



TUCUMAN BIOLOGY ASSOCIATION

(Asociación de Biología de Tucumán)

Abstracts from the

XXVIII ANNUAL SCIENTIFIC MEETING

October 26 – 28, 2011

Tafi del Valle, Tucumán, Argentina

L1.**“Miguel Lillo” Lecture****HIV-1 INFECTION IN CHILDREN**

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Within the last 30 years, HIV-1 infection has spread globally, starting from a few high-risk groups and soon becoming a worldwide pandemic. At present, the most frequent way of HIV acquisition is through heterosexual transmission, nearly half of all the affected adults being young women of childbearing age. Most children are infected by vertical transmission perinatally or by breast-feeding. In industrialized countries the improved uptake of antenatal HIV testing during pregnancy, antiretroviral therapy prophylaxis and elective cesarean section together with avoidance of breast-feeding have successfully resulted in a reduction in vertical transmission from around 30% according to the region to less than 1%. Natural HIV-1 infection progresses more rapidly in perinatally infected children than in adults. Since the infection probable occurs at a time of relative immunologic immaturity, 25% of the children can be severely immunosuppressed from birth onwards and progress to AIDS during the first year of life. At present, immediately after diagnosis, antiretroviral therapy implementation is recommended for all children within the first year of vertical infection.

Since the beginning of the epidemic, clinical evolution of HIV-1 in adults and children has changed remarkably from rapid progression in months up to prolonged asymptomatic periods of more than 10 years. Multiple viral and host factors may contribute to the variations in clinical evolution. The great mutability of HIV-1 due to reverse transcriptase errors in the viral genome during replication favors viral diversity with selection of emerging variants beneficial for the virus. Therefore the genetic composition of HIV-1 can be classified in groups M, N, and O, M being the one responsible for the pandemic. Group M has 9 subtypes, A, B, C, D, F, G, H, J, and K and there are at present more than 40 intersubtypes called CRF or circulating recombinant forms. In Argentina, after the B subtype, the recombinant form BF1 is the most frequent and prevalent one in the group of children infected by vertical transmission. There are attenuated viral variants with genotypic alterations associated with slower progression of HIV-1 infection but these constitute only a minority of the cases. Phenotypically, HIV-1 can have different tropism depending on the receptor-coreceptor complex used. The variant that utilizes the complex CD4-CCR5 is called macrophage tropic or R5 variant. When the complex CD4-CXCR4 is used the variant is called T-tropic or X4. Moreover there are R5X4 dual tropic variants. Viral cytopathogenicity varies according to viral tropism. Variants X4 and R5X4 are clinically more aggressive and immunosuppressive than R5, which are considered the main transmitted form. During the course of viral infection, X4 or R5X4 variants emerge in approximately 50% of HIV-1 infected patients. Other phenotypic properties that may differ between variants are replicative rate and degree of infectivity. With respect to host genes associated with HIV/AIDS, chemokine receptors and their ligands have been extensively investigated since they play a key role in HIV cell entry. A 32 base-pair deletion of CCR5 in homozygosis results in a truncated CCR5 protein that is not expressed on the cell surface and up to the present time is the only known mutation that blocks and prevents HIV-R5 infection. Insights gained into genetic variations of viral and host genome will be discussed throughout this lecture.

L2.**Opening lecture****GENETICS AND EVOLUTIONARY HISTORY OF SOUTH AMERICAN CAMELIDS**

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At present, four South American Camelid species are known, two of them wild, guanaco (*Lama guanicoe*) and vicuña (*Vicugna vicugna*), and two domestic, alpaca (*Vicugna pacos*) and llama (*Lama glama*); however, the origin of the domestic species is still a matter for debate. In order to investigate the origin of the domestic forms and their genetic diversity and structure we analyzed the variation in two mitochondrial gene sequences, the G banding pattern of chromosomes and 14 microsatellite markers. All analyses grouped guanacos with llamas and vicuñas with alpacas. The phylogenetic analyses showed *Vicugna vicugna* and *Lama guanicoe* as monophyletic groups. The analysis of both gene sequences showed two clades within vicuñas. Nevertheless, the results of the guanaco populations did not reflect the four proposed subspecies. The structure of chromosome bands showed fine and consistent differences in the short arm of chromosome 1, separating camels, guanacos and llamas from vicuñas and alpacas. This pattern was consistent even in a hybrid guanaco x alpaca.

Vicuña genetic structure is demographically mediated, it resulting from the scarce variation within populations caused by a past population reduction which in turn has contributed to the existence of highly distinct geographic populations. We found that genetic diversity in the northern subspecies was low within populations but that populations on average were highly differentiated. In contrast, the subspecies of the Andean guanaco studied showed evidence of limited structure using microsatellite allele frequency and mitochondrial DNA. Today our knowledge on the genetics of these wild and domestic species is limited in many aspects. However, it is clear that the structure and genetic differentiation between wild guanaco and vicuña and between llama and alpaca affords the opportunity to contextualize, expand, and apply our knowledge of camelid genomics. Increased emphasis is needed on the unique evolutionary history of each of these groups, using differences in population structure and phenotypic variation to better characterize and explore the camelid genome.

L3.**Lecture 1****ANIMAL USE IN BIOMEDICAL RESEARCH**

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Biomedical research employs at least one of the following materials: human volunteers, embryos, organs, plant, animal or human tissues or cells, experimental animals, etc. Despite ethical or epistemological objections that may be raised against such practices, the use of this biological reagent is still required for scientific progress. The discipline “Science of experimental animals” seeks its rational, efficient and humanitarian use, two of its salient aspects including educational work and ethical legitimacy. The former presents a teaching alternative for grade schools implemented in the Career of Medicine of the UNR. With respect to the latter, since the first legislation concerning animal welfare approved in 1822 by the British Parliament until the present, attempts have been made to regulate the research performed using animals and, if possible, the adoption of alternative methods to replace them. Biomedical research requires laboratory quality animals for the validity and efficiency of its work. The perspectives analyzed are aptly summarized in the words of J. Webster: “To consider science as a way for the proper understanding of animals, ethics as the the proper way to respect animals and professional training as a way for the conversion of thought”.

L4.**Lecture 2****NITRIC OXIDE AVAILABILITY AS A KEY REGULATOR IN THE DEVELOPING KIDNEY***Manucha W.**Investigador Adjunto IMBECU-CONICET. Facultad de Ciencias Médicas-Universidad Nacional de Cuyo, Mendoza, Argentina.**E-mail: wmanucha@fcm.uncu.edu.ar*

Congenital obstructive nephropathy is the primary cause of end-stage renal disease in children. Rapid diagnosis and initiation of the treatment are vital to preserve function and/or to slow down renal injury. Obstructive uropathy effects -decline in the plasmatic renal flow and glomerular filtration rate, interstitial infiltrate of leukocytes, significant decrease in urine concentration, loss of the capacity to concentrate urine as well as fibrosis and apoptosis- are a consequence of a variety of factors that work in complex ways and are still not fully understood. Experimental neonatal obstruction in rodents can be used as a paradigm for *in utero* obstruction in humans and the potential of novel therapies for congenital obstructive nephropathy can be explored therein. Mediators such as angiotensin II, transforming growth factor beta, heat shock response and nitric oxide (NO) have been implicated in congenital obstructive nephropathy. NO has emerged as an important endogenous inhibitor of apoptosis. The functional integrity of the kidney depends on normal development as well as on physiological cell turnover. Apoptosis induction is essential for these mechanisms. Multiple mechanisms are unleashed during obstructive nephropathy, one of the most complex being programmed cell death that leads to renal tubular atrophy and tubular loss. This presentation will focus on the interaction between nitric oxide and Hsp70 and on the regulation of renal antiapoptotic/antifibrotic and protective oxidative stress responses.

L5.**Lecture 3****PROCESSING AND ACTIVATION IN OVARIAN CANCER***Irusta G.**Laboratorio de Fisiología Ovárica. Instituto de Biología y Medicina Experimental-CONICET.**E-mail: irustag@gmail.com*

Ovarian cancer continues to be the leading cause of death among gynecological malignancy. Although the response to treatments is high, it is temporally. Due to the lack of symptoms in early stages, there is no strategy for its detection and 75% is totally metastatic at the moment of diagnosis. Tumor growth depends on angiogenesis process, and the developing of new blood vessels has become a promising target for the treatment of cancer. Antiangiogenic treatment inhibiting the Vascular Endothelial Growth Factor (VEGF) has been successful, but the tumors often develop resistance to these inhibitors. This is the reason why we focus on the study of another system involved in angiogenesis: *the Notch system*. Notch signaling is initiated by the engagement of a Notch ligand to a Notch receptor, all transmembrane proteins. On binding the Notch receptors and after a series of cleavages, an intracellular domain of the receptor translocates to the nucleus where it regulates gene expression determining cell growth and fate. We study the effect of a Notch system inhibitor on cellular proliferation, apoptosis and migration on a human granulosa tumor cell line. We detect an unbalance in the content of pro- and anti-apoptotic proteins, a decrease in the activation of intracellular pathways associated to cellular survival, like PI3K/AKT pathway, and a reduction of cell migration when we inhibit Notch system activation in cell culture. These results suggest that the Notch system could be a potential therapeutic target for the treatment of ovarian tumors originated in ovarian granulosa cells

L6.**Lecture 4****CHARACTERIZATION OF GLYCERALDEHYDE-3-PHOSPHATE DEHYDROGENASE EARLY AMYLOID-LIKE OLIGOMERS INDUCED BY HEPARIN AND THEIR IMPLICATION IN ALPHA-SYNUCLEIN AGGREGATION***Chehin R.**Instituto Superior de Investigaciones Biológicas (INSIBIO), CCT-Tucumán and Instituto de Química Biológica "Dr. Bernabé Bloj" (CONICET-UNT). Chacabuco 461 (T4000ILI) Tucumán, Argentina.**E-mail: rosana@fbqf.unt.edu.ar*

Lewy bodies and Lewy neuritis, the neuropathological hallmarks of different neurological diseases, are mainly made of filamentous assemblies of α -synuclein. However, other macromolecules including tau, ubiquitin and glyceraldehyde-3-phosphate dehydrogenase and glycosaminoglycans are routinely found associated with these amyloid deposits. Glyceraldehyde-3-phosphate dehydrogenase is a glycolytic enzyme that can form fibrillar aggregates but its role in Parkinson's disease is still unknown. In this work, the ability of heparin to trigger the amyloid aggregation of this protein under physiological conditions of pH and temperature is demonstrated by infrared and fluorescence spectroscopy, dynamic light scattering, small angle X-ray scattering and fluorescence microscopy. Finally, we demonstrate that the early oligomers present in the glyceraldehyde-3-phosphate dehydrogenase fibrillation pathway promote α -synuclein aggregation, recruiting α -synuclein toxic species toward less toxic amyloid fibril aggregates. The results presented herein suggest that heparin-induced glyceraldehyde-3-phosphate dehydrogenase early oligomers could be taken into account as a novel therapeutic strategy in Parkinson's disease and other synucleinopathies.

Co1.
BEHAVIOR OF HYBRID CORN (*Zea mays* L.) AT TWO PLANTING DENSITIES

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The stress imposed by high plant densities is an important issue for the selection of corn hybrids. Intraspecific competition accentuates the impact of drought and nutrient stress. The aim of this study was to evaluate the performance of experimental and commercial hybrids (HIB) in two plant densities (DE). The experiment was carried out at INTA, Leales, Tucumán, Argentina, during the 2010/11 growing season, in rainfed conditions. At planting, fertilization was performed with 50 kg.ha⁻¹ of diammonium phosphate and in V6 with 100 kg.ha⁻¹ of urea. Twenty-three hybrids (20 experimental, hereafter named L1 to L20 and 3 commercial, hereafter named T21, T22 and T23), were sown at two densities: 4.2 (D1) and 7 (D2) plants.m⁻². The variables measured were yield (RTO), number of grains per m⁻² (NG), prolificacy (PRO) and number of ears per m⁻² (NE). The analysis of variance showed significant differences in DE, HIB, for RTO and NE. NG and PRO showed significant differences for HIB and DE respectively. We found significant differences between D1 and D2 for the variables RTO and PRO. NE showed significant differences for D2. Hybrids L5, T21, T23, L6, L9 and L10 were better for RTO and NG, test LSD, $\alpha = 0.05$. The comparative analysis of hybrids in stress conditions allowed us to select four experimental hybrids with better performance at both densities.

Co2.
SOYBEAN EMERGENCE AND GROWTH PROMOTION BY *Trichoderma* spp. IN GREENHOUSE ASSAYS

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Sustainable agricultural production requires the use of effective and environmentally friendly management alternatives to reduce the use of agrochemicals. One of these alternatives is the use of biological agents such as *Trichoderma* strains. *Trichoderma* inhibit the growth of plant pathogens, induce systemic and localized resistance and influence plant growth and development. The aim of this work was to evaluate the effects of *Trichoderma* on soybean emergence and seedling growth. 10⁷ spores/ml suspensions of four *Trichoderma* strains (Tw, Tx, Ty and Tz) were prepared. Seeds were soaked for 3 minutes, dried at room temperature for 24 h and sown in sterile soil and sand contained in plastic trays. Germinative energy (EG) and power (PG) were determined. Length as well as fresh and dry weight of shoots and roots were measured. EG and PG of control were 73 and 81%, respectively. EG of Tz was 89% and PG was 90%, while Tx showed values of 85 and 88%, respectively. Tw and Ty had similar values (80% EG and 87% PG). The differences between the treatments (length of shoots and roots) were not statistically significant. All treatments increased fresh weight of shoots compared with control while Tx, Ty and Tz improved root fresh weight. When compared with control, treated seedlings showed increased biomass expressed as higher shoot and root dry weight.

