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(Asociación de Biología de Tucumán)

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LECTURES

A01

“Miguel Lillo” Lecture

HOW TO EXPLOIT THE PARENTAL CARE OF OTHER SPECIES? INTERACTIONS BETWEEN AVIAN BROOD PARASITES AND THEIR HOSTS

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Brood parasitic birds lay their eggs in the nests of other species, the hosts, which provide all parental care. Brood parasitism reduces the reproductive success of the hosts, which favors the evolution of adaptations that reduce the cost of parasitism (antiparasitic defenses). This favors the evolution of counteradaptations in the parasite that allow it to evade the host's defenses (counterdefenses), resulting in a coevolutionary process. Interspecific brood parasitism in birds evolved independently seven times and is currently present in approximately 100 species. These species can be generalists or specialists depending on whether they parasitize many or few hosts. Systems involving a specialist brood parasite and its host are particularly well-suited for studying coevolutionary processes, as it is easier to identify defenses and counterdefenses. The Screaming Cowbird, *Molothrus rufoaxillaris*, is a specialist brood parasite that uses almost exclusively a single host, the Greyish Baywing, *Agelaioides badius*. This host exhibits a variety of antiparasitic defenses that allow it to reduce the costs of parasitism. These defenses include differential recognition and aggression towards parasites, egg protection during the parasitic events, rejection of parasitic eggs, and discrimination of nestlings and fledglings from the parasite through their vocalizations and plumage coloration. In turn, the parasite exhibits a variety of counterdefenses, including prospecting host nests, rapid pre-dawn egg laying, innate vocal mimicry of nestlings, and vocal and visual mimicry of fledglings. These morphological and behavioral adaptations allow the parasite to efficiently exploit the parental care of its foster parents. These reciprocal adaptations illustrate why interactions between brood-parasitic birds, and their hosts are a model system for the study of coevolutionary processes.

A02

Opening Lecture

NATIVE NATURAL ENEMIES AS ALLIES FOR THE SUSTAINABLE AND RATIONAL MANAGEMENT OF THE CORN LEAFHOPPER, *Dalbulus maidis* (HEMIPTERA: CICADELLIDAE)

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The leafhopper *Dalbulus maidis* causes significant economic losses in the Americas, both through direct damage and by transmitting the disease known as “corn stunt”. It is a monophagous species that coevolved with maize since its domestication (≥ 8000 years ago). Traditionally, its populations were limited to the maize growing cycle (4–5 months in the field), surviving the rest of the year as adults sheltered in the surrounding vegetation. In the past decade, the use of high-yielding maize germplasms tolerant to variable environmental conditions has extended the crop cycle, creating favorable conditions for *Dalbulus maidis* population growth. This situation, combined with other environmental factors, led to a population outbreak of the pest during the 2023–2024 season, resulting in severe economic losses for farmers. The response to this issue—partly promoted by government institutions and agribusiness companies—has largely relied on synthetic insecticides and some biological products. However, their efficacy has been limited (25–55%) due to the insect's coverage with brochosomes and its constant grooming behavior. In Argentina, numerous native natural enemies affect vector populations, including several entomopathogenic fungi, 29 species of arthropod predators, and 28 insect parasitoid species. The role of predators has not yet been quantified, but it is likely to be key in controlling overwintering adults. Egg

parasitoids are the most effective, reaching 40–70% mortality in subsistence farming systems (without insecticide use) and up to 15% in chemically treated commercial fields. These parasitoids interrupt the epidemiological cycle by preventing the emergence of nymphs. Parasitoids of nymphs and adults have a lower impact (<3%), but their contribution is still noteworthy. In Argentina, the complex of natural enemies of the vector is diverse and significant; however, current agricultural practices—based on the intensive use of agrochemicals—limit their effectiveness. Therefore, for the sustainable control of this pest, it is recommended to adopt rational farming practices that support the conservation and activity of natural enemies in maize crops.

SYMPOSIUM: “MICROBIOME REVOLUTION: FROM SOIL TO BOWEL”

A03

INTESTINAL GLYCOBIOLOGY AS A CRUCIAL FACTOR IN REGULATING MICROBIOTA

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Introduction: Therapies involving microbiota modulation (probiotics, prebiotics, synbiotics, and fecal matter transplantation) have progressed to preclinical and clinical stages in inflammatory bowel diseases (IBD), reducing inflammation and increasing microbial diversity. However, several key challenges remain; among them, how to standardize these treatments, ensure long-term efficacy, and account for individual microbiota differences. Direct study of the microbiota has revealed several limitations, including the difficulty in culturing anaerobic bacteria, which hampers their characterization. In turn, the host controls intestinal inflammation through mechanisms that include maintaining the epithelial barrier and detecting microorganisms via pattern recognition receptors; disruption of these mechanisms can lead to pathological inflammation. Several relevant pathways controlling microbiota involve glycans present in soluble macromolecules, on the surface of host cells or bacteria, which, by interacting with evolutionarily conserved proteins (lectins), trigger various biological and immunological effects. Objectives: To determine the relevance of two host glycobiological pathways that could contribute to dysbiosis in intestinal inflammation: the sialylation of secretory IgA and the expression of Galectin-4 (Gal-4), a lectin with antibacterial activity. Methodologies: The influence of both glycobiological pathways was studied through in vivo experiments with WT mice as well as genetically modified animals specifically devoid of: Gal-4 in the intestinal epithelium (Villin-cre Gal4 f/f) and St6Gal1, enzyme responsible for $\alpha(2,6)$ sialylation of IgA in B cells (Cd19-cre St6gal1f/f) and plasma cells (Aicda-cre St6gal1f/f). In vitro experiments including organoids, as well as transcriptomic and glycomic analysis of samples from ulcerative colitis patients were also performed. Results and Conclusions: Intestinal inflammation alters the sialylation of secretory Immunoglobulin A and the expression of Galectin-4, influencing the inflammatory process.

A04

ALTERATION OF THE MRP2-DEPENDENT INTESTINAL BIOCHEMICAL BARRIER IN METABOLIC PATHOLOGIES: POSSIBLE MODULATORY ROLE OF THE MICROBIOTA

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The intestinal microbiota (IM) plays a crucial role in modulating host physiology, and its disruption (dysbiosis) has been linked to various diseases, including metabolic syndrome (MS) and obesity. These conditions can affect the pharmacokinetics of drugs used to manage their associated comorbidities. Mrp2, an essential ABC transporter of the intestinal biochemical barrier, restricts the absorption of toxic contaminants and orally administered drugs, thereby modulating their bioavailability. This presentation aims to provide insights into the potential role of the

IM as a key factor, together with candidate downstream mediators, in regulating Mrp2 in metabolic pathologies. To address this, rodent models of MS or obesity were established through high-fructose or high-fat diets (HFD). During the final phase of the dietary interventions, animals received supplementation with geraniol (antioxidant/anti-inflammatory) or inulin (prebiotic), respectively. In both models, we assessed metabolic parameters, paracellular barrier integrity, inflammatory cytokines, and oxidative stress (OS). Mrp2 expression was analyzed at both the protein and mRNA levels, and its activity was evaluated using the everted intestinal sac model. In the obesity model, the composition of the IM was also characterized. We observed intestinal inflammation and OS in both models, and HFD-induced dysbiosis. These alterations were associated with significant downregulation of Mrp2 expression and activity. Supplementation with geraniol or inulin attenuated inflammation and OS, and inulin additionally restored IM composition. These beneficial effects correlated with normalization of Mrp2 expression and activity. Collectively, our findings provide the first evidence that intestinal dysbiosis, inflammation, and OS constitute a central regulatory axis for Mrp2 in metabolic pathologies, with the IM serving as a key modulatory factor.

A05

INTEGRATING DIET, MICROBIOME, AND METABOLISM TO STUDY INTESTINAL MUCOSAL INFLAMMATION

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Inflammatory bowel disease (IBD), which includes ulcerative colitis (UC) and Crohn's disease (CD), presents a complex multifactorial pathogenesis. The incidence of IBD in Argentina is accelerating, with a distribution of 7 UC cases for every 1 CD case. To characterize the gut microbiome, dietary patterns, and metabolomic profile in IBD patients from Córdoba, Argentina, to understand intestinal inflammation and identify diagnostic and therapeutic biomarkers for IBD. Methodology: Stool samples from IBD patients and healthy controls were analyzed by 16S rRNA sequencing and NGS for microbiome characterization, followed by analysis using R software and detection of pathogenic bacteria by IgG-binding fractionation. Dietary analysis was performed by a daily survey for a week to define the diet of IBD patients compared to healthy individuals using the Nutrio spreadsheet, and urinary fatty acids were assessed by gas chromatography-mass spectrometry with metabolomic analysis using MetaboAnalyst 6.0. Patients with CD showed reduced microbial diversity compared to healthy individuals and specific pathogenic species bound to IgG. Dietary analysis revealed lower consumption of whole grains, cheese, and fiber, with higher meat consumption in patients with IBD compared to healthy individuals. Metabolomic analysis identified distinct profiles capable of discriminating IBD patients from healthy controls with high predictive value. The integration of microbiome, diet, and metabolomics analysis allows for a novel characterization of IBD, identifying potential biomarkers for disease diagnosis and monitoring, as well as potential specific therapeutic targets for patients with IBD in Argentina.

A06

**MICROBIAL METABOLITES: SUSTAINABLE INNOVATION IN BIOREMEDIATION,
BIOCONTROL AND FOOD BIOPRESERVATION**

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The search for natural products with biotechnological potential has become a strategic area due to the need to replace costly synthetic additives and reduce the environmental impact of production processes. Microbial metabolites, such as surfactants, exopolysaccharides, and antimicrobial compounds, emerge as valuable alternatives in agriculture, the food industry, and bioremediation, although their exploitation from local biodiversity remains limited. This study presents advances in three complementary lines. First, the production of exopolysaccharides (EPS) by *Bacillus atrophaeus* under different culture conditions was investigated. Sucrose, as well as the presence of Cu(II) and Cr(VI), enhanced yield. The EPS exhibited a molecular weight of 226 kDa, thermal stability up to 225 °C, and selective affinity for Cu(II), highlighting their potential in heavy metal bioextraction. Second, the optimization of biosurfactants (BS) using chemometric tools reduced production costs by 50% without compromising emulsification efficiency. In addition, BS displayed antifungal activity against *Fusarium graminearum*, *Colletotrichum acutatum*, and *Botrytis cinerea*, confirming their potential as biocontrol agents. Finally, the antifungal activity of cell-free kefir supernatant (KS) and an ethanolic garlic extract (GE) was analyzed. KS showed greater thermal stability than GE, while both retained activity under acidic pH and in the presence of up to 2.5% salt. Combined assays revealed a synergistic effect of KS and GE against *Penicillium olsonii* and *Aspergillus tritici*, reinforcing their applicability in food biopreservation. Overall, these results underscore the relevance of *B. atrophaeus* and microbial consortia as sources of multifunctional bioproducts. Optimizing their production and exploring synergistic interactions represent key steps for industrial application and the development of more efficient and sustainable technologies.

A07

**MICROBIOME ANALYSIS AS AN INDICATOR OF FRUIT QUALITY AND VIABILITY:
POSTHARVEST EFFECTS ON BLUEBERRIES FROM TUCUMÁN, ARGENTINA**

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High-throughput sequencing has become a key tool for monitoring agricultural ecosystems, soils, and plants. Culture-independent methods such as metabarcoding allow comprehensive characterization of microbial communities, offering critical insights into their roles in plant health, product quality, and postharvest performance. Accurate identification of microbial diversity, combined with rapid monitoring, is essential to detect emerging pests and pathogens, assess ecosystem health, and provide evidence for improved management practices. In fruits, metabarcoding enables the identification of microbial biomarkers linked to health status and the selection of beneficial taxa with potential applications in biocontrol and sustainable agriculture. Postharvest treatments, including washing, waxing, and cold storage, were shown to reshape bacterial and fungal communities, influencing both pathogen proliferation and the persistence of beneficial microorganisms. In blueberries from Tucumán (Argentina), metabarcoding revealed that freshly harvested fruits harbored greater bacterial diversity, with *Methylobacterium* and *Bacillus* as key biomarkers associated with plant health promotion. Conversely, postharvest fruits showed increased fungal diversity, including cold-tolerant pathogens such as *Botrytis caroliniana* and beneficial yeasts like *Vishniacozyma victoriae* and *Sporobolomyces roseus*. Overall, these results highlight microbiome-based approaches as innovative tools to guide biocontrol strategies and optimize postharvest practices. Such applications may balance pathogen suppression with the promotion of beneficial microorganisms, thereby improving fruit quality, safety, and sustainability.

POSTER PRESENTATIONS

A08

ECOTOXICOLOGICAL TRIALS OF AN AQUEOUS EXTRACT OF *Nicotiana glauca* USING ZEBRAFISH (*Danio rerio*) EMBRYOS

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Zebrafish (*Danio rerio*) is widely used as a model organism at both embryonic and adult stages. Its genome shares approximately 70% similarity with the human genome, making it an ideal choice for assessing the toxicological risks of compounds that may affect human health. Previous trials demonstrated repellent and insecticidal properties of an aqueous extract of *Nicotiana glauca* (Ng) obtained by infusion. The objective of this study was to analyze the teratogenic effects of Ng on early zebrafish embryonic development. Groups of 20 embryos were exposed in triplicate to different dilutions of Ng in aquarium water (100%, 50%, 25%, and 12.5% w/v), and development was monitored for 120 hours post-fertilization. As a positive control, dimethyl sulfoxide was validated in prior trials using the same methodology (3Rs principle), while aquarium water served as the negative control. Experiments were conducted at 27 °C in compliance with institutional bioethical regulations (CICUAL N° 068-2022). Results revealed significant differences in embryonic viability among Ng-treated groups ($p < 0.05$), demonstrating dose-dependent lethality. At higher concentrations (100% and 50%), coagulated eggs, necrosis, and arrested embryonic development were observed. At lower concentrations (25% and 12.5%), survival rates were significantly higher; however, embryos exposed to 25% also exhibited alterations in key developmental parameters, such as reduced hatching rate, impaired motility, and abnormal optic vesicle formation. This study provides preliminary evidence of the embryotoxicity of this natural product in *Danio rerio* laying the groundwork for future research that evaluates its safety and efficacy in phytosanitary applications.

A09

SYNTHESIS AND APPLICATION OF ZnO-Ce 3% AND 6% MIXED OXIDES FOR SUNLIGHT-INDUCED PHOTOCATALYTIC DEGRADATION OF RHODAMINE B AND SUBSEQUENT PHYTOTOXICITY EVALUATION IN *Lactuca sativa* SEEDS

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Emerging pollutants, particularly synthetic dyes discharged by the textile and food industries, pose an environmental challenge due to their stability, toxicity, and resistance to conventional wastewater treatment methods. In response to this issue, advanced oxidation processes, such as photocatalysis, offer sustainable and efficient alternatives. The objective of this research was to synthesize cerium-doped mixed zinc oxides (ZnO-Ce 3% and 6%) from inorganic complexes prepared by wet chemical methods and subjected to pyrolysis, to evaluate their ability to degrade Rhodamine B (RhB) dye by solar photocatalysis, and to analyze the phytotoxicity of the degradation products on *Lactuca sativa* seeds. The oxides were characterized by X-ray diffraction, Fourier-transform infrared spectroscopy, scanning electron microscopy, energy-dispersive X-ray spectroscopy, and photoluminescence (XRPD, FTIR, SEM, EDS, and PL, respectively), confirming the correct incorporation of Ce⁴⁺ and the formation of homogeneous crystalline structures. In solar photocatalysis tests, the materials achieved complete RhB degradation in less than 30 minutes, maintaining their efficacy and structure after four reuse cycles. Phytotoxicity bioassays revealed that untreated RhB solutions inhibited radicle and hypocotyl growth, whereas the photocatalyzed solutions exhibited behavior comparable to that of the mineral water control. Statistical

analysis of the data using RStudio and Minitab (boxplot and Tukey tests) confirmed significant differences between groups, demonstrating the decrease in toxicity after treatment.

