiphytes, observing also the anthropogenic factors that alter the riverbank. A total of 39 species belonging to 24 families was revealed. Among them, 32 are native and 6 exotic: *Fraxinus* sp., *Jacaranda mimosifolia*, *Juglans regia*, *Morus* sp., *Ricinus communis*, *Xanthosoma* sp., and a Yungas element, *Podocarpus parlatorei*. As factors that could potentially be altering the riverbank community, the presence of exotic species, cattle, clearing, fire, and solid waste were identified. It is concluded that the riparian vegetation of the section studied is not in proper conservation conditions and that probably the wellbeing of the watercourse is affected due to many anthropogenic factors. It is necessary to reveal other sections of the riverbank and to compensate the information with studies that determine the quality of the stream's water.

A77

ANTIVIRAL ACTION MECHANISM OF THE AQUEOUS EXTRACT FROM YERBA MATE *-Ilex paraguariensis* A. St.-Hil.- AGAINST DENGUE VIRUS SEROTYPE 2

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Ilex paraguariensis –“yerba mate”– stands out for its numerous medicinal properties. The antiviral capacity of the aqueous extract of *I. paraguariensis* against dengue virus serotype 2 (DENV-2) was previously demonstrated. The disease caused by the dengue virus (Flaviviridae) affects 390 million people each year worldwide. There are no effective antiviral drugs to treat this relevant disease. The objective of this work was to elucidate the target stages of action of the aqueous extract (AE) obtained from yerba mate. From leaves and sticks of commercial agroecologically produced “yerba mate” (Kalena, Argentina), the aqueous extract (AE) was obtained by extraction with water at 83°C (1/10, p/v), left to stand for 1 h, then it was filtered and subjected to lyophilization. The dry extract was resuspended in buffered saline solution and filtered with Whatman N°2 paper and sterilized with 0.22-µm filters. For the antiviral activity studies, AE was used at 300 µg/mL (non-cytotoxic concentration) and different treatments were carried out: (1) Adsorption and penetration stages, (2) after adsorption and penetration, (3) cellular pre-treatment, and (4) viral pre-treatment. All treatments were incubated at 37°C for 7 days in a humid atmosphere and with CO₂ (5%). Cells were then fixed with formalin (10%) and stained with crystal violet (1%). As a result, the following percentages of viral inhibition were obtained: Ads-Pen: 19.7 ± 0.5%, Post Ads-Pen: 76.9 ± 3.2, Pre-cell treatment: 8.8 ± 4.9; Viral pre-treatment: 30 ± 2.2. It can be concluded that AE exerted its antiviral action in the intracellular stages of DENV-2 virus replication.

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