Co3.
PEANUT SOWING DATE AND GENOTYPES ON RUE AND ITS VARIABLES

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Cultivar (C) and sowing date (SD) affect radiation use efficiency (RUE) and peanut yield. A field study was conducted without limitations in 2009/10 to quantify them. Granoleic (G) and Utre (U) were sown in 8/10, 10/11 and 12/09 (1, 2 and 3 SD). Fraction of intercepted radiation (FiPAR), specific leaf area (SLA), leaf area index (LAI), interception efficiency (Ie), extinction coefficient (Ke) and RUE of corrected total (RUEb) and pod (RUEp) biomass were measured. Pod yield was significantly higher in G for all SD and in the 1SD, for both cultivars, with loss of 28 and 30 kg/day of SD delay for U and G, respectively. The FiPAR correlated with yield and SLA varied with C, 61 (U) and 63 (G) gm⁻². Critical LAI was ≈ 5 in both C, while LAI_{max} was 10.8 (G) and 7.1 (U). Ke was stable at R4 without differences between C and SD, but variable during the season. All treatments reached Ie>95% with differences between C and SD regarding the time required to reach such value. RUEb was higher in G (2.63) vs 2.15 g.MJ⁻¹ in U. There was a similar response of RUEp between C, decreasing with SD, where 1SD had a higher value (0.55) compared with 2SD and 3SD (0.45 and 0.46 g.MJ⁻¹). RUEp and RUEb varied between C, which differed in LAI_{max} and SLA (both higher in G), and RUEp was greater in 8/10 SD where both C captured more PAR (particularly between R5 and R8).

Co4.
BLUEBERRY POSTHARVEST ROTS: INFLUENCE OF MATURITY STAGE

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Postharvest rots are considered the main problem in blueberry crops in Tucumán. Although cold management is the main tool to deal with this problem, early harvesting is an additional practice used to prevent biotic fruit rots. The aim of this study was to determine rots incidence and color changes in fruit harvested at different maturity stages. In a commercial field in Monteros, Tucumán, marketable fruits of 5 varieties at different maturity stages were collected. In the laboratory they were color sorted into three groups: C1-purple with a green halo at the base, C2-purple with a red halo and C3-100% blue. 50 fruits from each group were incubated for 7 days in humid chambers (with 3 replicates/variety) to assess rot incidence. Besides, the same 3 groups were kept at 15±2°C for 24 hours and then at 4±1°C for 72 hours, simulating the temperature conditions of a regular shipping period. None of the varieties reached 100% maturity when harvested at stage C1, but all of them showed good development when harvested at C2, except for Misty. In addition, in fruit harvested at stage C2, biotic decay incidence decreased significantly compared with the control harvested at C3, with mean values of 43% for O'Neal, 39% for Jewel, 7% for Misty, 14% for Emerald and 31% for Star. Under these assay conditions it is possible to use early stage harvesting (C2) in O'Neal, Jewel, Emerald and Star varieties as a complementary tool in blueberry postharvest rot management.

Co5.**DETERMINATION OF THE EQUATION OF THE DISSIPATION CURVE OF THIABENDAZOLE IN LEMON THROUGH EMPIRICAL MODELS**

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The pesticide thiabendazole is used in lemon production during the postharvest stage to combat fungi of different genera. In humans, the effects of acute overexposure to the fungicide include dizziness, nausea and vomits. The maximum limit value of thiabendazole residues in lemon established by the Codex Alimentarius is 10 mg/kg, which is the same limit used in Argentina. In this work we experimentally determined the dissipation curve of imazalil in lemon from the Tucuman Province, in simulated transportation conditions, and evaluated empirical mathematical models to determine the equation of the dissipation curve. Thiabendazole was applied during the packing process. The simulation of the transportation conditions was performed by keeping the sample for 2 days at room temperature and then in a cold storage chamber. Samples were taken at days 0, 1, 2, 7, 14, 21, 28 and 35 after application and analyzed by HPLC. The empirical mathematical model that provided a better fit was the zero-order reaction model, with a correlation coefficient of 0.91. The mean dissipation time calculated was 22 days. The lemon fruits showed a thiabendazole concentration that did not exceed the maximum limit established both in Argentina and by the Codex Alimentarius.

Co6.**MOLECULAR BIOLOGY TECHNIQUES USED TO CHARACTERIZE *Ribeiroia* spp. FROM NORTHERN ARGENTINA**

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Cercariae assigned to *Ribeiroia* sp because they showed two esophageal diverticles were found in Biomphalaria species from Salta (*B. tenagophila* and *B. orbignyi*) and Corrientes (*B. occidentalis*) provinces, Argentina. Prevalence varied between 0.2% and 0.6%. *B. occidentalis* cercariae had few granular cystogenous cells, showed veil around the acetabulum and lacked pre-pharyngeal body; *B. tenagophila* cercariae lacked pre-pharyngeal body; *B. orbignyi* cercariae had pink pre-pharyngeal body, para-esophageal glands and cystogenous cells with bar-shaped contents. *R. ondatrae* cercariae from North American *Helisoma tivolvis* showed acetabula with teeth, pink pre-pharyngeal tissue and few cystogenous cells. *R. marini* cercariae, from Caribbean *B. glabrata*, lacked pink tissue, had toothless, unveiled acetabula and many cystogenous cells. *Cercaria lileta* (*R. congolensis*) had pink tissue. The present work compares the genetic sequences of Argentinean cercariae with those already published for *R. marini*, *R. ondatrae* and *Cercaria lileta*. DNA was extracted with Qiagen kit, and PCR performed with primers ITS 2 (Wilson *et al.*, 2005), yielding a 650 bp product. Sequences were compared with the GeneBank database (megablast). We found 2.5% divergence between Argentinean samples and those already published, suggesting different species in agreement with morphological analyses.

Co7.**BACTERIOLYTIC ACTIVITY OF HEMOLYMPH FROM *Spodoptera frugiperda***

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Lysozyme (Lz) is a bacteriolytic enzyme widely distributed in nature. Its lytic activity is measured by a decrease in absorbance due to susceptible bacteria lysis. The works in which Lz from *Spodoptera frugiperda* was measured show great differences in the methods used and in the results obtained. Our aim was to determine the enzymatic activity in hemolymph (HL) from larvae and pupae of *S. frugiperda* to verify the relationship between Lz concentration and lytic activity. The lytic activity of Lz at different hemolymph concentrations was measured. Results showed: a) the most diluted samples had less lytic activity, but the effects were higher than expected for the corresponding enzyme concentrations; b) lysis at fixed time had no direct relation to concentration; c) lysis rates with respect to amount of Lz were highest in the most diluted samples; d) there were no remarkable differences between larvae and pupae lytic activities; e) activity of HL was more time persistent than that observed in vertebrate Lz milk. From the analysis of the results we can deduce the following: a) spontaneous lytic activity in HL from those dilutions with highest activity, measured as initial velocity, have 50-100 times more activity than that reported for goat milk and is similar to human, tapir and sea lion milk; b) the high activity observed during long term assays could be due to requirements of an efficient and persistent lytic activity even after the insect's death.

Co8.**LYSOZYME AND AMYLASE ACTIVITY IN COLOSTRUM AND MILK OF *Tapirus terrestris* (PERISSODACTYLA)**

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Synthesis of milk compounds, especially proteins, has special value for the newborn during the perinatal period. Hence, expressions of proteins in colostrum and in the early days of lactation are important to understand the biology of *T. terrestris*. The aim of this work was to obtain information about lysozyme and amylase, two whey proteins of irregular distribution in mammals. Samples from Temaiken Zoo tapir milk, collected from one week before birth until 30 days of lactation were analyzed. The turbidimetric method was used for lysozyme determination and a commercial kit for amylase. Results showed that activity of Lz in pre colostrum increased slightly between days -7 and -6, then decreased steadily from day -4 until day 3 postpartum, after which it became stable and remained constant throughout the first month of life. A decrease in amylase activities took place in the same way, but the decline began three days before the Lz decrease. In both cases the values dropped to 2% of the maximum measured in pre colostrums. These results show asynchrony in the expression of these two proteins, the meaning of which is clear in the case of the antibacterial lysozyme. The situation is different for amylase since, although a protective role in milk has been hypothesized for it, it has yet to be confirmed.

Co9.**OSTEOPONTIN IN CASEIN MICELLES OF HUMAN MILK**

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Osteopontin (OPN) is a highly phosphorylated glycoprotein expressed in many tissues and organs of all vertebrate species in which it has been investigated. OPN has several functions including cell adhesion and signaling. However, its presence in milk secretion is not sufficiently understood. The aim of this work was to investigate the presence of osteopontin in breast milk and its distribution in the two main milk compartments, casein micelles and whey. Milk samples were analyzed in healthy mothers with non problematic childbirths. The study period was between the first and the fourth week of lactation. Micellar proteins were separated from whey ones and subject to electrophoresis (SDS-PAGE) with reducing agents, western-blotting, and immuno-dotting. Results showed the presence in all studied samples of a protein with a molecular mass (MM) ~70 kDa) similar to that of osteopontin that reacts with anti-human osteopontin antibody. Other additional antibody reacting bands of lower MM were also revealed. They would correspond to peptides derived from the action of plasmin and/or other milk proteases. Most of the OPN was associated with casein micelles, and a small amount with whey. Westernblotting showed different band patterns in the two milk compartments. This would indicate different affinities for casein of OPN peptides found in milk.

Co10.**ATMOSPHERIC TRANSPARENCY DETERMINATIONS IN TUCUMÁN**

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Three solar UV radiometers were simultaneously operated in Tucumán province (NW Argentina) to evaluate particulate matter (PM) contents in the lower atmosphere. Natural and anthropogenic aerosol emission and suspension in the atmosphere reaches a maximum during the dry season (winter and early spring), concurrent with the sugar cane harvest season. The main anthropogenic component is smoke from massive burning of sugar cane and crop remnants. The aim of this work is to use radiometry atmospheric transparency results to compute PM content. The astronomic observatory at Ampimpa, (-26° 48' 03.43", 65°, 50' 36.32" W, altitude 2458 m asl) was chosen as a non polluted reference site while plain sites were INTA Famaillá (-27° 01' 08.85", 65° 22' 49.99" W, altitude 373 m asl) and the city of Tucumán (-26° 49' 17.68", 65° 11' 37.98" W, altitude 441 masl). PM weight is directly related to the natural logarithm of transparency and is inversely related to a known parameter *K*. Transparency, in turn, is taken as the quotient between *I* and *I*₀, the light intensities as measured simultaneously by the radiometers at Famaillá and Ampimpa. On October 21st, at 1500 LT, calculations resulted in $W_T = 1,958630844$ g. Extrapolation to other sites is straightforward.

Co11.**MACRO AND MICRO NUTRIENTS IN THREE AROMATIC AND MEDICINAL SPECIES FROM JUJUY-ARGENTINA**

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Numerous plant species grow in Jujuy. Infusions of aromatic and medicinal species provide macro and micro minerals that are also necessary for the better survival of the plant itself. Plant nutritional deficiency can affect the mineral content of decoctions (aqueous extracts-AE) prepared from them. Nutrients in plant material (PM) and in decoctions were determined and related to recommended daily intake (RDI) and plant mineral requirements. The species studied were: *Aloysia citrodora*, *Satureja parvifolia* and *Acantholippia salsoloides*. Samples collected at different times (3 to 48 months) were analyzed. Ca, Mg, Na, Cu, Fe and Zn in the AE and PM were determined by atomic absorption spectrophotometry. The percentage of extraction of Ca, Mg (macronutrients) and Cu (micronutrient) was lower in the AE prepared from PM more recently collected. For Na, the opposite was observed. Ca and Mg contribution to RDI by a portion of decoction (2g/200mL) varied from 1 to 3%. For Na, the contribution was less than 1%. If fluid intake per day was provided by *A. citrodora* decoction it would cover about 30% of the RDI of Ca and Mg, 10% Fe and 2% Cu. *A. salsoloides* in PM has a higher content of Zn, Fe and Cu. Cu has the highest rate of extraction and greater chemical availability in the AE. The concentrations of the minerals studied exceeded PM values necessary for the proper growth of the plant.

Co12.**RECOVERY AND REUSE OF ETHYL ALCOHOL PRESENT IN THE EFFLUENT OF PECTIN EXTRACTION FROM *Eriobotrya japonica***

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The method of pectin extraction consists of hot acid hydrolysis and its subsequent precipitation by addition of ethyl alcohol 96°GL. In experiences with pectin extraction from loquat and lemon peel, 50 - 60 liters of alcohol were used per kilogram of dried material, which created a considerable effluent. The objectives of this study were to recover the alcohol used for pectin precipitation, to evaluate its reuse and to help environment preservation by minimizing effluents. Pectin was extracted from loquat and lemon peel, and then precipitated. The collected filtrate was distilled to recover alcohol. A stainless steel column filled with steel wool was used in a batch operation. The product obtained at the bottom still contained alcohol. It was redistilled and the resulting product was similar to that of the first distillation. Alcohol was not found in the final effluent of the second distillation so it was assumed to be exhausted. The recovered alcohol had a graduation of 89°GL. It was used in additional precipitations. The amount of pectin precipitated with ethyl alcohol 96°GL was greater than that obtained with recovered alcohol. However, about 95% of alcohol was recovered, which is beneficial considering input consumption and effluent decrease.