In conclusion, the pyrolysis synthesis of inorganic complexes allowed obtaining active, stable, and reusable photocatalysts, capable of efficiently degrading RhB and reducing the toxicity of by-products, highlighting the potential of ZnO-Ce oxides for the sustainable treatment of wastewater polluted with organic dyes.

A10

STUDIES ON PHYSICAL AND CHEMICAL STABILITY OF DERMAL CREAMS CONTAINING FRUIT EXTRACTS OF *Eugenia uniflora* L.

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INTRODUCTION: *Eugenia uniflora* L. fruits are a source of antioxidant and nutraceutical compounds due to their calcium, phosphorus, anthocyanins, flavonoids, carotenoids, and vitamin C content. Extracts prepared from them are used to make dermocosmetic creams. The stability of creams is crucial to ensure they maintain their properties and efficacy over time, as well as for predicting the product's behavior during storage, transportation, and use, and for detecting possible alterations that could compromise their integrity. **OBJECTIVES:** To conduct a stability study on dermal creams formulated with *Eugenia uniflora* L. fruit extract. **MATERIALS AND METHODS:** The creams consist of an internal (oily) phase and an external (aqueous) phase. The stability of the extracts was determined in three creams (F1: blank, F2: aqueous extract and F3: hydroalcoholic extract). The creams were packaged in 50 ml polyethylene bottles. They were subjected to room temperature (20°C and 40% RH) for 180 days, and (37°C and 20% RH) for 90 days. Organoleptic tests (color, odor, and appearance), physical tests (pH, extensibility), chemical tests (quantification of total phenols, flavonoids and anthocyanins using spectrophotometric methods) were performed on the formulations at different times. **RESULTS:** The results showed that the creams at room temperature manifested good stability up to 180 days. The most stable product was determined to be the one made with the hydroalcoholic extract of the fruits studied. The color, aroma, and appearance remained stable over the study period. After 180 days, the creams had a pH of 5.5 and good spreadability. The total polyphenol, flavonoid, and anthocyanin content remained within the parameters. **CONCLUSIONS:** Low chemical degradation was demonstrated during the tested period, and it was concluded that the formulation with the hydroalcoholic extract had greater stability.

A11

EFFECTS OF *Vaccinium corymbosum* O'NEAL VARIETY EXTRACT ON THE GROWTH OF *Staphylococcus aureus* AND *Escherichia coli*

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Vaccinium corymbosum (blueberry) is a fruit with recognized antimicrobial properties that may help combat pathogenic bacteria. Its regular consumption is associated with benefits for urinary health, and its potential use as a natural preservative in the food industry has attracted interest within the scientific community. The objective of this study was to evaluate the effect of the O'Neal variety extract of *V. corymbosum* on the growth of *Staphylococcus aureus* and *Escherichia coli*. **Materials and Methods:** A hydroalcoholic extract (ethanol:sterile water 70:30) was prepared from the fruits, and phenolic compounds were quantified. From the stock solution (100%), dilutions of 75% and 50% were prepared. Antimicrobial activity was assessed using the agar diffusion

method (Kirby–Bauer), applying 50 µL of extract into 6-mm wells on Mueller–Hinton agar plates inoculated with *S. aureus* and *E. coli* (adjusted to 0.5 on the McFarland scale). Gentamicin disks were used as controls. Plates were incubated at 37 °C for 18 hours, and inhibition zones (mm) were measured. Statistical analysis was performed using ANOVA. Results: The 100% extract showed the highest antimicrobial activity, with inhibition zones of 14.27 mm for *S. aureus* and 11.80 mm for *E. coli*. The 50% concentration showed the lowest values: 10.16 mm and 9.10 mm, respectively. The gentamicin control produced inhibition zones of 13.30 mm (*S. aureus*) and 14.83 mm (*E. coli*). ANOVA indicated significant differences among the evaluated concentrations, with the 100% extract being the most effective. Conclusions: The extract of the O’Neal variety of *Vaccinium corymbosum* exhibited antimicrobial activity against *S. aureus* and *E. coli*, showing greater effectiveness against *S. aureus*. Differences in inhibition zones were statistically significant according to extract concentration and the bacteria evaluated.

A12

PREVALENCE AND DISTRIBUTION OF DENTAL PATHOLOGIES TREATED IN THE DENTAL EMERGENCY DEPARTMENT FROM JANUARY TO AUGUST 2025 AT PADILLA HOSPITAL

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Dental diseases are highly prevalent and affect life quality, work performance, and overall health. In Tucumán, the low rate of preventive care leads to delayed consultations in the emergency department, which are oriented toward pain relief than prevention. This scenario makes the Dental Emergency Service of Angel C. Padilla Hospital a key space not only for urgent care, but also for the early detection of stomatological lesions with tumor behavior. The aim of this study was to determine the prevalence and distribution of dental pathologies treated between January and August 2025. Materials and Methods: a descriptive, retrospective study was conducted based on records from the Hospital Management System, analyzing sociodemographic variables, frequency of consultations, and diagnoses. Ethical standards were followed, ensuring patient anonymity. A total of 4,262 consultations were recorded, with a monthly average of 533 and a daily average of 18, representing a 53% increase compared to the same period in 2024 (N=2,735). Of the patients, 58% were women, with a median age of 31 (P25=24; P75=43). Results: 90% of diagnoses corresponded to ten categories, the most prevalent being: unspecified consultation (48.9%), pulpitis (14.7%), periapical abscess without fistula (11.6%), and alveolitis (3.9%). From the remaining 1%, (3.2%) corresponded to oral cavity tumors and (1.6%) to potentially malignant disorders. Although less frequent, these cases constitute findings of great clinical and epidemiological relevance. Conclusion: the dental emergency department constitutes an essential epidemiological indicator to identify the main urgent conditions, optimize resources, and plan care strategies. This highlights the importance of early detection of stomatological and tumoral lesions, requiring timely referral protocols, professional training in early diagnosis, and the promotion of a preventive culture among the population.

A13

ANALYSIS OF THE PREVALENCE OF PATHOLOGIES IN ORAL TISSUES TREATED AT THE STOMATOLOGY TRAINING PROGRAM AT ANGEL C. PADILLA HOSPITAL

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Pathologies in the oral soft tissues encompass a broad spectrum of clinical conditions that affect the oral mucosa, gum, tongue, and other soft tissue structures. These conditions can be of infectious, traumatic, neoplastic, or autoimmune origin, and their prevalence is significant in daily stomatologic practice. The objective of this research was to describe and analyze the different pathologies on soft tissue of the mouth that were treated during the Stomatology training at the Ángel C. Padilla Hospital between March and July 2025. Materials and Methods: a retrospective observational study was conducted, based on records from the Hospital Management System, intraoral photographs and biopsies, applied to 23 patients of both sexes, aged 14 years and older. All cases of soft tissue pathologies of the mouth diagnosed clinically and histopathologically were included, taking into consideration variables such as age and sex. Cases with incomplete data or related to hard tissues (dental cavities) were excluded. The classification of pathologies followed the World Health Organization (WHO) criteria for oral diseases. The study complied with ethical standards, ensuring the anonymity of patients. Among the results, the most prevalent pathologies were infectious diseases at 39%, followed by autoimmune and tumor diseases at 26%, and traumatic diseases at 9%. 57 % of patients were women, and 35% of patients aged 54–64 years presented with a high number of diseases. The results highlight the need to integrate early detection protocols into training programs. In conclusion, the training program not only serves as an educational platform but also as a source of valuable data to improve clinical practice and reduce the burden of oral diseases.

A14

NATURAL EXTRACTS OF *Schinus molle* WITH ANTIOXIDANT POTENTIAL FOR ‘CLEAN LABEL’ AND SUSTAINABLE FORMULATIONS IN THE FOOD INDUSTRY

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Oxidative stress, caused by the proliferation of free radicals, is a key factor in the etiology of various human pathologies. In this context, the search for natural antioxidants derived from plant sources has gained unprecedented relevance. This study aimed to evaluate the total antioxidant activity and the preliminary phytochemical profile of *Schinus molle* (molle or peppertree) fruits. Ethanolic extracts (EE) were obtained from the fruits, and a phytochemical screening was performed. Subsequently, total phenolic and flavonoid contents were quantified. Antioxidant activity was evaluated through the DPPH free radical scavenging trials, lipid peroxidation inhibition (β -carotene/linoleic acid system), and power reducer. The phytochemical analysis of the EE revealed the presence of secondary metabolites of significant interest, such as tannins, flavonoids, anthocyanins, triterpenes, quinones, saponins, and anthracenoids. Regarding antioxidant activity tests, the ethanolic extract showed 88.08% DPPH radical scavenging activity (at 500 μ g/ml) and 10.94% inhibition of lipid peroxidation (at 500 μ g/ml). No activity was observed in the power reducer. A positive correlation was confirmed between the total phenolic content and the observed antioxidant activity. These findings demonstrate that *S. molle* is a promising source of secondary metabolites with significant antioxidant potential. Future studies are required to isolate and identify the bioactive compounds responsible for this activity, evaluate their safety, and determine their potential application as natural additives in the development of healthy and sustainable foods.

A15

EFFECT OF THE OSMOTIC DEHYDRATION PROCESS ON THE QUALITY OF *Sechium edule* (JACQ.) SWARTZ FRUIT SNACKS

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Fruits of *Sechium edule* (Jacq.) Swartz, commonly known as chayote or vegetable pear, have gained wide consumer acceptance and are recognized for their nutritional and biofunctional properties. Currently, there is an increasing demand for nutritionally enriched, fortified, and functional foods, which has stimulated interest in applied food science. Within this framework, attention has turned to plant-based snacks prepared without frying due to their lower caloric density compared with dehydrated and fried potato products. However, conventional high-temperature drying methods can, in some cases, lead to the loss of bioactive compounds. Therefore, there is a growing need to explore new processing techniques. The aim of this study was to evaluate the physical, chemical, and sensory properties of chayote snacks produced by: (1) hot-air drying (HAD) at 60°C or (2) a combined osmotic dehydration (OD) process with sodium chloride followed by a hot-air drying step (OD+HAD). The quality parameters evaluated included antioxidant activity, phenolic compounds, carotenoids, sugars, acidity, color, sensory acceptability, and hygroscopicity of snacks obtained through both methods. Depending on the sodium chloride concentration used (0.5, 1, and 2%), the OD stage reduced the initial moisture content of the vegetable by 15–30%. Applying an OD pretreatment prior to hot-air drying did not affect the acidity (150–159 mmol H⁺·kg⁻¹), sugars (520–588 g·kg⁻¹), or phenolic compound content (9317–10282 mg·kg⁻¹) in the final product. Snacks produced by the combined OD+HAD method exhibited improved color and sensory acceptability, and lower hygroscopicity, compared with those produced solely by HAD. The results indicate that the combined treatment yields chayote snacks with superior physical (color, hygroscopicity), nutritional (carotenoids), and sensory (acceptability) properties compared with conventional hot-air drying alone.

A16

POSSIBLE ASSOCIATION BETWEEN DIABETES MELLITUS AND THE TRANSFORMATION OF ORAL LICHEN FROM THE WHITE TO THE RED VARIANT

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Oral Lichen Planus (OLP) is a chronic inflammatory disease of the oral mucosa. It manifests as asymptomatic reticular white patches (white oral lichen) or as painful atrophic, erosive, or blistering lesions (red oral lichen). Red oral lichen is classified as a potentially malignant disorder, with a risk of developing oral squamous cell carcinoma. Its etiology is uncertain, but it involves to a T lymphocyte immune response against basal keratinocytes. Diabetes Mellitus (DM) has been suggested as a possible factor that induces the transformation of white OLP into red OLP, although the evidence is limited. Materials and Methods: a retrospective observational study was conducted on patients who attended the Oral Medicine Service from 2020 to 2025. Patients with a clinical and histopathological diagnosis of OLP, with or without a diagnosis of diabetes, were included. Patients with a histopathological diagnosis of dysplasia and squamous cell carcinoma were excluded. Of a total of 727 medical records reviewed, 16 met the inclusion criteria: 75% were female and 25% male, with an age range of 25 to 95 years, with a predominance in the 65 to 75-year-old group (31.25%). Five patients (31.25%) had diabetes mellitus, while 11 (69%) did not. OLP cases were classified as typical and atypical, identifying 3 typical cases (19%) and 13 atypical cases (81%). The most frequent sites were buccal mucosa (81%), followed by the tongue (13%) and gums (6%). All diabetic patients were diagnosed with red oral lichen. Results: in the total sample analyzed (n=16), diabetes was present in patients with red OLP, but not in those with white OLP. The possible association between DM and the transformation to red OLP was analyzed using Fisher's exact test, which did not

show a statistically significant association ($p = 0.51$). The adjusted odds ratio was 4.53 (95% CI: 0.19-105.85), indicating a possible trend toward a higher risk of red OLP in diabetic patients. However, the wide confidence intervals reflect the low power of the study. Conclusion: a possible trend towards a higher frequency of transformation from white to red OLP in patients with diabetes mellitus is suggested, although the association did not reach statistical significance, likely due to the small sample size. Studies with greater statistical power are needed to confirm this relationship.

A17

ANTIMICROBIAL ACTION OF CHAMOMILE EXTRACTS ON ORAL MICROBIOTA

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The inflorescences of *Matricaria recutita* L. (Asteraceae), known as chamomile, are traditionally used in the treatment of inflammatory oral conditions. These may be caused by microorganisms or by other factors but can become complicated by secondary infections due to the large number of commensal microorganisms in the mouth that may act as opportunistic pathogens. The objective of this study was to evaluate the *in vitro* antimicrobial activity of different chamomile extracts on oral microorganisms. Materials and methods: Aqueous extracts of dried inflorescences at 3%, 5%, and 10%, a 5% hydroalcoholic tincture, and essential oil obtained by hydrodistillation in a Clevenger apparatus were used. The microorganisms tested were *Streptococcus mutans* (Sm), *Streptococcus sobrinus* (Ss), and *Candida albicans* (Ca). These were cultured in Mitis Salivarius Agar (Sm and Ss) and Sabouraud Glucose Agar (Ca). The antimicrobial activity was determined by the agar radial diffusion method. Positive controls consisted of 0.12% chlorhexidine, and negative controls of 96% ethanol. The plates were incubated at 37°C under aerobic conditions for 48 hours, and inhibition zones were measured in millimeters. Results: The essential oil demonstrated significant inhibitory activity, with antimicrobial effects comparable to those of chlorhexidine, showing inhibition halos of 13–14 mm for *C. albicans* and 10 mm for streptococci. Conclusion: The results suggest that the compounds responsible for the antimicrobial activity are the volatile constituents present in the essential oil. Further susceptibility studies on other strains will continue to evaluate the potential use of this natural substance in the prevention and treatment of infectious processes of the oral mucosa.

A18

CHRONOBIOLOGY AND ENVIRONMENT: AN ANALYSIS OF QUALITY OF LIFE IN THE FOUR MACRO-REGIONS OF JUJUY

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The altitudinal and topographic gradient defines four geographical regions in Jujuy, ranging approximately from 400 to 6000 metres above sea level, which determines distinct environments for their population. Aim: the aim of the study was to examine the association between altitude and subjective quality of life of the population in Jujuy. Hypothesis: the hypothesis proposed that altitude influences the perception of well-being. It is assumed that altitude determines differences in light availability (sunshine duration, light intensity, among others), which affect circadian rhythms and, consequently, subjective well-being. Methodology: a total of 325 volunteers were evaluated (Puna: 62, Quebrada: 52, Ramal: 67, and Valles: 144), young adults (aged 18–50) with a neutral chronotype (inclusion criterion), around the solstices of 2022, generating a four-dimensional profile: Physical Health (PH), Mental Health (MH), Social Relationships (SR), and Environment (E), as well as two specific items

on general well-being and personal health perception, using the WHOQOL-BREF (W-B) questionnaire, which has recognised psychometric validity. Statistical analysis: data were analysed using ANOVA and Fisher's test. Results and conclusions: significant differences in W-B scores by dimension were found in three of the four regions studied: in the Puna, greater well-being was observed in summer (in all dimensions); in the Quebrada, no significant differences were found; in the Valles, the E dimension was higher in summer; in the Ramal, general well-being, MH, and E were higher in winter, showing an inverse pattern possibly associated with climatic comfort.

A19

RECURRENT APHTHOUS STOMATITIS: CLINICAL ANALYSIS OF ITS PREVALENCE AND CLINICAL FEATURES

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Introduction: Recurrent Aphthous Stomatitis (RAS) is the most common inflammatory disease of the non-keratinised oral mucosa, with a prevalence ranging from 5% to 66% across different countries. It is characterised by recurrent painful ulcerations classified into three types: minor (80% of cases), major, and herpetiform. Minor aphthae, measuring 3 to 10 mm, typically heal within 10-14 days without scarring and are often preceded by prodromal symptoms such as burning or stinging of the mucosa. Major aphthae exceed 1 cm and may leave scars, while herpetiform aphthae are multiple and can coalesce into large ulcers. Diagnosis is clinical, excluding other conditions that cause recurrent oral ulcerations. First-line treatment consists of short-term topical corticosteroids. The aim of this study was to determine the prevalence of RAS in patients attending Cátedra de Semiología y Clínica Estomatológica at Facultad de Odontología. UNT, also evaluating clinical features, risk factors, age, and sex. Materials and Methods: a descriptive, cross-sectional, and prospective study was conducted in 847 patients treated between 2019 and 2024. Cases of RAS were diagnosed, aphthae were classified, and pain intensity, location, duration, risk factors, and demographic variables were assessed. Results: The prevalence of RAS was 30.5%, with a higher incidence in young adults (20–35 years, 24.4%). Minor aphthae accounted for 91.1%, lasting between 7 and 10 days (37.6%). The most affected areas were the labial mucosa and the floor of the vestibular sulcus (32.9%) in both jaws. Pain was mild in most cases (60%). As a predominant risk factor, psychosomatic disorders were present in all cases (100%). We can conclude that RAS is particularly common in young adults of both sexes, with minor aphthae being the most frequent type of lesion on the labial mucosa and vestibular sulcus in the upper and lower jaws.

A20

EFFECTS OF FERTILISATION WITH CHICKEN LITTER FROM POULTRY FED WITH PROBIOTICS AND GROWTH PROMOTERS ON SOIL MICROORGANISM DIVERSITY

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The use of broiler chicken litter (CL) as an organic fertilizer, is a common practice influenced by UNLu, as it allows the reuse of by-products from poultry farms to improve soil structure and nutrient content. However, CL may alter the soil microbial community, affecting environmental health. The use of probiotics as an alternative to antibiotic growth promoters (AGPs) has gained widespread acceptance, although little is known about their environmental impact. The objective of this study was to evaluate soil microbial diversity in experimental plots sown with wheat for silage and fertilised with CL from birds supplemented either with AGP or with lactic acid bacteria as probiotics (LAB). The CL was obtained from two consecutive trials carried out at UNLu, where Cobb 500 broilers were raised for 42 days. Birds were fed a commercial diet, and one group received zinc bacitracin at

600 g/tonne (AGP), while the other received LAB in drinking water (1×10^7 CFU/L) during the first seven days of life. Composite soil samples were collected at the beginning, one month later, and at the end of the crop cycle for the enumeration of heterotrophic cultivable microorganisms (HCM), fungi, actinomycetes, phosphate solubilizers (PS), and cellulolytic microorganisms, using selective media for each group. Results showed statistically significant differences in cultivable microorganism counts throughout the crop cycle ($p < 0.05$, ANOVA, Tukey) between the two treatments. Towards the end of the crop, both treatments showed a significant decrease in actinomycetes, HCM, fungi, and PS. After one month, the AGP treatment induced a significant increase in cellulolytic microorganisms. Under our experimental conditions, preliminary results indicate that CL from AGP or LAB supplementation exerts differential effects on soil microbial diversity. Further studies evaluating repeated applications are needed to better understand their effect on the soil.

A21

SELECTION OF LACTIC ACID BACTERIA ISOLATED FROM ORGANIC HENS. INHIBITION ON *Salmonella* AND TOLERANCE TO LOW PH AND BILE

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Diseases caused by *Salmonella* spp. are a major concern for global public health. An alternative control strategy for certified organic production systems is the use of lactic acid bacteria (LAB) with antagonistic activity. Twelve LAB strains isolated from chicken guano were evaluated. Using a modified spot-agar method, inhibition was tested against 14 *Salmonella* strains, and an inhibition index was calculated by summing the inhibition halo diameters (mm) for each LAB strain. Acid tolerance was assessed by counting viable cells in phosphate-buffered saline (PBS) at pH 2.4. LAB strains previously reactivated in MRS broth (37°C, 24 h) were collected by centrifugation ($10,000 \times g$, 10 min, 4°C), washed twice with PBS, and resuspended in PBS at pH 7.7. A volume of 0.5 mL of bacterial suspension was added to 4.5 mL of PBS at pH 2.4 or pH 7.7. After 2 h at room temperature, CFU/mL were quantified. Acid resistance was calculated as: $\% R_{pH} = [(CFU/ml)_{pH\ 2.4} \times 100] / (CFU/ml)_{pH\ 7.7}$ (inoculum). Bile tolerance was determined by standardized streaking on MRS agar and MRS agar supplemented with 0.5% bile, using five consecutive streaks without reloading or sterilizing the graduated loop, and incubating at 37°C for 24 h to compare bacterial growth. The inhibition index ranged from 62 to 159 mm. The four strains with the highest indices were strains 4, 21, 3, and 7, with 159, 153, 142, and 130 mm, respectively. Thirteen of the fourteen strains showed survival between 80.14% and 97.55% at pH 2.4; four strains did not tolerate acidic pH. Among the strains with the highest inhibition, survival rates were 80.14% (strain 3), 96.62% (strain 21), and 95.4% (strain 7). All strains showed bile tolerance (similar growth in media with and without bile). Although strain 4 did not tolerate pH 2.4, it exhibited the highest inhibition index and could be considered a candidate for encapsulation. Overall, the selected LAB strains demonstrate high potential for survival in the intestinal tract and for use as probiotic agents.

A22

IMPACT OF THE TIMING OF ARTIFICIAL INSEMINATION ON THE REPRODUCTIVE EFFICIENCY IN A COMMERCIAL DAIRY WITH STATIONARY SERVICE. PRELIMINARY RESULTS

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Artificial insemination (AI) is a commonly used technique to improve reproduction in cattle, and its success depends on several factors, including the timing of insemination. The objective of this study was to preliminarily evaluate the effect of the timing of AI at detected heat on the reproductive efficiency in a commercial dairy farm with stationary service. A total of 431 Jersey breed cows and their crossbreeds were randomly selected from a herd of 2150 animals and subjected to double heat detection and artificial insemination (am-pm) compared with a control group of 1712 animals that were subjected to a single heat detection and artificial insemination during morning milking. Self-adhesive patches (LIC scratch patches) were used to facilitate heat detection. The data obtained were processed using statistical software. Submission, conception, and pregnancy rates were calculated and analyzed between the two groups (Control and Study). The results showed a significant increase ($p \leq 0.00001$) in the insemination rate (80% Study vs 71% Control), with no significant differences found in the rest of the parameters analyzed. In stable herds using AI, the service rate directly reflects the efficiency of heat detection. A higher frequency of heat detection translates into a higher insemination rate (IR) and, consequently, a higher pregnancy rate (PR). Detecting the highest percentage of heats possible during the service period reduces the percentage of empty cows at the end of the reproductive season. Optimizing the timing and frequency of insemination has a significant impact on reproductive efficiency, so implementing the AM/PM rule can improve the dairy's reproductive efficiency and profitability.

A23

TOXICITY IN ALCOHOLIC EXTRACTS OF *Vachellia aroma* AND *Vachellia caven* LEAVES

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Vachellia aroma and *Vachellia caven*, native plants of Argentina, are popularly used as antiseptics, astringents, antibacterials, and antiasthmatics, among other applications. The objective of the study was to compare the cytotoxic and phytotoxic activity of alcoholic extracts from the leaves of *V. aroma* and *V. caven* using bioassays with *Artemia salina* and *Lactuca sativa*. To this end, plant material was collected from georeferenced sites, dried at room temperature, and pulverized. Afterward, methanolic (ME) and ethanolic (EE) extracts were prepared for each plant. Cytotoxicity against the microcrustacean *A. salina* was evaluated in multi-well plates with 10 nauplii, and mortality was counted at 24 h. For the phytotoxicity tests, 20 *L. sativa* seeds were used in Petri dishes, and the inhibitory effect on the percentage of germination, root growth, and hypocotyl growth was quantified after 120 h of incubation in darkness and at room temperature. Both trials were executed in triplicate, using six extract dilutions (from 31.25 to 1000 mg/L) with positive and negative controls. Statistical analysis included Probit and ANOVA. The *V. aroma* exhibited low levels of toxicity against *A. salina* (EE maximum of 14% at 125 mg/L), and the median lethal concentration allowed both extracts to be classified as mildly toxic. Likewise, the *V. caven* extracts considered showed no significant cytotoxicity. The extracts from both plants did not show lethal effects on germination of *L. sativa* germination but exhibited sublethal effects on radicle and hypocotyl elongation. The ME of *V. caven* showed a greater phytotoxic effect on the percentage of root growth (74% at 1000 mg/L), whereas the EE extract of *V. aroma* was the most active in inhibiting hypocotyl growth (60% at 1000 mg/L). Finally, a selective behavior was observed between the plant species, emphasizing the bioactivity of *V. aroma* EE in most of the evaluated parameters.

A24

**PHYTOCHEMICAL ANALYSIS AND QUANTIFICATION OF PHENOLIC CONTENT IN LEAVES
OF *Vachellia aroma* AND *Vachellia caven***

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In search for bioactive secondary metabolites from *Vachellia aroma* (VA) and *Vachellia caven* (VC), native plant species from Catamarca province, a phytochemical characterization was carried out to value them as a key step for their use and revaluation. The aim of this research was to determine the phytochemical profile, the content of total phenolic compounds, and non-flavonoid phenolic compounds in extracts from their leaves. For phytochemical characterisation, aqueous extracts (infusion and decoction) and alcoholic extracts (99.5% ethyl alcohol and methanol) were prepared, and a different protocol was followed for aqueous and organic extracts. For the determination of total phenols, the colorimetric method of Folin-Ciocalteu was used, which is based on the reduction of this reagent by polyphenols, generating a blue complex measured at 765 nm. For the quantification of non-flavonoid phenolic compounds, a polymerization and subsequent separation procedure with formaldehyde and HCl was used, quantifying the non- flavonoids in the supernatant using the same method mentioned. The phytochemical analysis revealed the presence of reducing sugars, carbohydrates, catechin tannins, saponins, anthocyanins, flavonoids, and sterols/triterpene compounds in the aqueous VC and VA extracts; while in the alcoholic VC and VA extracts, catechin tannins, flavonoids, and sterols/triterpene compounds were detected. Regarding the phenolic content, the VC-I extract (infusion) stood out with 79,18 µg EAG/mg dry extract of phenolic compounds, and 17.28 µg GAE/mg dry extract of non-flavonoid compounds and 17.28 µg GAE/mg dry extract of non-flavonoid compounds; and the VA-A extract (alcoholic) with 68.45 µg GAE/mg dry extract of phenolic compounds and 29.22 µg GAE/mg dry extract of non-flavonoid compounds. Finally, similarities were observed in the phytochemical profiles of the extracts according to their type (aqueous or organic), while differences were detected regarding the quantification of total phenols and non-flavonoid phenols among the types of extracts and plant species.

A25

**DIFFERENTIAL REDOX PROFILES BY AGE AND ANEMIA TYPE: NEW EVIDENCE FROM
IRON DEFICIENCY ANEMIA AND BETA-THALASSEMIA TRAIT**

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Iron deficiency anaemia (IDA) and β -thalassaemia trait (BTT) are the most common types of anaemia in clinical practice. Although their pathophysiological bases differ (iron deficiency and globin chain imbalance), oxidative stress may contribute to erythrocyte damage and affect clinical severity. However, evidence on the role of redox biomarkers and their variations according to age is still limited.

Objective: To evaluate systematic behaviour of redox biomarkers in patients with IDA and BTT, and to analyse their association with haematological and iron metabolism variables in adults and children.

Methodology: Sixty-four individuals (36 adults and 28 children) were studied, classified as IDA, RBT and controls (CTRL). Haematological parameters, iron metabolism, capillary haemoglobin electrophoresis and redox markers [malondialdehyde (MDA), nitrites (NO_2^-), superoxide dismutase (SOD), catalase] were determined using spectrophotometric methods. Correlations were analysed using Spearman's correlation coefficient ($p < 0.05$). Results: Eighteen patients with IDA (10 children and 8 adults) and 27 with BTT (10 children and 17 adults) were identified. Adults with IDA showed significantly reduced NO_2^- levels compared to BTT and CTRL. BTT adults

showed a strong positive association between transferrin and MDA ($r_s = 0.75$), which was not replicated in children. In paediatric IDA, ferritin was negatively correlated with SOD ($r_s = -0.70$), suggesting a compensatory antioxidant response. No significant redox differences were observed among the paediatric groups. Conclusion: Redox profiles differ according to age and type of anaemia. The transferrin–MDA association in BTT adults and ferritin–SOD in paediatric IDA represent novel findings that support the hypothesis of a role for oxidative imbalance in the dynamics of haematological disorders. These findings expand the pathophysiological understanding of these anaemias and suggest new approaches for clinical follow-up management.