Co13.**GLYCEROL PRODUCTION BY *Oenococcus oeni* IN INTER-ACTION WITH NO-*Saccharomyces* WINE YEAST**

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Sequential cultures between *Kloeckera apiculata* and *Oenococcus oeni* in grape musts are an interesting challenge for basic and technological research. Microorganisms can grow from residual substrates and fermentation products and the resulting interaction modifies wine sensory characteristics. We evaluated the metabolic resources used by *O. oeni* to grow in culture supernatants of *K. apiculata*. Yeast pure cultures were inoculated into grape juice medium with and without yeast extract (juCE, juSE), fermented for 2 and 6 days and filtered. Then, they were inoculated with *O. oeni* A and F and samples were taken at 0 and 120 h for analytical determinations. *K. apiculata* consumed 81-83% of total sugars, mainly glucose. When *O. oeni* strains were inoculated into fermented media, consumption of fructose and pentoses was higher than glucose consumption. Glycerol production was observed with both strains, it being higher in juSE (19 mmol/g). In these conditions, the highest acetate and lactate concentrations were detected mainly for the A strain. Only in this medium ethanol production was found. Glycerol production would be related to an alternative way used by *O. oeni* to regenerate NAD⁺ and ATP more efficiently in nutrient-limiting media. These results allow us to choose media and culture conditions to select starter microorganisms to improve desirable properties in winemaking.

Co14.**IN VITRO SELECTION OF YOGHURT LACTIC ACID BACTERIA WITH IMMUNOMODULATORY PROPERTIES**

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Lactic acid bacteria (LAB) exert several health benefits due to their immunomodulatory activities. Previous studies have shown that yoghurt (prepared with a pool of *Lactobacillus (L.) bulgaricus* and *Streptococcus (S.) thermophilus* strains from CERELA Culture Collection) prevented gut inflammation. The aim of this study was to compare *in vitro* immunomodulatory activities of individual yoghurt LAB strains. *L. bulgaricus* (CRL861, 863, 864, 866, 869, 871, 872 and 887) and *S. thermophilus* (CRL806 and 807) were evaluated *in vitro* using mononuclear cells isolated from mice Peyer's Patches (PPMC). PPMC were co-cultured with each strain grown in milk (or with milk or yoghurt as negative and positive controls, respectively) and supernatant cytokine levels were determined by ELISA. TNF α increased in co-cultures with *L. bulgaricus* CRL866 and *S. thermophilus* CRL806, it being higher than in co-cultures with milk or yoghurt. Cells stimulated with *L. bulgaricus* CRL869, 871 and 872 increased IFN γ levels, but not to the levels induced by yoghurt. *L. bulgaricus* CRL864 and 866 increased IL10, and only 864 exceeded yoghurt levels. Co-cultures with *S. thermophilus* CRL807, *L. bulgaricus* CRL866 and CRL864 yielded the highest IL10/IFN γ ratios. Each LAB strain elicited different cytokine profiles in PPMC. *L. bulgaricus* CRL864 and *S. thermophilus* CRL807 showed the highest anti-inflammatory potential.

Co15.**PAPILLOMAVIRUS GENOME FROM HELA CELLS**

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Cervical cancer is the second most common cancer in women worldwide. HPV is etiologically associated with cervical carcinoma and can be detected by amplification of viral nucleic acid. The HeLa immortal cell line is derived from cervical cancer cells collected in 1951. Human papillomaviruses (HPVs) are frequently integrated into the cellular DNA in cervical cancers. The HeLa cell line contains 20-50 copies of HPV-18 per cell. The aim of this work was to prepare a positive control for polymerase chain reaction (PCR) with HPV DNA from a HeLa cell culture. HeLa cell line C229 (ATCC N^oCCL-2.1), passage 118 was subcultured with growth medium DMEM-10% fetal bovine serum and cryopreserved at 1.5 x 10⁶ cell/mL at -20°C. DNA was extracted by digestion with buffer-proteinase K and extraction-purification with commercial NucleoSpin[®] Tissue. Detection and typing of the viral DNA genome was performed by polymerase chain reaction using primers My 09/11 specific for the L1 region of HPV genome, combined with a restriction fragment length polymorphism assay (PCR-RFLP). Both methods of extraction allowed us to amplify the viral DNA genome. Typing with RFLP showed a profile for HPV-18. DNA obtained from the HeLa cell line is suitable for use as a positive control for PCR reaction in the detection of HPV in human clinical specimens.

Co16.**CHARACTERIZATION AND QUANTIFICATION OF FUNGAL PATHOGENS IN PEANUTS FROM NORTHWEST ARGENTINA**

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In Argentina peanut (*Arachis hypogaea*) is grown in the provinces of Córdoba, Salta, Jujuy and Tucumán, covering an area of approximately 400,000 hectares. Filamentous fungi are active agents of biological deterioration. They alter organoleptic characteristics, making moldy food unfit for human consumption. According to the identity of the pathogen present, some species can produce mycotoxins, secondary metabolites of high toxicity. The purpose of this study was to evaluate the incidence of different pathogens of the peanut seed in Northwest Argentina. Samples from three localities in Salta, making up 8 lots covering a combined area of 10,300 hectares were analyzed. For the determination of seed pathology, we used the method of incubation in potato dextrose agar for the isolation of pure colonies, and media Czapek-Sucrose 20, Czapek-glycerol and malt extract agar for selective determination. The infection percentages of the total incubated seeds ranged between 3 and 34% of total pathogens, with one lot with a high percentage (33%) of *Fusarium* spp. *Aspergillus* spp ranged between 1.3 and 10% and *Penicillium* spp between 1.6 and 6%. Prevalent pathogens were *Fusarium* spp., *Aspergillus* spp. and *Penicillium* spp., all of them with mycotoxin producers. We also found *Rolfisia* and *Thecaphora Sclerotium Frezzi* (coal groundnut).

Co17.**ANTIFUNGAL ACTIVITY OF *ZUCCAGNIA PUNCTATA*:
COMPARISON WITH COMMERCIAL FUNGICIDES**

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Argentina is an important cereal producer. Diseases restrict grain yields, especially those caused by *Fusarium* species. Commercial fungicides used for their control have limited efficiency and affect the environment. The aim of this work was to compare the fungicidal and fungistatic activity of an ether fraction (EF) from the tincture of *Z. punctata* with commercial fungicides: pyraclostrobin (Py) and epoxiconazole (Ep). The dry material extracted by tincture of *Z. punctata* was partitioned with diethyl ether. The antifungal activity of the EF (5-250 µg de ME/ml) and the fungicides (0.5-50 µg/ml) were assayed by the microdilution method on *F. thapsinum* (Ft), *F. verticillioides* (Fv), *F. graminearum sensu stricto* (Fse), *F. subglutinans* (Fs) and *F. bothii* (Fb). Minimum fungicidal concentration (MFC), minimum inhibitory concentration (MIC), MFC/MIC, and inhibitory concentration 50 (IC50) were determined. IC50s indicated that EF (19-27 µg/ml) produced a similar inhibition in all strains. IC50s of Py and Ep depended on the fungus tested, the most sensitive being Fse (2.4 and 2 µg/ml, respectively). MFCs (100 µg/ml for Fv and Fs; 250 µg/ml for Fb and Ft and 50 µg/ml for Fse) of EF coincided with their MICs, indicating that the inhibition observed is due to fungicidal action.

1. CHANGE IN LEVELS OF MONITORING IN CAI MONKEYS (*Cebus apella*) UNDER THREAT OF PREDATION IN THE IGUAZU NATIONAL PARK, ARGENTINA

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Diurnal primates face three main types of predators: birds of prey, cats and snakes. We studied the behavior of anti-predator vigilance in cai monkeys, *Cebus apella*, using models of natural predators (ocelots, eagles, rattlesnakes, yarara and coral snakes). The aim of this work was to determine if there was a significant monitoring difference between the natural situation and in the face of stimuli and between adults and young monkeys with respect to monitoring. This study was made in the Parque Nacional Iguazú, Misiones, Argentina. Two models were constructed of ocelots, three of snakes and two of eagles. We measured the time spent watching in each situation using a t-test. Statistically significant differences were determined between natural and experimental conditions. There was a significant increase in the time spent in watching in the presence of predators. Greater, statistically significant reactions, were found with ocelot and eagle stimuli than with snakes. We also found that adults in natural situations spent more time in watching than young monkeys, although in experimental situations the difference between them was not significant. These results are consistent with others found for different primate species.

2. VOCAL COMMUNICATION IN DOMESTIC CATS (*Felis silvestris catus*)

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Domestic cat vocalizations were recorded and analyzed in order to achieve a complete repertory analyzed with modern computational techniques. In previous papers, the analyses are incomplete and done with old spectrographic techniques. Calls from 11 females and 15 males from Tucuman homes were recorded in different contexts (food solicitation, aggression, mother-kitten interaction, etc.) and analyzed with the computer program Praat. Out of the 12 vocalizations cited for the domestic cat, we recorded almost all, including mews from different contexts, purrs, growl and gurgle. The male sexual call was analyzed for the first time: the physical parameters include a fundamental frequency (F) of 385-427 Hz, a minimum F of 385-468 Hz, a maximum F of 4235-5434 Hz, duration 0.8-1.9 sec; the call is tonal. This call has been listed but never before recorded or analyzed. The presence or absence of bouts of mews was determined and bout characteristics measured. The complete vocal repertory of the cat, when completed, will be used as a tool to contribute to animal welfare.

3. TIME VARIATION IN *Promecops claviger* AND *Lagria villosa* (COLEOPTERA) POPULATIONS IN THE SOYBEAN CROPS IN TUCUMÁN, ARGENTINA

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Beetles are an important component of soybean crops. In this work we studied the population variation of the two prevalent species *Lagria villosa* F. (Lagridae) and *Promecops claviger* Hustache (Curculionidae). Weekly surveys were done at INTA Santa Rosa-Leales and Tala Pozo-Burruyacu (Tucumán) during the 2007 crop season. Both species showed time variations when compared with the 2006 season data. During 2006 the dominant species were *L. villosa* in Leales and *P. claviger* in Tala Pozo while in 2007 the population of *L. villosa* decreased and the relative importance rates (IR) did not consider it as the dominant species in Leales. *P. claviger*, on the other hand, continued to be the dominant species in Tala Pozo. The analysis of the 2007 population fluctuation of both species (related to the phenological state of the crop) showed that it was different from the one in 2006. *L. villosa* showed no important population increase during the fructification period. *P. claviger* population, on the other hand, increased during the flowering period but not during the vegetative period as in 2006. It is important to study the variations in the population pattern in order to define control strategies.

4. MINIMAL GROUP OF SUSTAINABILITY INDEXES ADJUSTED TO SOY PRODUCTION IN THE PROVINCE OF TUCUMÁN

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Soy production represents the third economic activity of the province of Tucumán, with an approximate surface of 270,000 hectares. A sustainable conduction of the agroecosystems of this crop is essential in order to conserve natural, social and economic resources. Indicators are required to quantify the modifications that are produced in the different aspects considered. A sustainability indicator (SI) is a set of data designed to answer questions about a phenomenon or a given system; it is based on the original information available about the system analyzed. The aim of this work was to select a minimal group of indicators of sustainability adjusted to the soy production in the province of Tucumán with which to assess the tendency of the sustainability or unsustainability of these systems. Eighteen indicators were selected, included into the four pillars of sustainable agriculture: Environmental, Social, Economic and Institutional. All of the selected indicators constitute a tool to quantify and simplify phenomena and complex realities, thus enabling comparison of management systems or determination of the tendency of the sustainability of the soy agrosystem.

5. CALORIMETRIC STUDY OF SEED GERMINATION OF SOYBEAN CV. DM5.8RR STORED AT 5 AND 25°C

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Calorimetry is a technique that measures the heat evolved by any process that occurs in a seed during germination. We have developed a method based on this technique to monitor seed germination. In this work the causes of different quality in two lots of soybean (*Glycine max*) cv. DM5.8RR harvested at the Agro-Industrial Experimental Station Obispo Colombres, Tucumán, Argentina, in 2010 were investigated. Lot 1 (L1) had a germinability of 93% whereas lot 2 (L2) had only 62%. Seeds L1 were stored at different relative humidity (RH) at 25°C whereas those of L2 were stored at 5°C at the same RH. Water content (WC) of seeds was determined when equilibrium with RH was reached. Results showed: i) seeds have three stages of germination in agreement with the results of other monitoring methods, ii) poor quality of L2 is due to mechanical damage and iii) roots of seeds stored at 5°C protrude with more vigor than those stored at 25°C (higher heat flow). These results showed again the usefulness of calorimetry for this type of investigation.

6. GERMINATION AND RADICLE ELONGATION OF QUINOA SEEDS ARE DIFFERENTLY AFFECTED BY LOW Ca²⁺ CONCENTRATIONS

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Calcium is an abundant element in the lithosphere, 60-80% being found in the soil as Ca²⁺. It is an essential nutrient for plant growth: it promotes cell enlargement, participates in mineral nutrition, and strengthens and stabilizes the cell wall. Calcium levels that affect both germination and radicle elongation are still unknown. In this work, we analyzed the effect of different Ca²⁺ levels on germination percentage and radicle elongation of quinoa seeds. Seeds (cv. CICA) and different CaCl₂ solutions were used. Germinated seeds were recorded every two hours during a 12 h period. Radicle length was measured with a digital caliber. Results showed that low Ca²⁺ levels affected the temporal pattern more than germination percentage. Germination increased until 6 h at 10 mM of CaCl₂. Radicle length increased up to 3 mM Ca²⁺, while at higher levels it decreased. On the basis of the results obtained, we could infer that Ca²⁺ favors radicle growth of quinoa seeds during the early germination process with no changes in germinative response. Both parameters decreased at 20 mM, indicating that high levels of Ca²⁺ affect the deposition of new cell wall material.