A26

STIMULATION WITH TYPE II COLLAGEN WOULD INDUCE M2 MACROPHAGES POLARIZATION

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Introduction: Previously, we demonstrated that isolated and purified chicken type II collagen (CII) induces autoimmune arthritis when injected into C57BL/6 mice together with a potent adjuvant. **Objective:** To evaluate whether isolated and purified chicken CII stimulates immune system cells without the cooperation of an adjuvant. **Methods:** Murine macrophages (RAW 264.7 cell line) were seeded in 24-well plates (2.5×10^5 /well) with complete medium and then stimulated with different CII concentrations (25, 50, 100, and 200 $\mu\text{g/ml}$). Experiments included wells without stimulation as controls (C). After 24 h, supernatants were obtained to evaluate glucose, lactate, urea, nitric oxide (NO), and malondialdehyde (MDA). **Results:** Only high concentrations of CII induced a decrease in glucose due to cellular consumption, whereas different concentrations did not significantly induce lactate production. Increasing doses of CII did not produce changes in NO levels but significantly increased urea concentrations (C= $0.64 \pm 0.30 \text{ mmol/L}$, CII25 $\mu\text{g/ml}$ = $1.12 \pm 0.28 \text{ mmol/L}$, CII50 $\mu\text{g/ml}$ = $1.48 \pm 0.55 \text{ mmol/L}$, CII100 $\mu\text{g/ml}$ = $2.26 \pm 0.55 \text{ mmol/L}$, CII200 $\mu\text{g/ml}$ = $3.53 \pm 0.46 \text{ mmol/L}$; $p < 0.0001$, ANOVA) and induced lower lipid peroxidation (MDA). **Conclusions:** Stimulation induces macrophage metabolic reprogramming involving pathways such as glycolysis, oxidative phosphorylation, arginine, and lipid metabolism, leading to a pro-inflammatory M1 or anti-inflammatory M2 state with different functional characteristics. The results demonstrate that CII does not induce glycolytic metabolism (increased glucose consumption with the consequent increase in lactate) or an increase in oxidative stress parameters (NO and MDA) characteristic of M1 differentiation. However, CII stimulation leads arginine metabolism to urea formation, suggesting a differentiation of macrophages towards the M2 phenotype.

A27

CATALASE ACTIVITY AS A BIOMARKER OF OXIDATIVE AND METABOLIC DAMAGE IN CHRONIC KIDNEY DISEASE

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Chronic kidney disease (CKD) is defined as the progressive loss of renal structure and function. Catalase (CAT), an antioxidant enzyme predominantly located in the proximal tubule, protects cells from damage caused by reactive oxygen species. Its reduction alters lipid metabolism, impairs β -oxidation, and promotes the accumulation of lipotoxic species, thereby contributing to kidney injury. The aim of this study was to evaluate, in individuals with susceptibility factors, the predictive value of CAT in CKD progression according to KDIGO guidelines. Forty volunteers (aged 20–70 years old) with hypertension, overweight and/or diabetes were included, and

classified into two groups: “no risk” (G1-A1, G2-A1; n=24) and “at risk” (G1-A2, G2-A2; n=16) for CKD. Clinical history and anthropometric parameters were recorded, blood pressure was measured, and blood and urine samples were collected. CAT activity was determined using the method of Aebi. Values in the at-risk group were lower than in the no-risk group (0.40 vs. 0.80 U·mg⁻¹). No differences were observed between overweight and normal-weight individuals, nor between diabetic and non-diabetic participants. However, in hypertensive individuals, and in those with an elevated TG/HDL ratio and hyperglycaemia, CAT activity was reduced. The decrease in CAT activity under conditions of hypertension and metabolic disturbances may be associated with CKD progression. Further studies should be conducted to position CAT as an early marker of CKD progression and a potential therapeutic target in disease prevention.

A28

ANTIFUNGAL ACTIVITY OF EXTRACTS FROM TWO LICHENS ON PHYTOPATHOGENIC FUNGI OF VINE

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Diseases in vineyards caused by phytopathogenic fungi can lead to severe weakening of the plants and even death. One of the alternatives for controlling pests and diseases in vineyards is the application of chemical fungicides, although these may cause allergic reactions in consumers. Currently, the antimicrobial activity of lichens is well documented. For this reason, the present study aims to evaluate the antifungal effect of compounds from the lichens *Ramalina celastri* and *Usnea amblyoclada* for controlling diseases caused by phytopathogenic fungi such as *Fusarium* sp. and *Botrytis* sp., both of which affect vineyards in the Antinaco–Los Colorados Valley. Pathogenic fungi were isolated from clusters, leaves, and shoots of Torrontés Riojano vineyards located in Malligasta and Anguinán, department of Chilecito (La Rioja Province). Lichen samples were collected in the locality of Guanchín. Control tests were carried out using pure cultures of *Fusarium* sp. and *Botrytis* sp, incubated for 7 days at 25°C. The in vitro assays with the extracts were conducted using the poisoned medium method on Sabouraud agar. The antifungal activity of ethanolic lichen extracts at different concentrations (5, 10, 25, 50, 75, and 100 ppm) of *Usnea/Ramalina* was evaluated using 5 mm discs of *Fusarium* sp. and *Botrytis* sp. After inoculation, Petri dishes were incubated for 5 days at 25°C, and mycelial growth was measured on the final day. Three replicates were performed, with their respective positive controls (commercial fungicide “Carbendazim”) and negative controls (Potato Dextrose Agar, PDA). The results demonstrated that the lichen extracts at the tested concentrations inhibited approximately 90% of in vitro mycelial growth, compared to 95% inhibition observed with the positive control, indicating that these extracts represent an effective biological alternative to chemical control.

A29

PHYSIOLOGICAL RESPONSE OF CITRUS ROOTSTOCKS TO WATER DEFICIT

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Water deficit is one of the main abiotic factors affecting citrus production worldwide, altering water balance, photosynthesis, and cellular stability. This study aimed to characterize the physiological responses of citrus rootstocks subjected to different water-stress regimes at early growth stages. A greenhouse assay was conducted

with seven genotypes: 79AC, 61AA3, 75AB, Sour orange, Rangpur lime, Flying Dragon, and Troyer citrange. Two-month-old plants were subjected to three irrigation regimes: 70% field capacity (FC; control), 35% FC (moderate drought, MD), and no irrigation (severe drought, SD). After 40 days, stress-related parameters were measured. Accumulation of sucrose and proline—compatible osmolytes involved in osmotic adjustment and cellular protection—increased in all genotypes under SD, with 61AA3 showing the highest levels, tripling the control to 60 $\mu\text{mol g}^{-1}$ fresh weight (FW). Peroxide content, indicative of oxidative stress, increased in most genotypes, exceeding 30% over the control in 79AC. Chlorophyll a and b levels did not vary significantly among treatments, suggesting a stable photosynthetic apparatus across genotypes. In contrast, carotenoids increased significantly in 61AA3 and 75AB, reaching 0.50 mg g^{-1} FW, indicating a protective role against oxidative stress, despite the absence of significant differences in leaf area. Collectively, these results describe the behavior of juvenile rootstocks under water deficit and, by revealing adaptive mechanisms among genotypes, provide valuable information for selecting more resilient materials in citrus breeding programs.

A30

MICROENCAPSULATION AND BIOACTIVITY OF EXTRACTS IN THE VALORIZATION OF *Polylepis incana* AS A SUSTAINABLE AGROBIOTECHNOLOGICAL RESOURCE

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Revalorization of native plant extracts has become a key strategy to generate sustainable alternatives in Northwestern Argentina. Many species traditionally used in medicine hold underexplored potential within agronomic systems, where their bioactive metabolites could replace synthetic inputs. In this context, *Polylepis incana* represents a culturally significant species with possible applications in bioproduct development. This study aimed to evaluate the antimicrobial activity of a 70% hydroalcoholic extract against regionally relevant pathogens and to assess the stability of this activity following a microencapsulation process in 1% sodium alginate. Samples were collected in Yocavil Valley, yielding 4.5% extract through maceration, filtration, and evaporation at 40°C. The extracts were tested against *Candida albicans*, *C. parapsilosis*, *Staphylococcus aureus*, *S. epidermidis*, and *Escherichia coli*, showing a mean minimum inhibitory dose of 26,500 $\mu\text{g/mL}$ in diffusion assays. After alginate microencapsulation, the extract exhibited complete inhibition of *C. albicans* growth after 24 h, while *C. parapsilosis* showed a significant reduction compared to the control. Against *E. coli*, bacterial growth was limited to 3×10^8 CFU/mL compared to 8×10^9 in the control, confirming a clear inhibitory effect. In *S. epidermidis*, a partial reduction was observed (5×10^9 vs. 1×10^{10}), whereas *S. aureus* showed no inhibitory effect. From an agronomic perspective, these findings highlight the potential of native species for the development of biotechnological inputs, with applications extending from human health to animal and plant health. This approach promotes the replacement of synthetic chemical products and strengthens productive sustainability through the valorization of local biodiversity.

A31

COMPARATIVE EVALUATION OF BIOACTIVE POTENTIAL OF MEXICAN PLANTS AS A SOURCE OF ANTIMICROBIAL COMPOUNDS

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The increasing prevalence of antimicrobial resistance poses a serious threat to human and animal health, driving the search for alternatives based on natural products. Mexico harbors a wide diversity of plants with ethnomedicinal backgrounds and preliminary reports of antimicrobial activity, although many remain understudied or lack commercial interest. Among these are árnica, pipicha, matalí, and jasmine. Based on this, we aimed to evaluate the antimicrobial activity of methanolic, ethanolic, chloroform, and hexane extracts from these species against clinically and veterinarily relevant pathogens, with the goal of generating evidence to support their use in natural alternative treatments. Extracts were obtained through solid-liquid extraction using different solvents, and their inhibitory capacity was tested against bacteria and yeasts of clinical origin (e.g., *Escherichia coli*, *Pseudomonas aeruginosa*, *Candida albicans*, *C. parapsilosis*), veterinary relevance (enteropathogenic *E. coli* in lambs, *Salmonella* spp. from poultry), and foodborne pathogens (*Listeria monocytogenes*). Results indicated that árnica (methanolic, hexane, and chloroform extracts) and pipicha (ethanolic extract) showed consistent inhibition against *C. albicans*, *C. parapsilosis*, and *P. aeruginosa*, although only at high concentrations (16,000-50,000 µg/mL), suggesting moderate efficacy against these pathogens. In contrast, extracts displayed stronger activity against veterinary strains of *E. coli* and *Salmonella* spp. (400-416 µg/mL), particularly árnica and matalí in non-polar solvents. Likewise, against *L. monocytogenes*, jasmine (hexane extract), árnica, and pipicha proved effective. These findings support the potential of these plant species as sources of bioactive compounds for the future development of eco-friendly solutions applicable in animal health, clinical practice, and food safety.

A32

ANTIMICROBIAL ACTIVITY OF MEDICINAL PLANTS AGAINST ORAL CAVITY BACTERIA

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The oral cavity constitutes a complex microbial ecosystem in which more than 700 bacterial species have been identified. These communities are structured according to the specific microhabitats they colonize and exhibit commensal, opportunistic, or pathogenic functions. Commercial oral antiseptics are frequently associated with adverse effects such as tooth staining, dysgeusia, mucosal irritation, and alterations of the oral microbiota. In this context, herbal medicines represent a promising alternative, as they provide antimicrobial, anti-inflammatory, and wound-healing properties, together with a more favorable safety profile compared to conventional mouth rinses. The aim of this study was to evaluate the antimicrobial activity of the essential oil of *Rosmarinus officinalis* L. (Lamiaceae), and the decoction and tincture of *Vachellia aroma* Seigler & Ebinger (Fabaceae), against clinically isolated oral bacteria *Streptococcus sanguinis* and *Streptococcus oralis* obtained from Hospital Avellaneda. Rosemary essential oil (REO) was obtained from fresh aerial parts through hydrodistillation using a Clevenger-type apparatus. The decoction (DT) and tincture (TT) of dried bark from “tusca” were prepared following the Argentine Pharmacopoeia. The minimum inhibitory concentration (MIC) of the tested samples was determined using the broth microdilution method in 96-well microplates. The tested samples were active against *Streptococcus sanguinis*, with MIC values of 0.047 mg/mL for REO, and 0.088 mg/mL and 0.125 mg/mL for DT

and TT, respectively. *Streptococcus oralis* was susceptible to all extracts, with MIC values of 0.040 mg/mL for REO and 0.250 mg/mL for both DE and TT. The promising results obtained suggest extending the investigation to other strains related to dental caries and periodontal diseases, with the aim of developing phytotherapeutic oral antiseptics.

A33

OCA ROSA METABOLITES PROMOTE THE ANTIVIRULENCE ACTIVITY OF *Lacticaseibacillus paracasei* CO1-LVP105 AS A STRATEGY FOR CONTROLLING FLEECE ROT IN SHEEP

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Fleece rot is a skin disease in sheep. It is primarily caused by *Pseudomonas aeruginosa* and results in a reduction in wool quality due to follicle and fiber damage. Objective: to design two protocols—preventive (P) and treatment (T)—against *P. aeruginosa*, using a culture of *Lacticaseibacillus paracasei* CO1-LVP105 with and without the addition of an ethyl acetate subextract (EAS) from *Oxalis tuberosa* peels, and to evaluate the effects on wool through monitoring by optical microscopy, scanning electron microscopy (SEM), and stereomicroscopy. In the preventive protocol (P), wool was treated with an overnight culture of *L. paracasei* CO1-LVP105, either activated with EAS or non-activated, for 24 h. Subsequently, an overnight culture of *P. aeruginosa* PAO1 was inoculated and incubated for different periods to evaluate modifications in fiber ultrastructure by SEM. In the treatment protocol (T), wool was first contaminated with *P. aeruginosa* and then treated with *L. paracasei* CO1-LVP105 (activated with EAS or non-activated) for different times. Samples were collected for SEM processing and analysis. Colony-forming units (CFU), biofilm formation, and virulence pigments were quantified. Results demonstrated that, in protocol P, contact between wool and the activated culture of non-pathogenic sheep-derived bacteria prevented the adhesion of *P. aeruginosa*, thus inhibiting the establishment of *fleece rot*. In protocol T, the sheep bacteria activated with EAS produced a marked clearance effect on the pathogenic microbiota in contaminated wool, eliminating both biofilm and virulence pigments. The enhanced anti-virulence effects of *L. paracasei* CO1-LVP105—a strain that exhibits surfactant activity and detoxification of phenolic disinfectants—may be attributed to flavonoids, phenolics, coumarins, and other compounds previously identified in the peels of this Andean tuber by our research group.

A34

INFLUENCE OF THE ENVIRONMENT ON THE CLOACAL MICROBIAL COMPOSITION OF *Leptodactylus chaquensis*

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In anurans, the reproductive, urinary, and digestive systems converge in the cloaca, so their microbiotas are closely linked and exchange microorganisms with skin microbiota. This suggests that the cloaca reflects the combined influence of the intestinal, urogenital, and environmental microbiota. Our objective was to determine the composition of the cultivable cloacal microbiota in male *Leptodactylus chaquensis* collected from their natural habitat and kept in captivity (G2), and to correlate it with previous findings in specimens captured in their natural habitat (G1), to evaluate the impact of the environment on these bacterial communities. G2: Adult males (n=4) were collected from their natural habitat in Agua Azul (Leales) and kept for 30 days in captivity under controlled conditions. Samples obtained from the cloaca, under sterile conditions, were cultured on Blood, MacConkey,

CLED, and Azide agar. Differentiable colonies were characterized by GRAM staining and re-isolated for subsequent identification by MALDI-TOF MS. The results were compared with those of G1, whose samples were taken immediately after their capture in Agua Azul. In G2, 16 of 20 isolates were identified: *Pseudomonas aeruginosa* (4), *Bacillus* sp. (3), *Staphylococcus epidermidis* (4), *Proteus* sp., *P. mirabilis*, *Escherichia coli*, *Klebsiella* sp., and *K. pneumoniae*. Qualitatively, G2 presented a notably lower number and variety of colonies in pure sample cultures compared to G1, where representatives of the genera *Pseudomonas*, *Citrobacter*., *Acinetobacter*, *Enterobacter*, and *Salmonella* predominated. These data suggest that the cloacal microbiota of *L. chaquensis* is influenced by the environment. Captivity reduced the overall diversity, but preserved genera common to wild anurans, while also favoring colonization by bacteria typical of anthropized environments. These findings constitute the first evidence of the effect of environmental factors on the cultivable cloacal microbiota of this species.

A35

UTILIZATION OF *Neltuma ruscifolia* LEAVES THROUGH MICROENCAPSULATION BY SPRAY DRYING WITH DIFFERENT CARRIERS: PHYSICOCHEMICAL, FUNCTIONAL AND ANTIFUNGAL PROPERTIES

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Vinal (*Neltuma ruscifolia*) is a problematic weed whose leaves yield ethanol extract rich in phenolic compounds, with functional and medicinal properties. This study evaluated the microencapsulation of the extract by spray drying, using maltodextrin (MD) alone or combined with 1.5% or 3% arabic gum (AG), to improve its handling, stability, and bioactivity. The mixture was atomized in a spray dryer with an inlet temperature of 160 °C and an outlet temperature of 75 °C. Moisture content, water activity, solubility, hygroscopicity, morphology (SEM), thermal stability (TGA/DTG), chromatographic profile (HPLC-DAD), antioxidant activity (DPPH), and antifungal activity against *Fusarium* and *Aspergillus* strains were analyzed. The formulations showed low moisture (<5%), low water activity (<0.3), and high solubility (≥98%), ensuring stability and easy reconstitution. Increasing AG concentration reduced the powder yield (from 76.5% to 68.4%) and increased hygroscopicity, being the highest in the 3% AG formulation (15%). The formulation with 1.5% AG exhibited the highest total phenolic content (3270 ± 9 µg GAE/g), encapsulation efficiency (78%), and antioxidant activity (IC₅₀ DPPH = 0.95 mg/ml). SEM revealed small, wrinkled particles in the MD and 1.5% AG formulations; the 3% AG formulation also showed broken particles. TGA/DTG indicated greater thermal stability in encapsulated extracts (peaks >348°C). HPLC-DAD showed greater retention of bioactive with 1.5% AG. In antifungal trials, the 1.5% AG formulation retained 85-90% of the extract's inhibitory activity against food spoilage fungi. Microencapsulation with 1.5% AG produced stable and bioactive powders, expanding the use of *N. ruscifolia* leaves in food applications.

A36

ANTIFUNGAL ACTIVITY OF ESSENTIAL OIL AND DICHLOROMETHANE EXTRACT OF *Xenophyllum rosenii* (SENECIONEAE, ASTERACEAE), AND ITS METABOLITE 7-METHOXYTREMETONE

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Fusarium species cause cereal rots. New metabolites or extracts are needed as a basis for developing antifungal agents capable of controlling them. Recently, we determined the composition of the essential oil of *Xenophyllum rosenii* (Asteraceae), a high-Andean subshrub native to northwestern Argentina with potential medicinal properties, and isolated 7-methoxytremetone from the dichloromethane extract of its aerial parts. In this study, we evaluated the antifungal activity of the essential oil and the dichloromethane extract of the aerial parts of *X. rosenii* against *Fusarium* species, further investigated their mode of action and combined effects with tebuconazole. Antifungal activity was evaluated by dot-blot bioautography. The antifungal effect with tebuconazole was assessed through isobolographic analysis, and membrane permeability was determined by the exogenous ergosterol trial. 7-Methoxytremetone showed the highest antifungal activity (minimum inhibitory dose, MID = 10–20 µg), surpassing both the essential oil and the dichloromethane extract. It also exhibited synergism with tebuconazole, while the extract showed an additive effect. The exogenous ergosterol trials indicated that both the extract and tebuconazole primarily affected membrane permeability, whereas 7-methoxytremetone had a milder effect. 7-Methoxy-tremethron deserves further study due to its antifungal mechanism and potential as a synergistic agent in the development of new antifungal pesticides.

A37

IMPACT OF A PLANT EXTRACTS ON THE EFFICIENCY OF ALCOHOLIC FERMENTATION WITH *Saccharomyces cerevisiae* CAT-1 AND LACTIC ACID BACTERIA CONTROL

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Contamination by lactic acid bacteria (e.g., *Lactiplantibacillus plantarum*) during bioethanol production in Tucumán is controlled by adding antibiotics such as monensin (MO), which raises environmental concerns. Ethanolic extracts of *Larrea divaricata* (LD) have been shown to synergize with MO. In this study, we evaluated the control capacity of MO+LD combinations in *Lactiplantibacillus plantarum* ETAC 72 in alcoholic fermentation trials with *Saccharomyces cerevisiae* CAT-1. A must composed of sugarcane juice and molasses (20% total reducing sugars, pH 5.5) was fermented and inoculated with CAT-1 (10% yeast cream), under simulated industrial conditions (no agitation, 30°C, 24 hours). Three treatments were included: (i) fermentation control (yeast only), (ii) contamination control (yeast + *L. plantarum* ETAC 72, 5.5×10⁵ CFU/mL), and (iii) contaminated fermentations treated with MO+LD: 0.5× MIC MO + 2× MIC LD, and 0.5× MIC MO + 4× MIC LD. At the end of fermentation, residual sugars, must acidity, ethanol concentration, fermentation efficiency, yeast viability and budding percentage, and bacterial viability were evaluated. The MO+LD treatments resulted in sugar consumption and ethanol production like the uncontaminated control, reaching a practical fermentation efficiency of 81%, compared to 63% recorded for the contaminated control. The acidity of the fermented must decreased significantly (4.4 vs. 3.1 g H₂SO₄/L), indicating inhibition of lactic acid synthesis. However, *L. plantarum* viability was not affected, suggesting a bacteriostatic effect. Yeast viability decreased slightly, with an increase in budding percentage (10% in the control; 21% in the treatments). The MO+LD combination exerts selective pressure comparable to sulfuric acid used in industrial pre-fermenters, promoting the selection of more resistant yeasts, enhancing fermentation efficiency, and effectively controlling bacterial contamination.

A38

ISOLATION AND IDENTIFICATION OF BACTERIA WITH BIOTECHNOLOGICAL POTENTIAL FROM ARTISANAL WINES AND VINEGARS

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Acetic acid bacteria (AAB) play a key role in vinegar production due to their ability to oxidize ethanol into acetic acid. Genera such as *Acetobacter*, *Gluconobacter*, and *Komagataeibacter* stand out for their tolerance to extreme acidity and ethanol concentrations, making them excellent candidates for controlled fermentation processes. In this study, native strains of AAB were isolated, selected, and identified from artisanal vinegar and spoiled regional wine. Samples were cultured in three enrichment broths (I, II, and III) at $30 \pm 1^\circ\text{C}$ for 72h. Subsequently, they were plated on GEY-CaCO₃ agar (glucose, ethanol, and yeast extract with calcium carbonate) at $30 \pm 1^\circ\text{C}$ for 10 days. Colonies were isolated and phenotypically characterized. Screening was carried out based on acetic acid (AA) production and acetification rate (AR). AA production was determined by titration (%), and AR was estimated according to the increase in total acidity over time. Additionally, the acidifying capacity in GYC-CaCO₃ agar (glucose, yeast extract, and peptone with calcium carbonate) was evaluated by determining the potency index (PI), calculated as the diameter of the clear halo resulting from carbonate dissolution. A total of 20 strains were isolated from vinegar (AAB1) and 18 from spoiled wine (AAB2). Based on RAPD-PCR analysis of the isolates, five were selected for sequencing. Identification through amplification of the 16S rRNA gene revealed three species in AAB1 (*K. rhaeticus*, *K. europaeus*, *G. oxydans*) and one in AAB2 (*G. frateurii*). AA concentrations ranged from 6–26 g/L for AAB1 and 7–9 g/L for AAB2, with *G. oxydans* and *G. frateurii* standing out for their higher yield and faster acetification rates.

This study reports, for the first time, the isolation of native AAB from regional fermented products, highlighting their potential use in artisanal vinegars due to their fermentative efficiency and good performance under non-standardized conditions, which favors sustainable and value-added processes at small scale.

A39

QUANTIFICATION OF ATRAZINE BIODEGRADATION BY GAS CHROMATOGRAPHY (GC-FID)

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Atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine) is a selective triazine-based herbicide widely used worldwide. It is applied in the field, either pre- or post-emergence, to control broadleaf weeds in crops such as maize, sorghum, and sugarcane. This agrochemical is susceptible to degradation by bacteria that use it mainly as a source of carbon and nitrogen. In addition, rhizospheric and endophytic bacteria have been reported to contribute to the biodegradation of toxic organic compounds in contaminated soils. The aim of this study was to quantify atrazine degradation by native bacteria isolated from maize and strawberry roots using Gas Chromatography coupled to a Flame Ionization Detector (GC-FID). Culture media supplemented with different concentrations of the herbicide (25, 50, and 100 ppm) were inoculated with *Acinetobacter oleivorans*, IBR3 and a mixed culture of both, and incubated at 28°C and 150 rpm for 30 days. Aliquots of the cultures were collected at 0, 5, and 30 days, and centrifuged to recover the supernatant. From the supernatant, residual atrazine was extracted using three consecutive liquid-liquid extractions with ethyl acetate. Samples were injected into a GC-FID system, and residual atrazine was quantified using a calibration curve; the percentage removal efficiency of the herbicide was then calculated. Atrazine removal was observed in all treatments tested. The highest removal efficiency (59.04%) was achieved by the mixed culture at an initial atrazine concentration of 100 ppm after 30

days. These results suggest that mixed culture could be more efficient than individual strains for atrazine degradation in contaminated environments, particularly at higher initial concentrations.

A40

EVALUATION OF ATRAZINE BIODEGRADATION USING AN *IN VIVO* TOXICITY TRIAL WITH *Artemia salina*

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In bioremediation, it is essential to determine the toxicity level of degradation products derived from a xenobiotic compound. Partial biodegradation of the herbicide atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine) leads to the accumulation of various intermediate metabolites such as hydroxyatrazine (HA), desethylatrazine (DEA), desisopropylatrazine (DIA), and cyanuric acid (CA), among others. On the other hand, larvae (nauplii) of the planktonic crustacean *A. salina* are considered a simple and suitable model for acute toxicity testing. This organism has several advantages such as a short life cycle, ease of culture, high larval yield, low cost, and safety; moreover, it does not require additional nutrients during testing, and small amounts of the tested agent may be used. The aim of this study was to evaluate atrazine biodegradation by native bacteria isolated from maize and strawberry roots using an *in vivo* toxicity trial with *A. salina*. For the trials, MS medium was supplemented with different concentrations of the herbicide (25, 50, and 100 ppm). The media were inoculated individually with *Acinetobacter oleivorans*, IBR3, and a mixed culture of both strains, and incubated at 28°C and 150 rpm for 30 days. Aliquots of the cultures were collected at 5 and 30 days, centrifuged, and the recovered supernatants were used for the *in vivo* toxicity trial. Larval mortality was recorded for each treatment, and survival rates were calculated. Most treatments showed high *A. salina* survival. The mixed culture achieved the highest survival rate (80%) at an initial atrazine concentration of 100 ppm after 30 days of treatment. These findings suggest that toxicity reduction is mediated by microbial biodegradation and support the potential application of the mixed culture of *A. oleivorans* and IBR3 in future bioremediation studies.

A41

GENETIC TRANSFORMATION OF A CITRUS ROOTSTOCK WITH AN ANTIMICROBIAL PEPTIDE GENE FROM A LACTIC ACID BACTERIUM

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Citrus, like other crops, is exposed to various abiotic and biotic stress factors. Among the latter, citrus canker and HLB, caused by the bacteria *Xanthomonas citri* pv. *citri* (Xcc) and *Candidatus Liberibacter* sp., respectively, are two of the main diseases limiting citrus production. As a strategy for phytopathogen control, genetic engineering has been employed to obtain transgenic plants carrying genes encoding antimicrobial peptides. For example, bacteriocins-ribosomally synthesized antimicrobial peptides produced by various microbial groups, including lactic acid bacteria-inhibit the growth of different phytopathogens. Previous studies in our laboratory demonstrated that the *Enterococcus mundtii* strain CRL35 inhibits the *in vitro* growth of Xcc. This strain carries a single gene encoding class IIa bacteriocin. Based on this background, the aim of this study was to obtain transgenic lines of the Citrange Troyer rootstock expressing enterocin CRL35. The genetic construct included the CRL35 gene under the control of the constitutive CaMV 35S promoter, together with the reporter gene *uidA* and the *nptII* gene as a selectable marker. The construct was introduced into the *Agrobacterium tumefaciens* strain

EHA105. To obtain the transgenic lines, internodal segments derived from epicotyls of six-week-old seedlings were subjected to *A. tumefaciens*-mediated transformation. The explants were transferred to a regeneration medium, and the resulting shoots were selected through histochemical GUS staining. These trials enabled the identification of one transgenic line positive to the GUS reaction, which will be subjected to molecular and phytopathological analyses.

A42

OPTIMIZATION OF MALOLACTIC FERMENTATION IN WINES USING IMMOBILIZED CELLS OF *Oenococcus oeni*

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Malolactic fermentation (MLF), a key process in the production of high-quality wines, is carried out by lactic acid bacteria (LAB), particularly *Oenococcus oeni*. This process can be affected by adverse conditions such as low pH, high alcohol content, and the presence of sulfites or other antimicrobial compounds used as additives. The aim of this study was to evaluate the immobilization of *O. oeni* as a strategy to optimize MLF under winemaking conditions. *O. oeni* Ram 11 was immobilized in alginate and chitosan beads cross-linked with sodium tripolyphosphate (STPP). Different concentrations of the support components were tested to determine the most stable composition, establishing that beads composed of 3% alginate, 2% CaCl₂, 1% chitosan, and 2% STPP exhibited the highest resistance. Subsequently, alcoholic fermentation was carried out using a commercial culture of *Saccharomyces cerevisiae* drawn from Torrontés grape juice supplemented with a synergistic mixture of lapachol (L) + sodium metabisulfite (SMBS) (9.8 + 156.3 µg/mL), previously shown to inhibit the growth of *Aspergillus niger* and *A. carbonarius*, as well as the production of Ochratoxin A. The resulting wine had °Bx = 5.2, reducing sugars = 4 g/L, pH = 3.8, ethanol = 12% and free SO₂ = 32 mg/L. This wine was inoculated with free and immobilized cells of *O. oeni* Ram 11 to evaluate malolactic activity. In contrast to the free cells, which did not complete MLF in the presence of L+SMBS, the immobilized cells completed it within 5 days (residual malic acid < 0.1 g/L). These preliminary results suggest that immobilization protected the cells from the inhibitory effects of L+SMBS and enabled efficient exchange between the cells and the medium, representing a promising strategy to optimize MLF under unfavorable conditions.