7. GERMINATION OF *Morrenia odorata* (HOOK. & ARN.) LINDL.

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Morrenia odorata (Hook. & Arn.) Lindl. is a native plant used for medical purposes by rural inhabitants in Santiago del Estero where its fruits are consumed either raw or as jam. Tests aiming at assessing the incidence of various scarifying treatments on *M.odorata* germination were performed. The treatments were: a) 5 min bathing using concentrated sulfuric acid followed by a half an hour washing using water; b) 40°C water soaking followed by cooling to 20°C; c) sanding; d) unscarified blank. The culture was carried out on paper towels imbibed in distilled water that after being rolled and placed in polyethylene bags were placed in a germination chamber at 30-20°C. Daily records were taken for 30 days. The experimental design was randomized entirely with 5 repetitions of 20 seeds each. Both the germination percentage and germination average time (GAT) were estimated. The results were analyzed with ANOVA and Tukey's test ($\alpha = .05$) using the 2010 INFOSTAT. The unscarified blank showed 80% of germination while the samples treated as indicated above gave: 79% (b); 46% (c); and 24% (a). As to germination rates, those of the blank and of water soaking were similar. GAT was 23.43 for the blank, 23.10 for b), 5.73 for a) and 13.10 for c). The results show that the treatments designed have little incidence on the germination process; the effect of other treatments should be evaluated.

8. PRELIMINARY STUDY OF THE EFFECT OF IMBIBITION IN THE EXTRACT OF AN EARTHWORM COMPOUND SUSPENSION ON THE RADICLE EMISSION OF BEAN SEEDS WITH INDUCED DETERIORATION

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This research was aimed at evaluating the effect on radicle emission of imbibition in two concentrations of the extract of a vermicompost:water (1:5 and 1:2.5) suspension and in water (control). The experimental design included (for Perla INTA (white) and NAG 12 (black)) three treatments of mechanical deterioration: 0= without injury; two and four impacts. The germination results showed that in white bean seeds without deterioration and with two impacts both concentrations of the earthworm compound cause 8 h advance in radicle apparition, and only the 1:2.5 extract caused a 24 h delay in more deteriorated seeds. With respect to black beans, both extracts caused a 48 h delay in the apparition of radicles for seeds with two impacts, and a 18 h delay for those with more intense deterioration compared with the control. Furthermore, both concentrations of the extract affected radicle growth in the three treatments. We concluded that, for both bean cultivars, imbibitions in a vermicompost extract compound modifies the time for radicle emission in a differential way, and NAG 12 is the cultivar most sensitive to the depressor effect exerted by both extracts on radicle growth.

9. EFFECT OF SALINITY ON THE GERMINATION AND ABSORPTION OF QUINOA SEEDS AT DIFFERENT STAGES OF PHYSIOLOGICAL MATURITY

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Among the less developed species in agroecosystems with less benign microclimates in Catamarca, we can mention Quinoa (*Chenopodium quinoa* Willd.) as an example of Andean food. The aim of the experiment was to determine the effect of salinity on the germination and absorption of quinoa seeds at different stages of physiological maturity, depending on coat color (white, brown or black). Treatments consisted of subjecting the seeds at different maturity stages to different concentrations of NaCl: T1. 0.0m; 0.05M T2: T3. 0.15M., with 4 replications of 50 seeds each. ANOVA and comparison of means using Tukey's test with 99% confidence were performed. We assessed germination at 7 days and water absorption at 24 h of incubation. The results indicated that no significant differences were found in the tested material with the different treatments. With respect to absorption of salts there were differences between the different degrees of maturity of the quinoa seeds but not between treatments. Differences were expressed at different levels of maturity of the seeds tested, corresponding to the highest percentages of germination for seeds of greater maturity. We concluded that quinoa tolerates salinity at low NaCl concentration while mature seeds tolerate higher salinity.

10. DETERMINATION OF THE EFFICACY OF GLYPHOSATE IN THE CONTROL OF *Borreria spinosa* (L.) Cham. & Schldl.

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The objective of this work was to evaluate the efficacy of glyphosate applied to the vegetative stage of *B. spinosa*. The essays were made under controlled conditions in the Experimental Field of FAYA-UNSE. Plants were extracted from non-cultivated areas and transplanted into pots. The evaluated doses of the glyphosate 48% were 720; 1080; 1440; 2160; 2880; 3600 g.e.a.ha⁻¹ and untreated control. The experimental design was completely randomized with 4 replications. At 10 and 22 days after application a visual estimation of the herbicide effect was made. At 22 days plants were harvested, then separated into pieces and placed in a stove at 80°C. Biomass reduction percentage was calculated. The control of *B. spinosa* at the vegetative stage with glyphosate was moderate at 720 and 1080 g.e.a.ha⁻¹, severe at 1440, 2160 and 2880 g.e.a.ha⁻¹ and total at 3600 g.e.a.ha⁻¹. The species proved to be tolerant at the normal herbicide doses, 720 and 1080 g.e.a.ha⁻¹. In order to obtain control greater than 80%, doses higher than 1440 g.e.a.ha⁻¹ are required. It is concluded that *B. spinosa* is a tolerant weed to the usual glyphosate dose.

11. DIAGNOSIS OF THE MANAGEMENT OF CITRUS FARMS IN THE SAN MARTIN AND SILIPICA DEPARTMENTS OF THE PROVINCE OF SANTIAGO DEL ESTERO

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The production of citrus fruits in Santiago del Estero has decreased during the past 50 years even with excellent fruit quality and the possibility of early harvesting. The reason for this progressive reduction was analyzed in the Silipica and San Martín Departments, where 25 commercial farms were visited twice a month. Twenty-three variables, such as orange, tangerine and grape fruit areas; age of plants; incidence of frost, hail, wind and soil salinity, presence of curtains, watering, pruning, fertilization; control of pests diseases, rootstock and weed control were analyzed with the multivariate approach ACM with Escofier discretization on quantitative variables (SPAD 3.5 statistical package). The results showed that 65% of the soils displayed accumulation of soluble salts as well as high level groundwater due to improper use of irrigation water and deficient drainage. In general, the plants were old, some curtains were damaged, and some plants presented symptoms of drought in farms with available irrigation channels. In spite of these localized problems, neither wind or frost damage nor symptoms of serious pests or diseases were found. We concluded that the low yields of citrus farms are due to poor management technology, since no other limiting factors could affect their production.

12. IMPACT OF POPULATIONS OF THE WHITEFLY *Bemisia tabaci* ON JAPANESE MINT (*Mentha arvensis* L)

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The whitefly *Bemisia tabaci* G affects the Japanese mint grown in the irrigation area of Santiago del Estero. The aim of this work was to determine the population density of *Bemisia tabaci* G that could affect the yield and composition of essential oils of this mint. The study was conducted in a crop implanted in the Experimental field of the Faculty of Agriculture. Plots of 72 m were separated by 20 ridges with 0.60 m spacing between them. The experimental design was randomized blocks with six repetitions. The adult whiteflies were counted weekly in the early morning to prevent their flight. Five plants were selected at random from each plot and two branches from each were examined under a microscope. Ten leaves from different plant heights were examined to determine the number of nymphs and pupae per leaf. The essential oils were extracted by distillation and chemical composition was determined with gas chromatography and mass spectrometry. The results were analyzed with ANOVA and Tukey's test. The amount of adults, although low during the fall, increased in spring, exhibiting peaks between October and November. The content of essential oils decreased 30% in infected plants. It is concluded that 9 adults per leaf are enough to reduce the content of essential oils and menthol.

13. PHYTOSOCIOLOGICAL SURVEY OF WEEDS IN THE CENTRAL SUGARCANE CROP REGION OF TUCUMÁN (AR)

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Phytosociological survey is a remarkable tool for future action using bioecological strategies necessary for sustainable crop management. The objective of this work was to survey available species in the sugarcane agroecosystem of the central Tucumán region. The study was carried out in 2008-2011, in a sugarcane region of 1230 km², from the Salí River (East); Piedmont area (West); Concepción (South) and Los Nogales (North). Extensive areas method (Chaila, 1986) with quantitative and qualitative sampling of covering-abundance was used: 32 sampling stations were used. The following were carried out: a) quantitative readings in 1m²; b) qualitative readings for extensive areas; c) photos of sugarcane plots, weed species and established populations; d) collection of species for systematic characterization. We found 55 species distributed into 15 families and unispecific populations of *Sorghum halepense*, *Eryngium elegans*, *Eryngium ebracteatum*, *Sicyos polyacanthus*, *Ageratum conyzoides*, *Eupatorium laevigatum*, *Panicum maximum*, *Canna coccinea*, *Ricinus communis*, *Alternanthera philoxeroides*, *Equisetum giganteum*, *Solanum nigrum* and *Digitaria insularis*. We concluded that there are 55 outstanding species and 13 unispecific populations in the sugarcane crops in the central Tucumán region.

14. SEED CONTRIBUTION AND EMERGENT POPULATIONS OF *Panicum maximum* Jacq. IN SUGARCANE CROPS IN THREE TUCUMÁN LOCALITIES

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P. maximum (PANMA) is an important weed in Tucumán sugarcane plantations due to management system alterations. The objective of this work was to study emergent populations from the seed production and contribution at different localities. We worked in cv LCP 85-384 from 2009 to 2010 at El Ceibal, Santa Bárbara, Los Nogales. The study area was 4,800m². Initial plants were counted in December 2009, offspring establishment in January 2010, seed production in May 2010, and emergent populations in November 2010. ANOVA and Tukey's test were used in initial, intermediate and final populations. Seed production averages from initial plants were 905.00 seeds/pl⁻¹; 50,990.67 seeds/m²; 509,906.10³ seeds/ha⁻¹. Those seeds originated an emergent weed population of 1,073,333.33 pl/ha⁻¹ out of which an average of 135,733.33 pl/ha⁻¹ survived. Brute Mortality Rate (BMR)= 385.33‰; Brute Natalivity Rate (BNR)=614.67‰; Survival (Sv)=135.73‰; Survival Probability (SvP)=0.13‰. This indicates poor seed production per stem. A large number of seeds do not enter the soil bank due to adverse factors. BMR is intermediate and SVP is low. Los Nogales has high and El Ceibal low BMR. At El Ceibal, BNR is very high. Weed populations are becoming stabilized with low survival rates.

15. ASSOCIATIVE VALUE (As) OF THE *Sicyos polyacanthus* Cogn. AND *Panicum maximum* Jacq. ASSOCIATION IN SUGARCANE CROPS IN TUCUMÁN

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S. polyacanthus (SIYPO) and *P. maximum* (PANMA) are high aggressiveness sugarcane weeds. The objective of this work was to determine the associative characteristics between SIYPO and PANMA in competition with sugarcane crops in quantitative terms. We worked at Los Nogales in cv LCP 85-384, 3-year ratoon, in 2010. In a commercial plantation, 7 plots were established at random (160 m²). Mulching cultivation with no mechanical labor, watering or herbicides was performed, with nitrogen fertilization (90 kg/ha⁻¹). Abundance-Covering methods (Chaila, 1986) per class ranging from 0 (none, 0%) to 6 (abundant, 100%) were used. Abundance, covering and aggressiveness were evaluated. The quantitative association value was obtained from the collected data. For *Sicyos*, A=2; C=6; IAM=30; for PANMA, A=3; C=4; IAM=13.21. Associative value, As=38.74, is high and indicates important losses for competition in sugarcane production. Losses were: 42.27% of cane and 37.93% of sugar. Conclusion: a) the associative relationship between SIYPO-PANMA interacts with high values of abundance, covering and aggressiveness to generate As, a value that expresses the damage caused to yields; b) the covering of SIYPO is higher than that of PANMA and so are the aggressiveness values.

16. MANIFEST AGGRESSIVENESS AND LAW OF AGGRESSIVENESS IN THE BEHAVIOR OF *Panicum maximum* Jacq. IN SUGARCANE

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P. maximum (PANMA) is an important weed in Tucumán sugarcane crops. Weed aggressiveness indicates the population advance in terms of invasion, colonization and establishment. The objective of this work was to determine manifest aggressiveness by means a model and to establish a law of PANMA aggressiveness in sugarcane. The experiment was carried out at García Fernández, Santa Bárbara, Los Aguirre, in cv LCP 85-384 in 2010. Plots were of 80 m², with 5 replications. Areas of high infestation density were considered with 120 to 150 stem/m². An Abundance-Covering visual evaluation method per class ranging from 0 (none, 0%) to 6 (abundant, 100%) was used. For MAI (Manifest Aggressiveness Index), a simple model relating Abundance to Covering with respect o Total Covering and a n-parametric statistical analysis (Kruskal-Wallis test) were used. At García Fernández A = 4; C=5 and MAI= 12.90. At Santa Bárbara: A = 3; C=4 and MAI=13.50. At Los Aguirre: A = 4; C=6 and MAI=14.10. Greatest aggressiveness index, weed covering and production losses were found at Los Aguirre. The aggressiveness laws are: 1st) the higher the MAI, the greater the aggressiveness; 2nd) the higher the MAI, the greater the covering; 3rd) the higher the MAI, the lesser the abundance; 4th) the greater the aggressiveness, the greater the competition. A model with different classes can be valid for the determination of manifest weed aggressiveness.

17. ASSOCIATIVE LEVELS OF *Panicum maximum* Jacq. IN SUGARCANE CROPS FOR LOS NOGALES (TUCUMÁN)

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P. maximum (Poaceae-PANMA) is an associated weed in the sugarcane agroecosystem. The objective of this work was to determine the association levels for the sugarcane infesting species. We worked at Los Nogales in cv LCP 85-384 and cv TUC 77-42 (2010). In a commercial plantation 4 plots of 5-15 meter long furrows were established. Abundance-Covering evaluation methods per class ranging from 0 (none, 0%) to 6 (abundant, 100%) were used. Abundance-Covering and Manifest Aggressiveness were evaluated. A quantitative association value was obtained from a model that relates abundance, covering, aggressiveness and frequency for each weed. The greater frequency of the accompanying species indicates the inclusion as an associated weed. Parametric and non-parametric statistical analyses were carried out. Each association order has a similar associative value (As) and similar densities. First order has densities above 18 pl.m⁻² and As above 12. Second order has densities of about 16 pl.m⁻² and As close to 7.5. First Order weeds for LCP 85-384 were *Sicyos polyacanthus*, *Sorghum halepense*, *Cynodon dactylon*. For TUC 77-42: *Sorghum halepense*, *Cynodon dactylon*. We concluded that in the sugarcane crop weed associations have 4 orders and may have 5 depending on the cultivar.