A43

ISOLATION AND CHARACTERIZATION OF PHOSPHATE-SOLUBILIZING BACTERIA FROM TUCUMÁN MOUNTAIN RIVERS

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Phosphate-solubilizing bacteria (PSB) play a fundamental role in the biogeochemical phosphorus (P) cycle by transforming insoluble compounds into plant-assimilable forms. Several studies highlight their potential as biofertilizers, as well as in bioremediation processes in aquatic environments and soils. However, there are few reports of PSB in northwestern Argentina mountain rivers. The aim of this study was to isolate, identify, and characterize PSB from Tucumán mountain rivers, evaluating their potential under liquid and solid culture conditions. Three PSB were isolated in PKV medium from the San Javier and Potrerillo rivers. The solubilization

index (SI) was assessed on PKV agar. The concentration of P was determined in the supernatant of liquid cultures. Biochemical characterization included Gram staining and differential tests. SI values were 1.25 in SJ-1 and 1.67 and 1.71 in isolations P-1 and P-2, respectively. P release after 8 days reached 1471.1 ± 4.3 mg/L (SJ-1), 626.24 ± 11.27 mg/L (P-1), and 598.0 ± 25.1 mg/L (P-2). Solubilization was directly associated with a decrease in pH, with the lowest values recorded in isolate SJ-1 (pH 3.6), mainly attributable to the production of organic acids - a widely recognized mechanism in phosphate solubilization. Biochemical analysis suggests that the isolated PSB may belong to the genus *Pseudomonas* sp., commonly found in aquatic ecosystems and known for their solubilizing capacity. The results confirm the presence of PSB in Tucumán mountain rivers, with SJ-1 being the most efficient strain, combining the highest P release with the greatest pH reduction. These findings highlight the biotechnological potential of PSB in agriculture and in the treatment of phosphorus-rich effluents. This study provides an initial contribution to understanding the microbiota of Tucumán rivers and its valorization as a strategic resource in agro-environmental applications.

A44

CHARACTERIZATION OF BONE MICROARCHITECTURE ON THE FEMORAL NECK IN GROWING RATS FED A KETOGENIC DIET

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According to international literature, the ketogenic diet has been used to treat epilepsy in growing children. Because the femoral neck undergoes active bone formation during growth, this study aimed to determine the effects of a ketogenic diet on its bone microarchitecture using rat femurs as an experimental model. Twenty-one-day-old Wistar rats were assigned to one of two groups: control (C) (regular diet) or experimental (E) (ketogenic diet) for 30 days. Body weight and food intake were periodically recorded. At the end of the experimental period, ketonemia was measured and the rats were euthanized. The femurs were resected, their lengths recorded, and subsequently processed according to standard paraffin-embedding techniques. Longitudinal sections were obtained from the proximal metaphysis of the femurs. The following histomorphometric parameters were evaluated: growth plate thickness; bone volume; trabecular thickness, number, and separation. Statistical analysis was performed using Student's t-test. The ketogenic diet had significant effects on body weight, ketonemia, food intake, and femur length. Histomorphometric analysis showed that in group (E), the number of trabeculae was lower than in group (C) ($p < 0.05$), while trabecular separation was greater ($p < 0.05$). No significant differences were observed in the remaining parameters. These results suggest that the ketogenic diet negatively affects longitudinal growth and the bone microarchitecture of the femur.

A45

CHANGES IN BONE ACTIVITY AND MINERALIZATION OF THE ALVEOLAR BONE IN GROWING RATS AS A RESULT OF A KETOGENIC DIET

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In many cases, the ketogenic diet controls seizures in children with refractory epilepsy. In this context, the formation of paradental tissues occurs under the influence of this type of diet. In the present study, the bone activity of the periodontal cortical alveolar bone and its microchemical composition were examined in the incisor alveolar bone of Wistar rats fed a ketogenic diet for 30 days and compared with controls that received a conventional diet. After treatment, ketonemia was determined, and the animals in both groups were euthanized following international protocols. The mandibles were removed and separated at the midline. Half of the

hemimandibles from each group were decalcified and embedded in paraffin, while the remaining samples were embedded in methacrylate without decalcification. From both types of blocks, oriented histological sections were obtained at the level of the mesial root of the first lower molar. In the decalcified sections, bone activity was evaluated in the mesial and distal corticals of the alveolar bone associated with the continuously growing incisor. In the non-decalcified samples, microchemical analysis of the mesial and distal sectors of the alveolar bone was performed using EDS. The data obtained were analyzed using Student's t-test. The diet affected food consumption, body weight, and ketonemia. Histomorphometric analysis showed that in the mesial periodontal cortical, the percentage of bone resorption surfaces was significantly reduced, accompanied by an increase in quiescent surfaces in the group fed a ketogenic diet. No significant differences were observed in the bone activity parameters analyzed in the distal periodontal cortical. Microchemical characterization by EDS revealed alterations in alveolar bone mineralization.

A46

TESTICULAR ARCHITECTURE IN *Chinchilla lanigera*: IMPACT OF ZERANOL IMPLANTS IN COMMERCIAL BREEDING SYSTEMS

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In Tucumán, the farming of *Chinchilla lanigera* is an expanding productive activity. To improve fur characteristics and synchronize maturation, breeding facilities use subcutaneous implants of Zeranol (Z), a semisynthetic agent with estrogenic activity. Previous studies have shown modifications in sperm physiological parameters and histomorphological alterations in the epididymis after exposure to Z. Therefore, it is necessary to assess the impact of this compound on testicular architecture, the organ responsible for sperm production.

The objective of this study was to evaluate the histological organization and morphometric characteristics of the testes in *C. lanigera* implanted with Z and exposed for 60 days. Testes were collected from 9-month-old males, including treated animals (n = 6) receiving 12 mg of Z and untreated controls (n = 6). Testicular weight, length, width, and thickness were recorded. Samples were fixed in 4% buffered formalin at 4 °C for 24 h and stained with Hematoxylin–Eosin, Toluidine Blue (pH 2.5), and PAS–Alcian Blue (pH 2.5). Morphometric analyses were performed using TSView 5.0 CMOS. Animals exposed to Z showed a significant reduction in testicular volume and seminiferous tubule diameter. The germinal epithelium in treated animals did not maintain its normal structural characteristics, although complete spermatogenesis was observed in most tubules, with decreased sperm density. No significant differences were found in the relative proportion of Leydig cells between groups. These results suggest that exposure to 12 mg of Z for 60 days produces a significant decrease in testicular size and mass, consistent with an inhibitory effect on parenchymal growth and organization. These findings may indicate compromised spermatogenesis, suggesting potential adverse effects on sperm quality and functionality.

A47

SUBCELULAR ANALYSIS OF AMPHIBIAN TESTICLE INNERVATION

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Knowledge of testicular innervation is highly variable across vertebrates and particularly scarce in anuran amphibians. In previous immunohistochemical studies, we demonstrated the presence of catecholaminergic and peptidergic nerve fibers in the testis of *Leptodactylus chaquensis*, which may play a regulatory role in its function.

The aim of this study was to investigate the ultrastructural characteristics of this innervation and correlate them with previously described histological and immunohistochemical findings. Gonads from adult males were processed using routine techniques for transmission electron microscopy. Subcellular analysis revealed the presence of: a) nerve fibers associated with blood vessels forming neurovascular bundles at the testicular hilum, the entry site for the organ's vascular supply; b) nerves composed of unmyelinated fibers arranged in small groups and partially or completely surrounded by a simple layer of Schwann cell processes; c) individual myelinated fibers characterized by a large diameter and multiple concentric layers of highly electron-dense myelin; and d) neurofilaments, mitochondria, and vesicles of varying sizes and electron densities within the axoplasm. These results confirm and expand upon the previous findings. The presence of both myelinated and unmyelinated axons at the ultrastructural level corroborates the nerve fibers previously detected by immunohistochemistry. The observation of electrolucent vesicles (likely associated with low-molecular-weight neurotransmitters such as catecholamines) and electron-dense vesicles (typical of neuroactive peptides) provides cellular-level validation for the existence of catecholaminergic and peptidergic fibers. Taken together, these data not only confirm the sparse innervation of the testis in this species but also demonstrate, for the first time in anuran amphibians, the presence of testicular innervation at the ultrastructural level. The strong correlation between the subcellular observations and the light microscopy findings reinforces the validity and complementarity of both approaches.

A48

OVIDUCTAL ALTERATIONS INDUCED BY ZERANOL IN CAPTIVE ADULT FEMALE

Chinchilla lanigera

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The mammalian oviduct plays a key role in sperm capacitation, fertilization, and early embryonic development. The use of growth promoters such as Zeranol to optimize production is a widespread practice in commercial breeding, and this compound, which has estrogenic activity, may alter reproductive physiology by inducing changes in the normal histology of the organ. The aim of this study was to evaluate the impact of Zeranol exposure on the histomorphological structure of the oviduct in adult female *Chinchilla lanigera*, with particular emphasis on its relationship to reproductive processes under controlled management conditions. **Materials and Methods:** Seven-month-old females received subdermal slow-release implants containing 12 mg of Zeranol (Ralgro®) for 60 days. Oviducts were isolated, weighed, measured, fixed in 4% buffered formaldehyde at 4 °C for 24 h, processed using conventional histological techniques, and stained with hematoxylin–eosin (H&E), toluidine blue, and periodic acid–Schiff–Alcian blue (PAS–AB, pH 2.5). **Results:** The infundibulum, ampulla, and isthmus were identified. In Zeranol-treated females, both tubular and luminal diameters were reduced in the ampulla ($616.55 \pm 33.10 \mu\text{m}$; $505.75 \pm 14.98 \mu\text{m}$) and isthmus ($565.02 \pm 39.84 \mu\text{m}$; $258.8 \pm 36.08 \mu\text{m}$) compared with controls ($726.34 \pm 45.47 \mu\text{m}$; $595.65 \pm 34.43 \mu\text{m}$; $465.46 \pm 36.83 \mu\text{m}$; $262.52 \pm 41.38 \mu\text{m}$). Wall thickness remained preserved, with no differences between groups. Histochemical analysis revealed fewer secretory vesicles and lower reactivity to mucoproteins, proteoglycans, and glycoconjugates in the infundibulum and ampulla. In contrast, the isthmus exhibited intense staining for mucosubstances, along with a higher proportion of secretory cells relative to ciliated cells. **Conclusion:** Zeranol exposure appears to exert an inhibitory effect on the development of the *C. lanigera* oviduct, leading to alterations in histochemical reactivity, cellular distribution, and secretory dynamics. These changes may compromise the microenvironment required for optimal reproductive function.

A49

EVALUATION OF THE REDOX STATE IN THE CLOACAL FLUID OF THE AMPHIBIAN

Leptodactylus chaquensis

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Amphibians, due to their biphasic life cycle, are excellent bioindicators of environmental quality. Any disturbance in their habitat can alter cellular redox balance, affecting key physiological processes. However, there is still a significant lack of information regarding the basal redox state of anuran gametes and of the cells present in the cloacal fluid, the medium through which these are released. This study aims to analyze the redox state of the cloacal fluid in male *L. chaquensis*, an amphibian species widely distributed in Neotropical environments. Adult male specimens (n = 4) were collected from their natural habitat in Agua Azul (Leales, Tucumán). Animals were maintained in controlled conditions for 24 hours to obtain cloacal fluid samples. Biochemical markers of oxidative stress were evaluated, including thiobarbituric acid reactive substances (TBARS), as an indicator of lipid peroxidation, and the activity of the antioxidant enzymes superoxide dismutase (SOD) and catalase (CAT). In parallel, physicochemical parameters of the water at the collection site were measured: temperature (T°), pH, electrical conductivity (EC), dissolved oxygen (DO), and total dissolved solids (TDS). The biochemical determinations yielded the following values: TBARS: 0.261 ± 0.009 $\mu\text{mol/L}$; CAT: 3.18 ± 0.84 U/mg protein; SOD: 0.180 ± 0.11 U/mg protein. The water analysis revealed a pH of 8.19, a TDS of 1.235 mg/mL, and a DO of 11.8 mg/L. These findings provide, for the first time, baseline information on the redox state of the cloacal fluid of *L. chaquensis* and its relationship with environmental parameters. This contribution is relevant as it establishes essential reference values for future studies on the effects of environmental pollution on the reproductive health of this and other amphibian species, highlighting their importance as bioindicators under natural conditions.

A50

SAFETY AND RHEOLOGICAL CHARACTERIZATION OF BIOACTIVE AND BIOCOMPATIBLE SEMISOLID FORMULATIONS

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In addition to functionality and efficacy, the safety of topical formulations is a crucial aspect in the development of new pharmaceutical products. In this study, we evaluated the safety and rheological properties of thermosensitive hydrogels with potential antimicrobial activity, formulated with extracts from the bark of aliso (*Alnus acuminata*), cebil (*Anadenanthera colubrina*), eucalipto (*Eucalyptus grandis*), and queñoa (*Polylepis australis*). The aim was to provide alternatives to animal experimentation for the development of safe topical pharmaceutical products. The HET-CAM assay (hen's egg chorioallantoic membrane test) was used to assess the irritant potential of the formulations. All samples were classified as non-irritant, obtaining an irritation index of 0. This finding supports the use of these hydrogels as safe systems for topical administration. In parallel, the rheological properties of the hydrogels were characterized, showing an increase in viscosity with temperature. The gelation temperatures of all formulations ranged from 24.07°C (aliso hydrogel) to 25.60°C (queñoa hydrogel). These temperatures are close to ambient, facilitating their application in liquid form and subsequent gelation upon contact with the skin. In conclusion, these thermosensitive hydrogels have proven to be safe and effective systems for the topical administration of plant extracts. Their non-irritant profile, validated through an alternative method

to animal use, together with suitable rheological properties, positions them as promising formulations for the development of topical products with antimicrobial applications.

A51

ANTIOXIDANT, ANTITUSSIVE, AND TOXICITY ACTIVITIES OF *Lepidium bonariense* EXTRACTS

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Natural products are an inexhaustible source of drug prototypes; it is estimated that more than half of them are derived from bioactive natural compounds. This study focused on *Lepidium bonariense*, an agricultural weed known for its popular uses as a digestive and antiscorbutic agent. The objective was to characterize its aqueous (AE) and ethanolic (EE) extracts and evaluate their antitussive potential as well as their preliminary toxicity. Chemical analysis was performed using UHPLC-HR-QTOF-MS and TLC, while antitussive activity was evaluated in vivo in Wistar rats exposed to ammonia vapor. AE and EE were administered intraperitoneally, and their effects were compared with those of codeine, the reference antitussive. Cytotoxicity was determined using the *Artemia salina* L. lethality test. Additionally, the ethanolic extract was fractionated for biotargeted chemical analysis of antioxidant activity by DPPH bioautography. Chemical analysis revealed that the extracts are rich in polar metabolites, such as glucosinolates. The antitussive activity of AE and EE at 1000 mg/kg reduced cough by 54.54% and 27.27%, respectively, representing a notable reduction; however, this effect was lower than that of codeine (75% inhibition). Classification of the extracts according to their degree of toxicity showed that the ethanolic extract was moderately toxic ($LC_{50} = 413.15 \mu\text{g/mL}$), while the aqueous extract was non-toxic ($LC_{50} = 2409.24 \mu\text{g/mL}$). Fractions 4 and 5 obtained by fractionation of EE presented the highest antioxidant activity. These findings open the door to future research in phytomedicine to identify and isolate the compounds responsible for these activities in order to develop new prototypes of natural drugs.