18. BIOCHEMICAL CHARACTERIZATION OF SUGAR CANE WASTE AND RATES OF DECOMPOSITION IN CONTRASTING SOILS OF NON SALINE DEPRESSED PLAINS, TUCUMAN, ARGENTINA

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In the province of Tucuman in the sugarcane area, over 200.000 ha are grown, 50% of them in the depressed plain region. Soils in this area are of alluvial origin, very heterogeneous and spatially affected by the presence of a shallow water table. These soils must be handled in order to keep a residue cover on the surface trying to increase their organic carbon content and their structural stability. The biochemical composition of the stubble of harvested green cane and how this composition, along with soil features and climatic conditions, influence their rate of decomposition were determined. Clay loam Fluventic Argiudolls (Fa) and sandy loam Hapludoll fluvacuentics (FA) with poor and imperfect drainage respectively were studied. Woven bags were filled with 40 g of stubble (litter bags technique) and placed in the track and the furrow, and buried on soil surface. Bags were removed periodically. Lignin acid detergent (LDA), nitrogen-free extract (ENN), crude fiber (CF), humidity, ashes, proteins, crude fat, carbon-nitrogen ratio, temperature and soil moisture were measured. Results for cane and leaf respectively were: LDA: 10, 6% and 3.2%; FB%: 36.8% and 20.8; ENN: 41.7% and 62%. Values of the rate of decomposition fluctuated between 25 and 48%, the highest value being for leaf litter and buried stubble in FA.

19. PRELIMINARY CHARACTERIZATION OF THE FERN *Pteris vittata* L. FOR ORNAMENTAL USE AS CUT FOLIAGE

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In Argentina the use of fern as cut foliage is related to extractive activities. With a view to the incorporation of fern to the productive process, we evaluated the potential of *Pteris Vittata*, a species of Chinese origin. The evaluations were performed in the province of Tucumán between 4/01/11 and 21/02/11, on 7 transplanted plants (15/07/10) in flowerbeds under greenhouse conditions. Variables observed: 1) Length of leaves, from the petiole to the end of the leaf (LF), 2) Number of fronds for plant (NF), 3) Number of new shoots (NB), 4) Rate of growth (TC) and 5) Life in a glass (Vv), which measure the number of days during which the foliage maintains its fresh aspect, without withering and/or rolling, tanning or shedding of leaves. The LF of 10 leaves/pl was evaluated (03/03/11). At the same time, 7 weekly evaluations of NF and NB were performed. For evaluation of Vv, 10 mature leaves were placed in glass flasks of 250 cc (water pH 7.8 and CE 1.1 ds/m) which were placed in a hot, luminous and drafty environment. The average results were: LF of 62 cm, NF of 22 fronds/plant, NB of 4.8 shoots/plant, TC of 9.2 cm/week and Vv of 15 days. *P. vittata* meets the conditions of post-harvest duration and of growth and development necessary to consider its capacity for cut foliage and to plan further studies to develop a productive alternative.

20. VISUAL ABUNDANCE-COVERING METHOD FOR THE DETERMINATION OF AGGRESSIVENESS INDEX OF *Panicum maximum* Jacq. IN SUGARCANE FOR SANTA BARBARA (TUCUMÁN)

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Because of structural changes in sugarcane management systems in Tucumán, *P. maximum* (Poaceae-PANMA) has become the main weed with great aggressiveness and competes with crops for resources. The objective of this work was to establish a method to determine aggressiveness by means of the Abundance-Covering evaluation. We worked at Santa Bárbara in cv LCP 85-384 in 2010. Plots were randomly established 100 to 150 stem.m⁻² in a commercial plantation in a high infestation area. Abundance-Covering evaluation methods (Chaila, 1986) per classes ranging from 0 (none, 0%) to 6 (abundant, 100%) were used. For Manifest Aggressiveness Index (MAI) we used a simple model which related Abundance-Covering with respect to Total Covering. Adequate statistical analyses were used. The average results were: A=4; C=5; MAI=12.60. Because of the high aggressiveness value, losses were 39.44% for cane and 36.28% for sugar. There were no significant differences between plots for Abundance-Covering. There were statistical differences in the two extreme values of the index. It is concluded that the visual method with the different classes for abundance-covering of a weed can be valid to determine its manifest aggressiveness.

21.

THE PREDATORY CAPACITY OF *Ceraeochrysa claveri* (Neuroptera: Chrysopidae) ON TUNA MOTH EGGS *Cactoblastis cactorum* (Lepidoptera: Pyralidae) IN LABORATORY CONDITIONS*Reguilón C¹, Flores G¹, Correa M del V², Valoy M¹, Andraca G³, Ordano M¹.**¹Fundación Miguel Lillo. Miguel Lillo 251. 4000. Tucumán. Argentina. ²INSUE (Instituto Superior de Entomología "Dr. Abraham Willink"). ³UNAM (Universidad Nacional Autónoma de México). E-mail: c_reguilon@yahoo.com.ar*

Prickly pear (*Opuntia ficus indica*) cultivation is of great importance in arid and semi-arid regions of northwestern Argentina. The moth *Cactoblastis cactorum* is the main pest that attacks plants, leading to loss of production. *Ceraeochrysa claveri*, one of the seven species of the genus *Ceraeochrysa* in Argentina, is considered promising for biological integrated pest control due to its potential as predators of crops pests. The aim of this paper was to evaluate the predatory capacity of *C. claveri* on *C. cactorum* eggs in the laboratory. The rearing of the moth took place in the CIRPON camera and the rearing of chrysopas and the predatory testing in a laboratory (T: 25-27°C, HR:40-60%). We evaluated the ability of daily predation (number of prey consumed) in the third stage larvae of *C. claveri* on eggs of *C. cactorum*. It was determined that *C. claveri* during the third instar larval stage preys on an average of 56.47 ± 9.89 eggs of the pest. The results show for the first time data concerning the capacity of *C. claveri* to act as a natural enemy for the control of the prickly pear moth.

22.

COMPARATIVE STUDIES OF MYCORRHIZAL INOCULATION IN SEEDLINGS OF *Poncirus trifoliata* VAR. *Flying dragon* AND *Citrumelo swingle* IN TUCUMÁN, ARGENTINA*Pérez Visñuk M¹, Ortiz N¹, Brandán de Weht C¹, García R², Weht R¹. ¹Fac. Agronomía y Zootecnia, UNT. ²Citrusvil S.A. E-mail: celiainesbrandan@yahoo.com.ar*

The aim of this study was to evaluate and compare the effects of the inoculation with fungi (*Glomus intraradices*) on the behavior and evolution of seedlings of *Poncirus trifoliata* var. *Flying dragon* and *Citrumelo swingle* in a commercial nursery. Parameters studied with 5% statistical significance were root length, aerial length, fresh weight and stem diameter at the neck in 45-day-old randomly selected plants. Low numbers of spores in substrate and colonization rate. The presence of live mycophagous nematodes decreased reinfection potential and mycorrhizal fungus efficiency, harming plant-microorganism symbiosis. Mycorrhiza fertilization in *Flying dragon* (T1) did not show increases. *Citrumelo swingle* (T2) presented values higher than T1. Three parameters showed better increase in T2 than T1. Similar increases in stem diameter in both treatments. Fresh weight increase was greater in T2 than T1. Mycorrhizal inoculation on *Citrumelo* increased biomass and fresh weight. Mycophagous nematodes influenced mycorrhizal action. We concluded that with the application of nematicide products that do not affect mycorrhizal fungi but are effective in controlling contaminants, the effect of inoculants as biological fertilizers will be fully expressed.

23.

PRELIMINARY STUDY OF THE CHEMICAL FAMILY OF FATTY ACID CONTENT IN SEED OIL QUINOA BY GAS CHROMATOGRAPHY*de la Quintana L, Luna G, Martínez S.**Departamento Química. Facultad de Ciencias Exactas y Naturales. Universidad Nacional de Catamarca. Av. Belgrano 350. 4700. San Fernando del Valle de Catamarca. Argentina.**E-mail: gluna_61@yahoo.com.ar*

Quinoa is a species that grows in the Andean region of the Catamarca province. Quinoa seeds are an interesting subject for study because of their protein value and the presence of polyunsaturated fatty acids. The aim of this study was to determine the composition of fatty acids in quinoa oil. Six samples (creole variety) were randomly collected in April-May 2010. They were cleaned, treated for desaponification and dried before milling. The lipid fraction was extracted with hexane with the Soxhlet's procedure for a period of six hours at 50°C and analyzed by gas chromatography. Average oil yield 7.85%, percentage of unsaturated fatty acids 87.26%. Chromatogram analysis revealed: palmitic acid (C: 16) of 9.02%, stearic acid (C: 18) at 0.49%, oleic acid (C 18:1) 37.92% and linoleic acid (C: 18: 2) 49.36%. The proportion of unsaturated fatty acids is comparable to sunflower oil (87.3%), olive oil (78%), soybean oil (79%) and corn oil (85.8%), demonstrating the quality of this oil that would provide a large percentage of the fatty acids required daily.

24.

MINERAL COMPOSITION OF GRAINS OF QUINOA (*Chenopodium quinoa* Willd) GROWN IN THE CATAMARCA PUNA*Luna G, de la Quintana L, Martínez S.**Departamento Química. Facultad de Ciencias Exactas y Naturales. Universidad Nacional de Catamarca. Av. Belgrano 350. 4700. San Fernando del Valle de Catamarca. Argentina.**E-mail: gluna_61@yahoo.com.ar*

The cultivation of quinoa is an option as an alternative food production due to its high nutritional value. Quinoa seeds have a relatively high content of phosphorus, potassium, iron, calcium and other minerals which are usually low in plant foods and allow the body to perform its vital functions. The aim of this work was to determine the mineral content of quinoa grain grown in Catamarca. The grain belongs to the creole variety. Six samples were taken at random during the April-May 2010 harvest season. The mineral content was analyzed according to AOAC Standards and IBNORCA. We obtained the following results: 1.745% calcium, 0.65% phosphorus, 0.51% potassium and 48.75 ppm iron. These values are consistent with the literature that points out that the calcium and phosphorus content in quinoa represents up to 65% of the total ash content and is higher than those of other cereals. The high mineral content, especially calcium, provides more nutrients than other crops. These qualities make quinoa a mitigating element in mountain communities that usually suffer from food deficiencies.

25. *Echinochloa colona* (L) Link GERMINATION STUDIES

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Echinochloa colona (L) Link (*Poaceae* family, *Panicoideae* sub-family, *Paniceae* tribe) is a weed in rice, soybean and citrus crops called "pasto overo". In 2008 a glyphosate resistant biotype was detected in soybean crops in northwestern Tucuman in the Tajamar river basin, collected by De Marco, N. This weed is a summer-annual herb of 15 to 70 cm length, tufted with straight to decumbent cane stem. Caryopsis of 1.4 to 1.8 mm length. The aim of this paper is to determine the germination behavior of *Echinochloa colona* glyphosate resistant seeds on soybean crops and wild plants. The trials were made using caryopsis (**Sg**) from a soybean crop with recommended glyphosate doses at Timbó-Viejo, Tucumán, and also from wild plant seeds (**Ss**). The germination assays were conducted in a greenhouse in April 2011 with temperatures from 15.5 to 25 degrees Celsius. About 100 seeds **Sg** and **Ss** were planted in germinating trays with 5 repetitions with the same substratum and humidity conditions. The **Sg** planted germinated: after 3 days, 55 seeds, after 8 days, 25 seeds and after 11 days, 12 seeds. The **Ss** also germinated: after 11 days, 30 seeds, after 15 days, 20 seeds and after 20 days, 10 seeds. From these first results we can infer the emergency hits and the most important shock cohorts in order to optimize the cultural practices of control with respect to the proper time for herbicide application.

26. EFFECT OF STORAGE TIME OF *Zea mays* VAR. *Amileasaccharata* SEEDS ON SEEDLING GERMINATION AND GROWTH

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In the Andean valleys of Jujuy, maize (*Zea mays*) is a product of mass consumption. It can be found almost anywhere in our territory, and is one of the few crops in commercial seed production. The objectives of this research were to evaluate the morphological changes in seeds of *Zea mays* var. *amileasaccharata* fresh and aged and inoculated with plant growth promoting rhizobacteria (PGPR) *Pseudomonas fluorescens* (H6) and *Bacillus thuringiensis* (D3) strains, and then determine the strength and viability of seeds by different methods. The samples used were seeds stored for a period of 6 months to 1 year and recently harvested seeds. We defined the following treatments: Control (uninoculated seed), T 1 (0.5 ml/100g of seeds strain H6) and T 2 (0.5/100g of seeds strain H6 + D3). We determined: 1) morphological alterations of seeds and seedlings germinated; 2) with the Tetrazolium test abnormalities were identified at an embryonic stage. The plant growth promoting bacteria significantly stimulated germination and seedling growth of corn (T1 and T2) from fresh seeds. However, no significant differences were observed when comparing the control with the T1 and T2 plants from stored seeds. Storage time of *Zea mays* var. *amileasaccharata* seeds is an important factor associated with seedling growth.

27. IN VITRO ANTAGONISM OF *Trichoderma* spp. AGAINST *Fusarium* spp. ISOLATED FROM SOYBEAN

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Microorganisms can be used for the biological control of plant pathogens. *Fusarium* spp. produces seed rot and seedling blight in soybean. The aim was to evaluate the antagonistic capacity of *Trichoderma* strains against *Fusarium* isolated from soybean. The dynamics of growth of 4 *Trichoderma* isolates and *Fusarium* as well as pathogen-antagonist interaction were determined. Readings of orthogonal diameters of the colonies were performed daily and the percentage of occupied area (PAO) was adjusted. Competition for substrate was studied by direct confrontation and PAO for each organism was performed on both colonies until confrontation. The antagonistic capacity of *Trichoderma* strains was evaluated according to Elías-Arcos and Bell scales. A PAO of 22-25% was observed at 72 h for all *Trichoderma* strains while the pathogen reached only 3% of PAO. Ty was the first isolation to achieve 100% of PAO in 144 hours. *Trichoderma* strains reduced PAO of *Fusarium* in direct confrontation assays between 43 and 55% at 144 h. Tw and Ty fall into Class 1 (Bell scale) and Grade 4 (Elías and Arcos scale), while Tx is Class 3 and Grade 0. Tz is less aggressive (Class 2 and Grade 2). These isolates showed a significant antagonistic capacity toward *Fusarium*, proving to be potential biocontrol agents of plant pathogens.

28. SHADE IN PEANUT GENOTYPES. I: EFFECT ON GROWTH AND PARTITIONING

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Shade could produce reductions in biomass and partitioning (*p*) of peanut. A field study was conducted under free water conditions (2010/11) to evaluate the shading effect in two peanut genotypes (Granoleico and Utre) sown in Oct-08. After R3 stage, shade was applied using a mesh with 85% of light exclusion for 10-day periods, 3 for Granoleico (GS1, GS2 and GS3) and 2 for Utre (US1 and US2). Dry matter was measured by sampling plants at regular intervals, and used to calculate CGR and *p*. Growth decreased under shade in both cultivars, but after stress it continued with similar or somewhat lower rates than control, total biomass accumulated at the end being lower in all treatments. The decreases were 13 and 20% for US1 and US2, and 12, 18 and 35% in GS1, GS2 and GS3, respectively. A similar tendency was observed in pods biomass. Cultivars and shading showed a similar *p*-pattern, where at the beginning of the crop season the largest *p* was to leaves and stems, and later to pods. After the stress, plants under shade had a *p* increase to leaves which was higher in early shade (US1 and GS1), and lower in later ones, when filling pods became an important sink. Thus, *p* to pods in GS1 and US1 was nil during shade, but in US2, GS2 and GS3 *p* was equal or greater than control, showing the sink strength effect on the *p* pattern.

29.

SHADE IN PEANUT GENOTYPES. II: EFFECTS ON YIELD COMPONENTS AND MARKET QUALITY

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Shade could reduce number and weight of pods and market quality in peanut. A field study without water limitation was made in 2010/11 to study shade effects on yield, yield components and seed size. Two cultivars, Granoleico (G) and Utre (U), were sown in Oct-08 and after the R3 stage shades were applied for a 10-day period (mesh 85% of light exclusion), 3 for Granoleico (GS1, GS2 and GS3) and 2 for Utre (US1 and US2). The shade reduced pod yield 14, 22 and 33% for GS1, GS2 and GS3, and 17 and 34% for US1 and US2 with respect to control, which yielded 8493 (G) and 5123 (U) kg.ha⁻¹. No differences between treatments were found with respect to sound mature pods, shelling % and number of seeds per pod. However, direct yield components showed a high correlation with yield, pod number (R² 0.85 *p*<0.0001) and pod weight (R² 0.57 *p*<0.05). Pod number decreased on average 11% for both cultivars due to the shade effect, but the difference was not significant. Individual pod weight decreased 15% (*p*<0.05), affecting confectionery yield, which was 78, 72 and 69% for GS1, GS2 and GS3, and 71 and 65% for US1 and US2, while for control it was 87 (G) and 79% (U). Pod yield and market quality decreased in response to the lower incident radiation (shade) at different times of the reproductive stage in both cultivars. The lower yields agreed with decreases in pod number and weight, and the lower market quality was due to lower pod weight, particularly in the late shade treatments.

30.

RESULT OF MINERAL NUTRITION AND ORGANIC SOLIDS CONTENT IN VEGETATIVE ORGAN MATURITY AND FRESH STRAWBERRY PLANTS IN A TAFI DEL VALLE NURSERY, TUCUMÁN, ARGENTINA

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The aim of this work was to evaluate the contribution of mineral and organic nutrition to dry matter content in vegetative organs and maturity in fresh strawberry plants cv. Camarosa in a nursery in Tafi del Valle in 2009/10. The experimental design was RCB with 7 fertilization treatments: 1. Control; 2. Nutribacter 3l/ha⁻¹; 3. Manure (10t.ha⁻¹); 4. Nutribacter 3l/ha⁻¹+manure (10t.ha⁻¹); 5. Nutribacter 3l/ha⁻¹, 159+UFP/ha⁻¹ 130UFN/ha⁻¹; 6. Manure (10t.ha⁻¹)+159 130UFN/ha⁻¹ UFP/ha⁻¹; 7. 130UFN/ha⁻¹+159 UFP/ha⁻¹ and 5 repetitions. Dry matter (%) in total plant (TDM), crown (CDM) and root (RDM) and plant physiological maturity measured by Plant Harvest Index (PHI) was evaluated. ANOVA, Tukey's test and Pearson's correlation coefficient were used. Dry matter content of TDM in 7 (52 639) and 3 (51 732) were lower than control; CDM showed no significant differences; RDM in 7 (41 655) and 3 (38 955) had contrasts with respect to the control (28 997); PHI: 3 (48 268) and 7 (47 361) were significantly different from control (37 986). Significant differences were found between RDM (35.512) and CDM (8.6894). Positive correlation was established between PHI and RDM. Mineral and organic nutrition contributed to an increase in dry matter, mainly in the root, and maturity in fresh strawberry plants in the nursery associated with higher quality plant material.

31.

EFFECT OF NITROGEN FERTILIZATION ON THE DYNAMICS OF GENERATION AND MORTALITY OF SUGARCANE STALKS

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Nitrogen is fundamental for sugarcane performance since it participates in metabolic processes and has high manufacturing costs. Being a highly mobile element in the soil-plant system, it is leached into subsurface waters and causes environmental pollution. The aim of this study was to determine the effect of nitrogen fertilization on the dynamics of generation and mortality of sugarcane stalks. During the 2010/11 season, we conducted a field trial in the INTA Famaillá station with cultivar LCP 85-384 at 2nd ratoon crop. Treatments, consisting of 5 doses of nitrogen (0, 60, 120, 180 and 240 kg urea/ha), were arranged in a complete randomized block design with three replications. Preliminary results showed that nitrogen fertilization did not produce significant differences in the number of stalks at the end of tillering. However, it modified stalk mortality during the early-growth phase: doses similar to or higher than 120 kg urea/ha generated lower mortality until the close of the canopy, while doses similar to or higher than 180 kg urea/ha reduced final mortality. The highest leaf and stalk biomass were reached when doses similar to or higher than 180 kg urea/ha were used. Photosynthetically active radiation intercepted and leaf area index were also increased with doses similar to or above 180 kg urea/ha.

32.

EFFECT OF SOLARIZATION ON THE PRODUCTION OF PHYTOTOXIC SUBSTANCES FROM DIFFERENT ORGANIC SUBSTRATES

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The aim of this work was to determine the effect of the solarization on the germination of wild radish (*Raphanus sativus* L.) as an indicator of the action of toxic substances. In spring mount sifted humus and mount unsifted humus subjected to decomposition were solarized. The substrates were watered and covered with transparent plastic 100µ. The design was completely randomized with 4 replications. At 40, 75 and 90 days after solarization, a 2 kg sample was extracted from each plot. The Zucconi test was performed with each sample: after weighing 20 g of the sample, 20 mL water were added, followed by shaking 15 min and filtering. In Petri dishes, 100 wild radish seeds were placed on wet filter paper with 5 mL of the extracts. They were incubated in a chamber for 5 days at 20°C. Germinative power and radicle length were determined. Increases in germinative power and radicle length with respect to the non solarized control were found with the three solarization periods assayed. The highest values were obtained when substrates were solarized for 75 days, with increases of up to 35% in germinative power and 2,5 cm in radicle length. It is concluded that solarization of the substrates does not produce toxic substances that can inhibit either germination or radicle growth in the indicator species.

33. ORGANOCHLORINE PESTICIDES IN VINASSES

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This work starts the study of organochlorine pesticides (OP) in vinasses. The sugar-alcohol industry produces vinasses as residues (about 12 L/alcohol L) that are poured into the hydrologic system, thus a study of OP in vinasse is justified. There are no data on the presence of OP in vinasses. Most of the current studies focus on their treatment, such as concentration by evaporation and later combustion, obtaining energy and a residue rich in potassium. This work aims at analyzing the presence of OP in different vinasse fractions obtained during concentration (from 10 to 62°Bx). The mixtures studied were supplied by the Sugar Industries Department (harvest 2010). Brix measurement was used to determine evaporation grade. Eleven OP were studied. The analysis was performed with an HP6890 gas chromatograph fitted with an electron capture detector and a capillary column. Heptachlor, 0.17µg/L, was detected in the initial vinasse (10°Brix), and values of 0.15µg/L, on average, in the 5 more concentrated fractions. An increase in concentration would have been expected since solvent is evaporated, thus we assume that the vapor would have carried away heptachlor or its epoxides if they had been formed. In conclusion, only heptachlor was detected, not an increase in concentration. We believe that condensed vapors should also be analyzed.

34. MICROBIOLOGICAL, PHYSICO-CHEMICAL AND ECOTOXICOLOGICAL CHARACTERISTICS OF THE WATER OF THE LAS MADERAS RESERVOIR, EL CARMEN, JUJUY, ARGENTINA

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The aim of this work was to characterize the reservoir water quality. The study was conducted from January to December 2009. 4 sites were chosen for sampling in the reservoir. Dissolved oxygen values (mg / L) ranged from 3.7 to 12 mg / L, pH between 5.60 and 6.90, temperature between 9 and 26°C and conductivity between 320 and 178 uS/cm. Water Quality Index (ICA) for site 1 was 58. In site 2 ICA was 70 and in sites 3 and 4 it was 64. We did not detect the presence of agrochemicals. Assays with *Lactuca sativa* showed that the average germination percentage of treatments was 94.08 and 95.9% for the control, indicating that there was no toxic effect of water on germination. In most of the reservoir water samples the increase in root length was 12.3% higher on average than the control. The reservoir water samples tested in bioassays with *Lactuca sativa* L. values showed high germination rates, indicating that they are not phytotoxic and are fit for irrigation. The results obtained showed that from the point of view of the bacteriological quality of the water the area is suitable for the installation of frequently used recreational facilities.

35. SPATIAL DISTRIBUTION OF *Culicoides* BITING MIDGES (DIPTERA: CERATOPOGONIDAE) IN TWO ENVIRONMENTS OF SALTA PROVINCE, ARGENTINA

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Biting midges are known vectors of medical and veterinary diseases globally. In Northwestern Argentina they are involved in filariasis transmission caused by *Mansonella ozzardi*. The aim of this paper was to determine the abundance and spatial distribution of *Culicoides* in two types of environments through principal component analysis (PCA). Samplings were conducted during 2004-2005 in San Ramón de la Nueva Orán, El Oculito and Aguas Blancas using CDC light traps placed in forest and anthropized environments. 753 specimens were collected and five species were identified: *C. debilipalpis*, *C. lahillei*, *C. insignis*, *C. paraensis* and *C. venezuelensis*. The PCA registered in the first two axes 70% of the variability, accounted for by the temperature, the rainfall, the humidity, the wind speed and the species, *C. debilipalpis* and *C. insignis*. A new PCA applied only to species found that CP1 and CP2 registered 65% of the variation, accounted for by the abundance of *C. lahillei*, *C. paraensis*, *C. insignis* and *C. debilipalpis*. The results showed that wind speed determined a variation in the abundance of *C. debilipalpis* and *C. insignis* in both San Ramón de la Nueva Orán and El Oculito. The abundance of *C. lahillei*, *C. paraensis*, *C. insignis* and *C. debilipalpis* discriminated the forest environment of Aguas Blancas from the other localities sampled.

36. INSECTS IN MAIZE-CUCURBIT CROPS IN THE IRRIGATION AREA OF SANTIAGO DEL ESTERO

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The "fence" is an agro ecosystem of polyculture, traditional among farming families, surrounded by natural vegetation characteristic of semiarid Chaco. There is no information in our province concerning the insect species present in this type of production system. The aim of this work was to understand the complex of insects present in soil with a maize (*Zea mays*)-anquito (*Cucurbita moschata*) association. Treatments were: T1=50% maize and 50% anquito; T2=Interspersed (2 lines maize+1 line anquito); T3=monoculture maize and T4=monoculture anquito. The experimental design was random blocks with four replications and two planting dates. Two pitfall traps per plot were used and the insects captured were determined at the level of order, family and/or species and classified according to their dietary habits. The most abundant predatory species were *Megacephala* sp. (Coleoptera: Cicindellidae) and *Clivina* sp. (Coleoptera: Carabidae), whereas the corresponding most abundant phytophagous-detrivorous ones were *Gromph lacordairei* Brullé (Coleoptera: Scarabaeidae) and *Acanonicus hahni* (Stal) (Hemiptera: Coreidae). In general, in the fields with corn-anquito, population densities of phytophagous insects found were smaller than those of predatory insects whereas the number of predatory insects was higher compared to the monoculture plots.