A52

SOLUBILITY AND TOXICITY OF COPPER(II) COORDINATION COMPLEXES

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The development of organometallic drugs has sparked growing interest across academia, science, and industry, offering new perspectives for harnessing the properties of biologically active metals. Consequently, research on transition metal complexes has intensified, valued for their therapeutic potential, lower incidence of adverse effects, and ability to overcome resistance. Cu(II) complexes are notable for their anticancer, antimicrobial, antifungal, and antiviral properties. Their activity is attributed to the biological and physicochemical features of the Cu(II) ion and to the specific properties of the ligands, as well as their possible synergy. However, applicability may be limited by stability and solubility issues, which impact bioavailability, and by toxicity -factors that are critical in developing new metallodrugs. The objective of this study was to evaluate the solubility and toxicity of Cu(II) complexes with betaine hydrochloride, niacinamide, and phenanthroline. Solubility was assessed in distilled water, DMSO, and acidified water (pH 5–6) from 15 mg/mL stock solutions; all compounds remained dissolved at 0.5 mg/mL. Acute toxicity was evaluated in the nematode *Caenorhabditis elegans*. Unlike cell-based assays, this model provides whole-animal data at low cost and shows good predictive value for toxicity in rodents. Bioassays in *C. elegans* showed, for all compounds, an LC_{50} ranging from 0.47 to 7.5 mg/dL, consistent with a dose-dependent decrease in survival. These results provide a robust starting point to optimize design, improve stability, solubility, and safety, and move toward broader functional testing.

A53

ANTIMICROBIAL ACTIVITY EVALUATION OF Cu(II) COMPLEXES WITH ORGANIC LIGANDS

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Antimicrobial resistance and biofilm formation hinder infection eradication and promote relapse, prompting new therapeutic strategies. In this context, Cu(II) complexes offer multimodal action: including a- interactions with membranes and nucleic acids b- enzymatic targeting and c- redox chemistry with ROS generation. This combined action has the potential to compromise biofilms. Ligand selection enables fine-tuning of charge, lipophilicity, and stability, impacting solubility, uptake, and selectivity. In this study, we evaluated the antimicrobial activity of Cu(II) complexes with betaine, nicotinamide (niacinamide), and phenanthroline, exploring how ligand identity shapes the balance between potency and safety. Activity was assessed by an agar spot assay against *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella enterica*, *Listeria monocytogenes*, *Klebsiella pneumoniae*, and *Candida albicans*. Although most complexes did not produce zones of inhibition, phenanthroline showed marked activity (up to ~40 mm against *C. albicans*), and complex 14 (Cu(II)–phenanthroline–betaine) retained activity against Gram-positive bacteria and *C. albicans* (zones ~6.5–18.5 mm, strain-dependent), with no detectable effect against *Pseudomonas* or *Salmonella*. This pattern suggests that phenanthroline is a major determinant of potency and that coordination with Cu(II) and betaine modulates both spectrum and intensity of response. Considering these results, compound 14 emerges as a priority candidate. To assess its benefit–risk profile, it is essential to complete a comparative toxicological assessment, along with testing stability in physiological media and determining MIC (planktonic) and MBEC (biofilm).

A54

ISOLATION AND CHARACTERIZATION OF BIFLAVONOIDS FROM *Selaginella sellowii* HIERON

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Throughout history, civilizations have turned to plants as therapeutic resources to address various diseases. Since the beginning of the 19th century, with the development of techniques for the extraction, isolation, and characterization of bioactive metabolites, the pharmaceutical industry experienced a decisive advancement, with plants serving as the primary source of medicines. Several fern species, particularly those of the genus *Selaginella*, traditionally used in the treatment of various pathologies, have gained relevance due to their notable richness in biflavonoids—substances with well-documented biological activities. The aim of this work was to isolate and purify the compounds present in the extract of *S. sellowii* Hieron using chromatographic techniques, followed by characterization and identification through NMR, MS, UV-vis, and IR spectroscopy. The plant material of *S. sellowii* Hieron was air-dried and subjected to maceration with ethyl ether to obtain a low-polarity ethereal extract. Subsequently, two successive extractions with methanol were performed to obtain a high-polarity extract. The latter underwent a cleaning process that included dewaxing and dechlorophyllation through size-exclusion chromatography using Sephadex LH-20. The processed extract was fractionated by silica gel column chromatography, and fractions that tested positive for aromatic compounds (TLC, UV detector, and Fast blue reagent) were subjected to RP-HPLC (C18, Methanol:Water 4:1), yielding four pure substances. Analysis by NMR, MS, IR, and UV-vis led to the identification of the following compounds: **2,cis-3,cis-5,trans-6-tetramethyldioxane**, **amentoflavone**, **hinokiflavone**, and **bilobetin**. These include one dioxane derivative and three biflavonoids with significant and documented biological activities such as anti-inflammatory, antioxidant,

antitumoral, antiviral, and antimicrobial properties. This work represents a first approach to a promising research line on biflavonoid natural products with medicinal and pharmaceutical potential.

A55

IN VIVO TOXICOLOGICAL AND PHARMACOLOGICAL EVALUATION (ANTI-ANXIOLYTIC AND ANTINOCICEPTIVE ACTIVITY) OF *Anadenanthera colubrina* (VELL) BRENAN (CEBIL) SEEDS

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The indigenous peoples of the Northwest of Argentina used *Anadenanthera colubrina* (Cebil) seeds in religious ceremonies, claiming they possessed psychotropic properties. This study evaluated the anxiolytic and antinociceptive properties and in vivo toxicity of ethanolic and aqueous extracts of Cebil seeds (AE and EE). The toxicity of the extracts was assessed using an acute oral toxicity study (OECD 425 Up-Down Method) at a limit dose of 5000 mg/kg BW. For pharmacological activity, oral doses of 250 and 500 mg/kg BW were administered. Antinociceptive activity was assessed using the Formalin Test and the Hot Water Tail Immersion Test (compared with morphine and ibuprofen). For anxiolytic activity, the Open Field Test and Elevated Plus Maze Test (positive control: diazepam 1 mg/kg, ip) were used. Data processing was performed using ANY-maze 7.5. The acute toxicity results indicated that the LD50 was greater than 5000 mg/kg. The Formalin Test (EE) (500 mg/kg) showed greater activity in the first phase of the trial (57.44%), morphine (70.94%), and ibuprofen (11.6%). In the Heat Pain Induction Test, the greatest inhibitory effects were observed at 30 minutes for EE (500 mg/kg) and morphine (90 and 100%, respectively); ibuprofen showed low activity in this test. The anxiolytic efficacy of EE (500 mg/kg) and diazepam was statistically significant ($p < 0.05$) compared to the control group. This activity was demonstrated by an increase in the percentage of entries and time spent in the central area of the field and in the open arms of the maze, which are considered highly anxiogenic. The findings are promising for the field of psychopharmacology. The evidence of analgesic and anxiolytic effects in Wistar rats, coupled with the absence of acute toxicity in the model used, could constitute a new therapeutic option for the management of pain and anxiety. However, further toxicological studies are needed to verify their long-term safety.

A56

FUNCTIONAL STUDY OF TUMOR SUPPRESSOR PROTEIN *BARD1* DURING EMBRYONIC DEVELOPMENT

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Breast cancer (BC) is a complex multifactorial disease involving the interaction of genetic and environmental factors. Among the genes associated with hereditary BC are *BRCA1* and *BARD1*, which encode proteins that form a complex involved in DNA repair and epigenetic transcriptional regulation. Mutations in these genes produce inactive truncated proteins, causing genetic instability and promoting tumorigenesis. Notably, Brca1, Bard1, and other tumour-suppressing proteins are expressed during the early stages of vertebrate embryonic development, enabling their functional study in a living system. This study aimed to analyse the biological role of the antitumour protein Bard1 and to explore mechanisms associated with embryonic malformations and tumour development. We used embryos from the *Xenopus laevis* model organism due to its advantages, mainly its large size, external development, and high degree of genetic homology with humans. The experimental strategy involved the loss of *bard1* gene function using CRISPR/Cas13 technology. The absence of Bard1 caused morphological alterations in

early embryonic tissues, especially during gastrulation, and led to failures in cell differentiation during organogenesis, as evidenced by the lack of specialised glandular tissue. A molecular analysis was also conducted to evaluate the affected embryonic tissues. Using tissue-specific markers, we observed alteration expression of *sox2* (neural ectoderm marker) and a loss of *foxD3* expression (neural crest marker). The dedifferentiation phenotype identified in this study resembles that observed in malformations caused by the absence of other antitumour proteins, as well as in tumour cells. This work provides a biological model for studying the normal function of *bard1* and offers insights into its potential implications in pathological contexts.

A57

SURVEY OF DIAPAUSING PARASITOIDS IN *Anastrepha fraterculus* (DIPTERA: TEPHRITIDAE) IN TUCUMÁN YUNGAS

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Seasonal thermal variations influence insect behavior and physiology, modulating symbiotic relationships within tritrophic systems. This research evaluates diapause as one of the strategies employed by five parasitoid species exploiting the same resource, *Anastrepha fraterculus*, in northwestern Argentina (NOA). Fruits from three host species—peach, native walnut, and guava—were collected and processed in the locality of Horco Molle, Yerba Buena, Tucumán. The fruit was conditioned, and the puparia were systematically examined over the course of one year. From a total of 415 kg of collected fruit, 95,145 *A. fraterculus* pupae were obtained, from which 47,989 adults emerged. Guava fruits yielded the highest proportion of puparia (63.3%), followed by peach (28%) and native walnut (8.7%). Only 496 of the remaining puparia gave rise to adult parasitoids exhibiting diapause. Of these, 6.6% corresponded to *Ganaspis pelleranoi* (Figitidae: Eucolinae), whereas the rest consisted of four species from the family Braconidae: *Doryctobracon areolatus* (Szépligeti) (78.6%), *D. brasiliensis* (Szépligeti) (12.1%), *Opius bellus* (Gahan) (1.4%), and *Utetes anastrephae* (Viereck) (1.2%). The recorded diapause duration among these parasitoids ranged from 6 to 10 months. All diapausing parasitoids adults emerged from *A. fraterculus* puparia developed in guava fruits. These findings highlight the ecological relevance of this fruit host species, which is the last to bear fruit and offers extended temporal availability throughout much of the autumn. This phenological particularity, along with other environmental factors, may act as a trigger for the onset of diapause in parasitoids associated with this tephritid. This study represents the first survey of diapause in *A. fraterculus* parasitoids in northwestern Argentina (NOA)..

A58

RESPONSE OF EPILITHIC BIOFILMS TO NUTRIENTS, SALINITY, AND THEIR INTERACTION IN AFFECTED RIVERS: A MICROCOSM STUDY

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Epilithic biofilms respond sensitively to environmental variations that affect water quality, and, consequently, their role in nutrient cycling, a key process for the functioning of river ecosystems. This study aimed to assess the response of biofilms to stressors related to effluent discharges from sugar and paper industries, the main sources of pollution in Tucumán, through microcosm analysis. To this end, stones colonized by biofilms were collected from a reference river (Las Piedras, Horco Molle) with low concentrations of nutrients (0.093 mg NO₃- L⁻¹; 0.186 mg PO₄⁻³ L⁻¹) and dissolved salts (EC = 0.243 mS cm⁻¹). After a laboratory acclimation period, microcosms were exposed to the following treatments: control; nitrogen (N); phosphorus (P); sodium chloride (NaCl); N + P; N + NaCl; P + NaCl; and N + P + NaCl, simulating eutrophication and salinization scenarios. Eight treatments were

applied in triplicate: stream water (control) with the addition of: nitrogen (N: 12 mg NH_4^+ L^{-1}), phosphorus (P: 6 mg PO_4^{3-} L^{-1}), sodium chloride (NaCl: 3 g L^{-1}); and their combinations, simulating eutrophication and salinization conditions. The experiment lasted 8 days, being recorded from start to end: temperature, pH, electrical conductivity, and dissolved oxygen. Nutrient concentrations (NH_4^+ , NO_3^- y PO_4^{3-}), major ionic composition, and biofilm biomass (Chl-a and dry weight) were determined. PO_4^{3-} decreased rapidly between days 4 and 8, especially in N + P compared to P + NaCl (Kruskal-Wallis, $p < 0,05$), which suggests a synergic effect in its absorption, with an increase in biomass, dissolved oxygen, and pH, which indicates greater photosynthetic activity. In contrast, nitrogen showed lower uptake than phosphorus (t-test, $p < 0,05$). Salinity not only altered the ionic balance but also influenced the magnitude of nutrients. The effects on nutrient absorption and the biomass of biofilm lead to shifts in community composition and metabolic activity.

The response of the biofilm to these stressors will help identify sensitive species and promote their use as bioindicators, contributing to the monitoring and conservation of aquatic ecosystems.

A59

COMPOSITION OF EPIGEOUS ARTHROPODS IN DIFFERENT ENVIRONMENTS OF THE DR. MANUEL BELGRANO DEPARTMENT (JUJUY, ARGENTINA)

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Arthropods are a group susceptible to environmental changes, which make them good candidates as bioindicators of anthropogenic stress, biodiversity, and the environment. This research aims to understand the arthropod community of Dr. Manuel Belgrano department (Jujuy) in environments with different degrees of urbanization. Sampling was carried out every 45 days between March and April 2025 in three types of environments: urban, peri-urban, and rural, in the northern (NA) and southern (SA) areas of the city. Arthropods were captured using three 100 m transects with four pitfall traps each, which remained active for 48 hours. Samples were processed in the Animal Biology Department laboratory (FCA-UNJU). 6,677 individuals were collected, distributed in the classes: Chilopoda (2), Diplopoda (6), Malacostraca (152), Arachnida (1,107), Enthognata (1,421), and Insecta (3,989), of the Phylum Arthropoda. Twelve orders of the class Insecta were identified, four of Arachnida, and one of Malacostraca. The most abundant group was Hymenoptera (2284), and the most diverse was Diptera (23 families). In the SA and NA, Formicidae (Hymenoptera) stood out, representing 22% and 20% of the total abundance, respectively. Acari (Arachnida) (22%) also predominated in the SA and Poduromorpha (Collembola) (20%) in the SN. The diversity of families was similar between the urban, peri-urban, and rural environments of the NA, with Formicidae and Acari being the most representative in all of them. In the NA, the greatest diversity was observed in the rural environment (51 families), followed by the peri-urban (41) and urban (25) environments, with Formicidae and Collembola predominating. These groups are representative of the epigeal fauna; reflect their important role in maintaining the ecological balance of the soil, making them excellent candidates as bioindicators of environmental status. Continued monitoring is expected to update information on the arthropod fauna of Dr. Manuel Belgrano Department and to evaluate the possible influence of urbanization on its composition.