37.
EFFECT OF PHYTOPHAGOUS INSECTS ON THE YIELD OF A CORN-ANQUITO ASSOCIATION, SANTIAGO DEL ESTERO

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The “cerco”, a traditional farming practice in Santiago del Estero, is a multi-crop-ecosystem surrounded by natural vegetation. The aim of this work was to study the effect of plant insects on the yields of the corn (*Zea mays. Leales 25 Plus*)-anquito (*Cucurbita moschata*) association with respect to the monoculture of each species in plots of equal size on two sowing dates. Treatments were T1=50% corn + 50% anquito, T2=intersowing (2 lines of corn+1 line of anquito), T3=only corn and T4=only anquito. The experimental design was random blocks with four replications. Counts of insects and damaged plants were performed weekly, in 2 m of consecutive furrows. The yields of the treatments were determined at the harvest and expressed in Kg/ha. The plant insects were *Bemisia tabaci* G. and *Diaphania hyalinata* L. In anquito and *Spodoptera frugiperda* Smith in corn. No significant damage by insects was found. Treatment ($p = 0.0304$) and sowing dates ($p < 0.0001$) were significant for corn production. Sowing date was significant ($p = 0.0002$) for anquito yield, but treatment was not. In general, crop yields were high as a result of favorable climatic conditions and low pest insect densities.

38.
Azorella compacta: A PROMISING PLANT FOR PEST CONTROL

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Plant extracts have been used for centuries throughout South America as insect repellents and insecticides. Ecological agriculture has a tendency towards becoming ecologically, economically and socially more sound than conventional agriculture. Plants of the *Azorella* genus growing in the Andean mountains of Argentina accumulate diterpenes with mullinane and azorellane skeleton. The chloroform extract (CE) from the aerial parts of *A. compacta* was analyzed by chromatographic and spectroscopic techniques. Processing of CE by column chromatography afforded a fraction from which 11,12-epoxymulin-13-en-20-oic acid was obtained (D). Both CE and D were incorporated into the diet of 2nd instar larvae of *Spodoptera frugiperda*, at 300 and 100 µg/ g of diet, respectively. We evaluated the influence of treatments on the feeding behavior, the mortality and malformations of larvae, pupae and adults. Our results showed a strong antifeedant effect on larvae with inhibition of food intake of 85% and 81% for CE and D, respectively. Compound D provoked a pupal mortality above 40%. Adults which survived after the treatment with CE and D showed 45% of malformations. This is an important step in developing rational methods for controlling pests.

39.
ETHNOMEDICAL PRACTICES FOR HEALTH CARE

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In Lamadrid, a community located southeast of the province of Tucumán, we found a coexistence of conventional and traditional medicine. The aims of this study were: a) to determine the frequency of the use of traditional medicine in the first instance in patients attending the Ramón Maza hospital of Lamadrid; b) to know the reasons for consultation and the ethnomedical practices performed. Semi-structured interviews were carried out with adults above 35 years of age who attended the Ramon Maza hospital during the April-May 2011 period. Our results showed that 31% of the patients visited a traditional healer in the first instance when a health problem appeared. The reasons for consultation were mainly problems with alcohol and removal of warts. Organic-social disorders were also reported such as evil eye, envy, witchcraft, aikadura (a children's disease caused by a fright of the pregnant mother) and fright. Other therapeutic practices such as “cura de palabra” (healing with words) (60%) and the use of medicinal plants (20%) were also found. We consider it important to know ethnomedical practices as beneficial alternative therapies.

40.
IMPORTANCE OF PRIOR KNOWLEDGE IN THE UNIVERSITY ENVIRONMENT

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The constructivist approach diagnoses the initial state of students: prior knowledge, conceptions and motivations that affect the teaching-learning process in the classroom. It is assumed that the teacher is responsible for transforming these ideas into scientific concepts. The aim of this study was to investigate the students' previous knowledge of biology and its relation to the processes of digestion and nutrition. E performed a diagnostic evaluation of students who completed the subject General and Cellular Biology of the 2nd year of the Bachelor's Degree in Food Technology. A questionnaire with 10 open-ended questions was used. The results showed that 85% of the previous ideas related to the topic were inadequate with respect to the degree of articulation, level of approach to scientific knowledge and relevance of this unit to the subject in question. We concluded that knowledge and use of the previous ideas of the student during the teaching-learning process favored the selection of teaching strategies necessary to achieve active forms of learning. This study also provided elements to focus on individual and group differences in students.

41. GUIDED RESEARCH AS A DIDACTIC BASIS FOR THE TEACHING OF GENERAL AND CELLULAR BIOLOGY

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The aim of this work is to modify the classical teaching/learning system to help students develop knowledge from the resolution of situations based on open problems through guided research. The contents of General and Cellular Biology were designed in the years 2009 and 2010, when case studies and real problems began to be incorporated into the syllabus. The proposal was structured in three distinct parts: the study guide, the materials developed by teachers and students and the evaluation process. The results show that this approach favored the independent learning of 79% of the students. 87% of them presented examples or situations where they used the contents of the course and 84% developed a reflective activity. 75% of the students presented their final reports in time. The use of the proposed methodology favored the academic performance of students during exams. As the students developed the proposed methodology, the results were: 1st partial exam: 45% passed, 2nd partial exam: 66% passed and 3rd partial exam: 75% passed. In conclusion, we can say that guided research adapted to problem-based learning was proved to be effective as a teaching basis in the teaching/learning experience because, according to the new spirit of university education, the realization of effort involves the acquisition of basic skills and intervention by the students.

42. STRATEGIC TRAINING: ADVANCES IN PROBLEM RESOLUTION

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The educational system should help students to acquire learning strategies that allow them to transform, elaborate and reconstruct knowledge. There are conceptual domains as well as strategic ones. Teachers present oriented problems and students construct knowledge by means of research. The objective of this work was to explore the relationship between strategic training and progress in problem resolution to improve comprehension. In the Theoretical-Practical classes of the subject Vegetal Physiology (2003 Study Plan-FAZ-UNT independent study is used as an alternative methodology of Problem Based Learning. During 2010, diagnostic and progress questionnaires were used with 70 students who answered closed questions concerning learning strategies and abilities that favor problem resolution. Results showed that 64.4% of the students developed the capacity for analysis; 59.7% the capacity for theorizing; 56.1% the capacity for synthesizing; 54.8% the capacity for applying and transmitting knowledge. Data analysis by means of descriptive statistics for each variable, frequency distribution, indicates that analysis is the capacity that students achieved best. Assignments proposing new situations allow students to plan, select and re-think their own learning activity, thus favoring increased autonomy. Students elaborate possible solution strategies to meet concrete agricultural problems.

43. IMPACT OF TEACHERS' PERFORMANCE ON FIRST YEAR STUDENTS OF MEDICINE

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Introduction: Teachers' styles have important effects on students' learning though there are no recipes for effective learning. **Objective:** to identify teaching style impact on first year students of medicine. **Methodology:** a structured survey was done with 60 of students. Teaching styles, theoretical classes and practical works of three subjects were evaluated in a one to five scale. **Results:** for teachers of theoretical classes: 46% of them are experts in the subject; 39% set the aims; 32% answers questions satisfactorily; 26% communicate properly; 24% set the contents in relation to other subjects; 19% help students to use previous knowledge; 17% generate interest. For teachers of practical classes: 50% of them are experts in the subject; 48% explain the activities to students; 39% set the aims; 31% work with errors; 28% relate contents to previous units; 26% enjoy teaching; 20% encourage information seeking. **Conclusions:** students think teachers have expertise, set objectives, answer questions satisfactorily, communicate knowledge, help comprehension and promote relationship between contents and with previous knowledge. Their capacity to keep interest and enthusiasm in teaching was the least valued. Students value teachers' academic training more than their capacity to promote meaningful learning strategies and satisfactory communication.

44. ADMINISTRATION OF RESIDUES IN THE TEACHING OF CHEMISTRY

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The teaching of experimental chemistry generates residues of various characteristics during laboratory practices, such as Cr (VI), characterized as a "dangerous" residue according to National law N° 24051 and Provincial law N° 6605. Designing laboratory practices that take into account humans and their environment involves the management of residues with a suitable methodology. Four laboratory practices were designed in which the end product of an experiment is the initial reagent of another so as not to generate effluents. Lab 1: $\text{Cr}(\text{OH})_3(\text{s})$ separation by simple filtration and vacuum filtration. Distillation of the filtered liquid. Lab 2: Preparation of concentrated solutions of K_2CrO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$, with the distilled water obtained in Lab 1. Lab 3: Chemical Equilibrium: $\text{K}_2\text{CrO}_4 \leftrightarrow \text{K}_2\text{Cr}_2\text{O}_7$ (obtained in Lab 2) and $\text{Cr}_2(\text{SO}_4)_3$ ($\text{Cr}(\text{OH})_3$ (obtained in Lab 4 in the previous year) depending on pH ($\text{NaOH}-\text{H}_2\text{SO}_4$), Ionic Equilibrium, use of pH universal ribbons. Lab 4: Oxidation-reduction processes, reduction of $\text{K}_2\text{Cr}_2\text{O}_7$ (obtained in Lab 3) to $\text{Cr}_2(\text{SO}_4)_3$. The chromium compound used in Lab 4 as Cr salt (VI) is reduced by means of an oxidation-reduction process to Cr (III), the latter oxidation state being considered less toxic. As a conclusion, its addition in all the processes developed in the experiments does not produce effluents.

45. IMPORTANCE OF CHEMISTRY IN AN INTRODUCTORY COURSE FOR APPLICANTS TO FACULTAD DE AGRONOMÍA Y ZOOTECNIA

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The need to introduce Chemistry as a subject into the introductory course for students of careers in which Chemistry is not their main interest as such but is related to specific subjects in a career (such as Agricultural Engineering) has been discussed over the last few years. Besides, most of the students skill or interest in the subject because chemistry is not a part of the regular high school curriculum. The aim of this study was to show how students have increased their academic performance since 2011, when Chemistry was introduced into the admission course to Facultad de Agronomía y Zootecnia. Inorganic Nomenclature was chosen since it is one of the subjects dealt with in the course. A test was set with the same degree of difficulty and the same number of questions as the tests used in previous years. The percentage of correct answers required in 2008, 2009 and 2010 was 60%. In 2011, the requirement was 80. Results obtained during the last four years were summarized for comparison. The percentage of passing students per year in 2008 was about 51%; in 2009: 50%; in 2010: 54% and in 2011: 65%. On the basis of the results obtained so far, it can be inferred that the introduction of Chemistry into the admission course was highly beneficial for students.

46. DETERMINATION OF LEVELS OF DIFFICULTY IN CONTENTS OF THE BIOLOGY SYLLABUS IN STUDENTS OF THE 3rd CYCLE OF GENERAL BASIC EDUCATION-E.G.B.

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The aim of this work was to determine the contents in the Biology syllabus with greater degrees of difficulty for students and to evaluate the result of support classes in the improvement of the academic yield of the students. The activities were interviews with the teachers, evaluation analysis and direct observation. Support classes with personalized and group teaching were planned. In order to evaluate the effectiveness of the support classes, a daily register of contents, time, resources and methodology used was kept. The contents with greater difficulty were: in the 7th year, Ecosystems and Levels of organization; in the 8th year, Functions of Nutrition, Fertilization and Pregnancy; in the 9th year, Cellular level. We worked with 58 students, out of which 86% passed and 14% had to attend recovery classes. Conclusions: strategies and methodological suggestions were designed for a meaningful approach to the above subjects with a positive impact on the teaching-learning process and an improvement of the academic yield of the students. *Key-words: contents, difficulty, learning, biology.*

47. BENTHONIC COLEOPTERA IN A YUNGAS STREAM IN CATAMARCA: DIVERSITY AND SEASONALITY

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The objective of this study was to make a list of benthonic Coleoptera in a Yungas stream in Catamarca and to determine taxocenosis seasonal variations. El Arbolito stream (28°37'13"S and 66°02'05"W, at 1.040 m asl) was studied in Concepcion, Capayan. Sampling was seasonal, in an annual cycle. The samples (n=3, larvae/adults) were obtained with "suber" (300 µm mesh size; 0.09 m² surface area), fixed *in situ* with 96° alcohol and taxonomically determined using a binocular lens. 9,067 ind/m² were collected. The fauna detected was 6 families and 10 genera: *Epimetopus* (Epimetopidae); *Hydraena* (Hydraenida), *Thinobius* (Staphylinidae), *Austrelmis*, *Neoelmis*, *Heterelmis*, *Macrelmis*, *Phanocerops* (Elmidae), *Helichus* (Dryopidae) and *Psephenops* (Psephenidae). The most abundant and diverse family was Elmidae (5 genera and 5,944 ind/m²). The most abundant genera were *Austrelmis* (3,232 ind/m²) and *Psephenops* (2,990 ind/m²). The lowest density was recorded in summer (623 ind/m²), and the highest in winter (3,790 ind/m²). Elmidae was the only family present in the four seasons of the year, ranging between 623 individuals/m² (summer) and 2,645 ind/m² (winter) with the 5 genera represented. The biological measuring obtained represents the first contribution to the knowledge of the diversity and seasonality of benthonic coleoptera in streams of Catamarca.

48. LEAF ANATOMY OF *Tillandsia didisticha* IN THE PROVINCE OF TUCUMAN

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Tillandsia didisticha (E. Morren) Baker belongs to the subfamily Tillandsioideae. It is an epiphyte species found in Salta, Jujuy, Tucuman, Corrientes and Formosa. The aim of this work was to study the leaf anatomy of *T. didisticha*. The work was carried out on fresh material collected at random from the botanical garden of the Miguel Lillo Foundation and its surroundings. Conventional anatomical techniques were applied. The leaf is hypostomatic with subepidermal tissue. Both epidermis present square to rectangular cells with sinuous walls. Stomata in abaxial surface with 4-7 subsidiary cells, average size 36x36 µm and density of 10 stomata/mm². Scales are typical in both epidermis. Mesophyll with aquifer parenchyma and radial clorenchyma. The main vascular bundle showed xylem surrounded by phloem with two sheaths: sclerenchymatic and parenchymatic. Presence of raphides, styloid and mucilage secretory ducts. Anatomical characters of *T. didisticha* are an important contribution to future studies in the taxonomy of this group.