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ANTIMICROBIAL ACTIVITY OF ENCAPSULATED *Larrea divaricata* EXTRACT DURING IN VITRO DIGESTION

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Argentine sheep production faces neonatal gastroenteritis in lambs caused by enterobacteria, usually controlled with antibiotics, which has led to bacterial resistance and negative environmental effects. Natural alternatives, such as the use of *Larrea divaricata* (LD) extract are attractive. Oral administration requires knowledge of the extract's toxicity and encapsulation, but it is unknown whether encapsulation affects its antimicrobial activity. This study evaluated the toxicity of LD against *Artemia salina* and the release of its constituents and antibacterial activity of LD microencapsulated in alginate with or without glyco-gelatin reinforcement, during a simulated gastrointestinal digestion process. Mortality of *A. salina* in seawater exposed to LD concentrations allowed calculation of the lethal concentration 50 (LC₅₀) by probit analysis. LD microencapsulated in alginate (1%) passed through simulated saliva (pH 7, 18 h), rumen (pH 2, 3 h), and intestine (pH 8, 2 h) phases. Subsequently, their effects on viability of *E. coli* and *Salmonella* strains (10⁶ CFU/mL) were evaluated. LD showed an LC50 of 16.5 µg/mL, classifying the extract as toxic. The microencapsulated LD showed the highest release of components during the first hours. Both microencapsulation and glyco-gelatin protection had significant effects on reducing bacterial viability. Controls maintained values above 1.2×10⁹ CFU/mL, while free and encapsulated extracts achieved notable reductions, with lower loads in *E. coli* (2.2×10⁸ CFU/mL) and *Salmonella* (2.6×10⁸ CFU/mL). Double encapsulation with glyco-gelatin showed a superior protective effect compared to simple alginate (4.1×10⁸ vs. 1.02×10⁹ CFU/mL), confirming the persistence of antimicrobial activity after simulated digestive passage. In conclusion, encapsulated LD extracts maintained relevant inhibitory capacity and are promising for controlling gastrointestinal infections in sheep production.

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HEMATOLOGICAL AND BIOCHEMICAL PARAMETERS EVALUATION IN SERRANO CREOLE GOATS FROM NORTHWESTERN ARGENTINA (NOA)

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Clinical analyses are highly valuable tools for assessing the health status of animals and for detecting variations due to physiological conditions, climate, environmental, and nutritional factors, among others. The objective of this study was to evaluate hematological and biochemical parameters in Serrano Creole goats from Northwestern Argentina (NOA), in different physiological states between April and July of this year. The methodology included complete blood counts and biochemical analyses of total proteins, albumin, and globulins in 20 goats from the experimental goat center of the FAZyV. Analysis of variance (ANOVA) showed that hematocrit values did not differ significantly among lactating (24%), pregnant (27%), and dry (28%) goats. However, Tukey's multiple comparison test revealed a significant difference between dry and lactating goats ($p = 0.007$; $\alpha = 0.05$). No significant differences were found in total leukocyte counts between groups (lactating: 9,800 cells/µL; pregnant: 9,100 cells/µL; dry: 7,700 cells/µL; $p > 0.05$). Total protein levels remained similar among lactating (7.1 g/dL), pregnant (7.2 g/dL), and dry (7.3 g/dL) goats, with no significant differences ($p > 0.05$). It is concluded that the physiological state of the goats (lactating, pregnant, or dry) had a limited effect on the evaluated blood parameters. A significant difference was observed only in hematocrit between dry and lactating goats, while leukocyte counts

and total proteins showed no significant variation among the groups. These values serve as a reference framework for diagnosing clinical cases that may compromise reproductive efficiency, as well as the health and nutritional status of goats. Therefore, continued monitoring and the evaluation of a larger number of individuals are essential to obtain more robust and representative results.

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CARCASS YIELD DETERMINANTS IN 'SERRANO CRIOLLO' KIDS FROM NORTHWESTERN ARGENTINA: PRELIMINARY APPROACHES

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The mountainous areas of Northwestern Argentina are inhabited by Serrano Criollo goats, one of the seven native Argentine breeds listed in the FAO Global Animal Genetic Resources Database. Meat production -particularly suckling kids weighing 9–12 kg live weight - constitutes the main product marketed by producers in this region. The objective of this study was to relate the proportions of non-carcass components (NMB) to slaughter live weight (SLW) and to identify the biological factors that determine carcass yield (CY) in kids of this breed. Ten animals (8 males and 2 females), aged 47 to 141 days and weighing 11 to 17 kg, from the Experimental Goat Center of the FAZyV, National University of Tucumán, were slaughtered. Recorded variables included birth weight (BW), slaughter live weight (SLW), hot carcass weight (HCW), and the weights of NMB components: blood (BLD), skin and horns (SKH), lungs, trachea and heart (LTH), liver (LIV), spleen (SPL), digestive tract with contents (DTC), white viscera (WV), forelegs (FL), and hind legs (HL), both with skin. Age at slaughter (AS), average daily gain (ADG), and carcass yield (CY) were also calculated. Data were processed in R using principal component analysis (PCA) and Spearman correlations. The proportions of NMB relative to SLW were: BLD 4.2%, SKH 7.8%, LTH 2.1%, LIV 1.8%, SPL 0.2%, DTC 25.3%, WV 1.5%, FL 1.8%, and HL 2.1%. Mean CY was 53.3% (± 3.63) and mean ADG was 112.8 g (± 29.3). PCA showed a positive association between ADG and CY, and a negative association with AS, explaining 77.1% of the variance. A significant positive correlation was found between ADG and CY ($\rho = 0.782$; $p = 0.019$). AS was negatively correlated with both ADG ($\rho = 0.821$; $p = 0.004$) and CY ($\rho = 0.747$; $p = 0.013$). Results suggest that AS and ADG are likely determinant and biologically consistent factors of CY, although validation with larger sample sizes is required. These findings provide guidance for management and selection strategies in goat production systems.

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Stevia rebaudiana MICROPROPAGATION

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Vegetative propagation through apical cuttings of *Stevia rebaudiana* is the most common method used by growers to increase the number of plants each year. However, a considerable amount of time is required to obtain the necessary number of mother plants to provide sufficient cuttings, in addition to the fact that it is a low-efficiency process. Therefore, micropropagation represents a biotechnological technique for the rapid and large-scale multiplication of genetically homogeneous plants of high quality and sanitary status. The objective of this study was to establish a micropropagation protocol for *S. rebaudiana* and the subsequent acclimatization of the resulting plantlets. Apical shoots of 3 cm in length, obtained from mother plants, were used as explants. These were rinsed under running water and disinfected with 70% ethanol (1 min), 1% NaOCl (20 min), and three final rinses with sterile distilled water. The explants were placed in Murashige and Skoog (MS) culture medium supplemented with vitamins, sucrose (3%), and agar (0.4%), adjusted to pH 5.8, in individual tubes containing 4 ml of medium. They were subsequently incubated at 27 ± 2 °C with a 16-h photoperiod under artificial light. Three subcultures

were performed, achieving a multiplication rate of 80%. On average, each cultured shoot (with one node) produced 5 to 7 nodes in the first and second subcultures. The protocol used demonstrated high efficiency for implementation as a method to produce plantlets derived from selected mother plants and as support for breeding programs for this species in Tucumán.

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AUXIN HORMONES EFFICIENCY IN *Stevia rebaudiana* ROOTING

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Stevia rebaudiana is a species of increasing economic interest due to its use as a non-caloric natural sweetener and its various health-promoting properties. Seed propagation is limited by low viability and high genetic variability, making vegetative multiplication an alternative for obtaining uniform seedlings. The aim of this study was to refine vegetative propagation techniques by evaluating the rooting ability of apical and subapical cuttings and the effectiveness of different auxins on root induction. Plant material was obtained from the active germplasm bank of E.E.A. Famaillá, INTA, and the assay was conducted in the Genetics Laboratory of FAZyV. Rooting response was evaluated in apical cuttings treated with indoleacetic acid (IAA), indolebutyric acid (IBA), and naphthaleneacetic acid (NAA) in liquid form at different concentrations, and root length and weight were measured after 30 days. Additionally, powdered IBA (500 and 1000 ppm) was assessed, and apical and subapical cuttings treated with 500 ppm IBA were compared. Evaluated variables included root and stem length, number of leaves, fresh weight, and dry weight, analyzed by ANOVA. Results indicated that IAA at 500 ppm promoted greater root length and fresh weight compared with the control, whereas NAA did not induce rooting. Powdered IBA showed no significant differences between concentrations, although a slight tendency toward greater development was observed at 1000 ppm. No significant differences were found between apical and subapical cuttings, although secondary shoots were observed in the latter. Overall, the results show that IAA at 500 ppm is the most effective hormone for stimulating rooting; however, under field conditions in Tucumán (September to November), it is possible to obtain good propagation levels without the application of growth regulators. These findings represent a low-cost and easily applicable alternative for small and medium-sized growers interested in the propagation of *S. rebaudiana*.

A65

***Stevia rebaudiana* YIELD COMPONENTS EVALUATION DURING 2024–2025 SEASON**

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Stevia rebaudiana Bertoni is a species of increasing interest due to its capacity to accumulate steviol glycosides in the leaves, representing a productive alternative for small-scale growers in northwestern Argentina. The aim of this study was to evaluate yield components in three genotypes preserved in the INTA Famaillá Active Germplasm Bank and established at the El Manantial Experimental Farm (FAZyV-UNT). A randomized complete block design was implemented with three introductions (M9.18, F12.8, and L3), propagated by apical cuttings and cultivated under drip irrigation and standard agronomic management. Aerial biomass variables were measured, including plant height, diameter in two axes, number of main stems, dry weight of leaves and stems, foliar and stem yield, canopy surface and volume, harvest index, and specific leaf mass. Data were analyzed through descriptive statistics and analysis of variance (ANOVA). Significant differences were observed among genotypes, with M9.18

showing the highest values for plant height, leaf and stem dry weight, foliar and stem yield, as well as canopy surface and volume, although with a relatively lower harvest index. Genotypes F12.8 and L3 displayed intermediate performance with lower values in most descriptors. It is concluded that there is genetic variability among genotypes that can be exploited in selection programs aimed at increasing productivity, and that M9.18 shows the greatest productive potential under the agroecological conditions of Tucumán. These results provide preliminary information for the design of management and species-improvement strategies in the region.

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RESPONSE OF MAIZE (*Zea mays* L.) TO DIFFERENT FERTILIZATION TREATMENTS

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Maize cultivation plays an important role in Northwestern Argentina. Currently, efforts are being made to reduce the gap between achievable yields and those obtained by producers, and fertilization is one of the factors that contributes to this gap. The objective of this study was to evaluate the effect of different fertilization treatments on yield (YLD), prolificacy (PRO), thousand-kernel weight (TKW), number of grains per square meter (NG), and lodging percentage (%LOD). The trial was carried out in Isca Yacu, Jiménez Department, Santiago del Estero, at the Javicho S.A. establishment. Sowing took place on December 27, 2024, using the hybrid SS2223S VIP3 (NIDERA), at a density of 5.5 plants m⁻². Prior to sowing, 120 kg ha⁻¹ of triple superphosphate were applied, and chemical weed-control management was performed. After crop emergence, plots were demarcated (four rows of 10 m). A completely randomized block design with four replications was used. Fertilization treatments were applied at the V6 phenological stage and consisted of: A (no fertilizer); B (N 100 kg ha⁻¹ + P 50 kg ha⁻¹); C (N 100 kg ha⁻¹ + P 50 kg ha⁻¹ + K 50 kg ha⁻¹); and D (N 100 kg ha⁻¹ + P 50 kg ha⁻¹ + K 50 kg ha⁻¹ + micronutrients Mn, Fe, Cu, Zn, B, Mo, Mg, S at 150 g ha⁻¹). At physiological maturity, 5 linear meters from the two central rows were harvested, weighed, moisture was measured, and YLD was adjusted to 14.5% grain moisture. ANOVA for YLD showed significant differences for treatments D, C, and B compared with A ($p < 0.0466$). PRO, TKW, NG, and %LOD did not show significant differences among treatments. Although YLD did not differ significantly among fertilized treatments, treatment D yielded 11,730.11 kg ha⁻¹, which was 417.57 kg ha⁻¹ higher than C and 422.64 kg ha⁻¹ higher than B. This indicates that fertilization produced yield responses among the different treatments. Further trials should be conducted to determine nutrient sources and rates that reduce the gap between achieved and achievable yields.

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CULTIVATING OPPORTUNITIES: MUSHROOM PRODUCTION IN CHILECITO, LA RIOJA

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The "Cultivating Opportunities" project, carried out at the National University of Chilecito (UNdeC), focuses on the production and research of edible and nutraceutical mushrooms, such as *Pleurotus* spp. and *Ganoderma lucidum*, in the Antinaco Valley - Los Colorados. Objectives: to provide a new food alternative that supports self-sustaining development; to train young people, women, and families in the Antinaco Valley - Los Colorados region; and to study and select strains for our collection. The mushroom cultivation method uses organic by-products; therefore, the aim is to take advantage of waste generated by regional crops such as olive, grape, and walnut, among others. The essential input for fruiting is the fungal "seed" or spawn, which is prepared using oat grains in sterilized, recyclable glass bottles and jars that are later placed in sterilized substrates. Mushroom

production: is carried out in 3-kg polypropylene bags containing poplar shavings, walnut shells, and olive leaves (50:25:25). Decontamination is performed in 200-L containers, steamed for 2 hours at 100°C in an open space. In 2025, the laboratory produced 100 bottles of spawn, 100 bags of myceliated substrate, 30 bags of sterilized substrate, and 3 kg of mushrooms. Strain studies are currently underway. We conduct training sessions in Vinchagasta schools, at the UNdeC Agricultural Technical School, and within the community. We promote a circular economy model, as spent substrates can be recycled as fertilizer for crops, thus closing the production cycle and minimizing agricultural waste in the region. This initiative encourages healthy, organic food consumption and reduces agricultural waste by recycling spent substrates as fertilizer. The project plans to expand to reach the general public and the culinary community, thereby strengthening the production and consumption of these mushrooms in the region.

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ARTHROPOD COMMUNITIES IN JUJUY PUNA: COMPARATIVE ANALYSIS BETWEEN YAVI AND CASABINDO

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Jujuy Puna is home to a remarkable diversity of arthropods, key components to the ecological structure and bioindicators of environmental health. Comparing communities from different locations reveals patterns of richness, dominance, and distribution linked to altitude, humidity, vegetation, and microhabitat heterogeneity. The aim of this study was to compare the diversity, composition, and dominance of arthropod orders and families between Yavi (3500-3600 metres above sea level) and Casabindo (3600-3900 metres above sea level), and to assess their relationship with local environmental variables. Sampling was conducted between December 2024 and March 2025 at three sites per locality, selected based on topography, vegetation, and land use. At each site, three 200 m transects were set up with pitfall traps every 5 m, active for 48 h. Specimens were identified to family level and grouped into Insecta, Arachnida, and Entognatha. Abundance, richness, and distribution were analyzed using accumulation curves, and the Shannon (H'), Simpson (D) and Pielou (J) indices. The findings show a high abundance of Hymenoptera (Formicidae), Diptera, and Coleoptera. Yavi presented a higher proportion of Entognatha, whereas Casabindo displayed greater family richness and variability among sites. Casabindo approached the expected maximum wealth and showed more balanced communities ($H' = 1.68$; $D = 0.32$; $J = 0.71$), compared to the dominance of Yavi ($H' = 1.25$; $D = 0.45$; $J = 0.52$). The differences are associated with the environment: Casabindo, more arid and homogeneous, exhibited diverse but uneven communities; Yavi, with higher humidity and heterogeneous vegetation cover, showed dominance of a few groups. Formicidae and Araneae stand out as bioindicators. These findings provide information for conservation strategies, the management of Puna ecosystems, and the planning of biodiversity-based sustainable tourism, based on biodiversity.