49. FOLIAR ANATOMY OF *Vallesia glabra* (APOCYNACEAE), AN IMPORTANT SPECIES IN FRUGIVORY

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Vallesia glabra (Cav.) Link is a native shrub that grows between 0-1000 m.a.s.l.. *V. glabra* has medicinal and frugivory importance. The aim of this work was the anatomical characterization of *V. glabra*. The material collected in Frias (Santiago del Estero) was treated by conventional techniques. The blade is entire, asymmetric, narrow-ovate, with acute apex and cuneate base. Pinnate venation, eucamptodroma. Both epidermis with quadrangular to rectangular cells with thin, straight to curved walls and striated cuticle. Anomocytic and actinocytic stomata (25x18 µm). In cross section the blade is dorsiventral, anfiestomatic; unistrata epidermis with thick cuticle; palisade parenchyma with 3 layers, 3-4 of spongy; subepidermal collenchyma at the level of nerve 1°. Nerve 1° is bicollateral, being collateral with parenchymatic sheath in the minor bundles. Subcircular grooved petiole with simple trichomes in the insertion with the stem; unistrata epidermis, cortical parenchyma with 5-6 layers, vascular bundle bicollateral. Non-articulated laticiferous in blade and petiole, composed starch only in the latter. Leaf histological elements characteristic of *V. glabra* are: stomata, trichomes, starch and laticiferous. This investigation is a relevant contribution to future studies due to the nutritional and medicinal importance of this species.

50. LEAF ANATOMY CHARACTERIZATION OF *Lonchocarpus lilloi* (FABACEAE; PAPILIONOIDEA)

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Lonchocarpus lilloi (Hassl) Burkart is a tree endemic to Salta and Jujuy. It grows between 350-500 m a.s.l. The aim of this work was to study the leaf anatomy of *L. lilloi*. We worked with fresh material collected from the Botanical Garden of the Miguel Lillo Foundation and from the Experimental Reserve of Horco Molle. The material was treated with conventional anatomic techniques. The results showed a dorsiventral leaf. The adaxial epidermis presents quadrangular and rectangular cells. The abaxial epidermis, with irregular cells, presents different types of stomata: paracytic, hemiparacytic, anomocytic and amphiparacytic; average size, 27 x 20.5 µm; density, 153 stomata x mm². The trichomes are simple with an average size of 160 µm and glandular with an average size of 64 µm. The principal vascular bundle showed xylem surrounded by phloem with two sheaths: sclerenchymatic and parenchymatic. Presence of secretory ducts and cubical crystals in lamina and petiole. The diagnostic characters for identification of *L. lilloi* are: stomata types, trichomes, crystals and secretory ducts.

51. RADICAL ANATOMY OF ENDOMYCORRHIZA IN STRAWBERRY (*Fragaria x ananassa* var. *camino real*) GROWN IN THE PROVINCE OF TUCUMÁN

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INTA-Famailla has implemented a spectrum of strawberry varieties to reduce the risk of relying on a single variety. The aim of this work was to characterize radical anatomy and quantify endomycorrhiza in *camino real* varieties. Plants were grown in soils with 2 treatments: without disinfection (S/D) and with disinfection (C/D, metam sodium). Samples were collected from the root system of 10 individuals per treatment with 2 replicates at 2 phenological stages. The primary structure of adventitious root epidermis presented unistrate, parenchymal cortex of 2-4 layers, endodermis with radial Caspary band, unistrate pericycle and diarch stele. The adventitious secondary structure showed different stages of early growth, with remnants of epidermis and cortical parenchyma (from the primary structure) attached to developing periderm, low internal cortical parenchyma and vascular system (xylem and phloem). The varieties studied in both plants revealed endomycorrhizae S/D and C/D, morphology corresponded to *Paris*. In both stages variations in fungal structures were observed, predominance of arbuscules (70%), hyphae remained low, presence of dark septate. The radical anatomy is described for the first time and the presence is announced of vesicular arbuscular mycorrhizal fungi in *Fragaria x ananassa* var. *camino real*.

52. MORPHOLOGY AND ANATOMY OF THE SPOROPHYTE OF *Doryopteris pentagona* (PTERIDACEAE)

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Doryopteris is a 30 species tropical genus, with 5 species in Northwestern Argentina. As a cheilanthoid fern, it is adapted to xeric habits. This genus presents difficulties in the taxonomy due to hybridization. *Doryopteris pentagona* Pic. Serm. is an element of the Yungas forest. The aim of this work was to study the morphology and anatomy of this species. The material was deposited in the Fundación Miguel Lillo Herbarium (LIL). Frond diaphanization, free hand sections and specific staining were applied. Stomata size and frequency were calculated for 9 individuals. *D. pentagona* presents a soleno-dictiostelic rhizome, scales with a terminal gland. Diarch roots. Dimorphic fronds. Petiole with glandular trichomes. Epidermis and subepidermis with fibers. V-shaped xylem, independent protoxylematic group, both surrounded by phloem, pericycle and endodermis. Abaxial epidermis with glandular trichomes. From the characters studied, the scales and the distribution of tissue in the petioles have diagnostic value. Similar preliminary results of the anatomy of the petiole of other species of the genus show the same tissue distribution, and this character could be a sinapomorphy of *Doryopteris*, since it is not found in other ferns in the Pteridaceae family.

53.

HISTOLOGY OF THE STORAGE ORGAN OF WILD MACA, *Lepidium meyenii* (BRASSICACEAE)Chain FE¹, Mercado MI¹, Coll Araoz MV¹, Catalan CAN¹, Grau A², Ponessa GP³.¹Inquinoa-Conicet; ²Inst de Ecología Regional, Fac de Cs Nat e Inst Miguel Lillo, UNT; ³Inst de Morfología Vegetal, Fund Miguel Lillo. E-mail: fernandochain@hotmail.com

Samples of the underground reserve organs of wild Maca (*Lepidium meyenii*) from the Calchaquies Summits of the province of Tucumán were fixed in FAA and embedded in paraffin in order to study their anatomy. Wild maca storage organ is a contractile root with normal secondary growth. It has a differentiated peridermis from outer cortical parenchyma cells, cortex and star shaped pith, constituted by amiliferous parenchyma with idioblasts of myrosin. Also, it has secondary phloem and xylem with abundant parenchymatous rays. Tissue from the contractile area adjusts to the shortening of the root caused by vertical contraction and radial expansion of the inner cortical parenchyma. The mechanism of contraction is discussed.

54.

HISTOLOGICAL STUDIES OF GONADS FROM LINES AIMED AT DEVELOPING GENETIC SEXING IN *Ceratitis capitata* (WIEDEMANN) (DIPTERA, TEPHRITIDAE)Michel AA¹, Manso FC², Cladera JL², Vaca GV¹, Milla F².¹Instituto de Morfología Animal, Fundación Miguel Lillo, Miguel Lillo 251, 4000 San Miguel de Tucumán, Argentina. ²Instituto de Genética "Ewald Favret", INTA, C.C. 25.1712, Castelar, Buenos Aires. E-mail: adrianaazucenamichel@hotmail.com

Ceratitis capitata is a fruit fly of economical importance and quarantine relevance in Argentina. Genetic sexing strains have been developed at IGFAF, with different times of development between males and females. As development can be followed by morphological and cytological studies of the gonadal primordium, we aim in the present work to show a histological study of larvae and pupae of these genetic lines and to confirm the differential development previously obtained. The material was collected in a controlled environment at a breeding temperature of 25±2°C, 66±20% RH and a photoperiod 14L: 10D. It was fixed in Bouin and stained with hematoxylin-eosin and Mallory's trichrome. The development stage, in which the male and female primordia are differentiated, was determined. The results obtained confirmed previous cytogenetic observations with histological studies showing that gonadal development and gametogenesis have different timing in this strain of *C. capitata*. This study contributed to increase our knowledge of the relationship between genetic regulation of the time of development and the process of gonadal maturation. *Convenio Cooperación Científica FML-INTA*.

55.

DIVERSITY OF *Cordyceps s. l.* IN ARGENTINACatania M¹, Robledo G², Casanova Jesús V^{1,3}.¹Lab. de Micología. Fund. Miguel Lillo. M. Lillo 251 (4000). Tucumán. Argentina. ²IMBIV, UNC-CONICET. Córdoba. ³Fac. de Cs Nat. e I.M.L., UNT. E-mail: mcatania@tucbbs.com.ar

Cordyceps Fr. includes about 400 species, with a cosmopolitan distribution. Pathogens of arthropods and other fungi are used as biological control agents. Phylogenetic studies indicate that *Cordyceps* and *Clavicipitaceae* do not form a monophyletic group and have been grouped into the families *Clavicipitaceae s. s.*, *Cordycipitaceae* and *Ophiocordycipitaceae*. The aim of this study was to review the state of knowledge of the diversity of species of *Cordyceps s. l.* in Argentina. A bibliographic search was conducted of all the species mentioned in the literature. Besides, materials were collected in protected areas of the Yungas (NOA), in Tucumán and in the Atlantic Forest (NEA), in Misiones. Our results show that *Cordyceps s. l.* is represented in Argentina by at least 7 species. *C. submilitaris* was found in the larvae of beetles and *C. dipterigena* on adult diptera, collected in Tucumán. *C. unilateralis* on formicids, *C. incarnata* and *C. aff. polyarthra* were collected in Misiones. *C. sobolifera* on *Proarna bergi* nymphs in Jujuy; *C. militaris* on lepidopteran larvae in Neuquén. As a result of the study of new materials collected the following species were identified: *Ophiocordyceps nutans* on hemipteran and *Isaria tenuipes* (anamorph) on arthropod larvae are first recorded for our country; *C. polyarthra* on lepidopteran larvae, first report for north-western Argentina.

56.

DETERMINATION OF DENSITY AND MECHANICAL PROPERTIES OF *Cedrela balansae* C. DC.

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Cedrela balansae grows in the Yungas region (Transition Forest). Its wood is one of the most prized for its striking appearance due to its xylotechnological characteristics that predict quality, aptitude and behavior for different uses and applications. The aim of this study was to analyze density and mechanical properties of wood in three specimens in the Orán Department, Salta. The following were determined by standard tests: density (IRAM 9544), Janka hardness (IRAM 9570), dynamic flexion (IRAM 9546) on Amsler Universal Machine, static bending (IRAM 9545 and COPANT 555) and compression parallel to the fibers (IRAM 9551) in Instron model 8504. Air-dry density was 0.442 g/cm³ indicating that it is a light wood. The average value for hardness in the radial direction (364 kg/cm²) was higher (323 Kg/cm²) than the tangential direction, qualifying it a softwood, which agrees with its density. Dynamic bending values (1,900 kgm), resilience coefficient (0.302 kgm/cm²) and type of break describe it as wood with high resistance. Static bending: MOR (modulus of rupture) 583.11 Kg/cm², MOE (modulus of elasticity) 88321.78 Kg/cm² and LE (elastic limit) 446.54 Kg/cm². In compression MOR 89,987 Kg/cm² measured in an INSTRON machine fitted with transducers for greater accuracy. MOE 20,634.664 Kg/cm² and LE 254.886 Kg/cm².

57. EFFECT OF CULTURE MEDIUM COMPOSITION ON GROWTH PARAMETERS IN THE *INVITRO* MULTIPLICATION STAGE OF *Oncidium herzogii* SCHLTR.

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Oncidium herzogii is an epiphyte orchid indigenous to Bolivia and Tucumán, Salta and Jujuy provinces. It grows in warm, wet zones (400-800 m.a.s.l.). Due to agricultural expansion, its germoplasm conservation and propagation must be carried out *in vitro*. The objective of this work was to evaluate the effect of 2 growth regulators in Murashige-Skoog culture medium at half concentration on the growth parameters of *Oncidium herzogii* Schltr in the *in vitro* multiplication stage. Number, plant length and leaf number were evaluated. Treatments: TE (modified Murashige and Skoog (1962) at half concentration (1/2 MS) without growth regulators), T1 (1/2 MS + 0.5 BAP + 0.1 ANA), T2 (1/2 MS + 1 BAP + 0.1 ANA), T3 (1/2 MS + 2 BAP + 0.1 ANA), T4 (1/2 MS + 0.5 BAP + 0.2 ANA), T5 (1/2 MS + 1 BAP + 0.2 ANA), T6 (1/2 MS + 2 BAP + 0.2 ANA). The experimental design was completely randomized. TE was the only treatment with a lower plant number and height. The other treatments increased values. In TE, root number kept constant but in the other treatments there was a significant increase in the 2nd evaluation. Root length was constant in both evaluations in all treatments. Leaf number increased significantly except in TE. ANA and BAP increased plant number and length and number of roots and leaves. T1 caused results statistically similar to the rest of the treatments with higher values.

58. CHARACTERIZATION AND PROPERTIES OF AN ORGANIC BIOFERTILIZER OBTAINED FROM MICROBIAL BIOPOLYMERS

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Slow-release technology has acquired importance in agriculture. Its aim is the gradual release of an active material from an organic matrix into another medium to obtain a certain action, trying to reduce applications, increase the efficiency of the substance and minimize environmental damage. We studied physical and chemical properties, stability and N₂ slow-release capacity of a biofertilizer synthesized in our laboratory made up of a dextran-urea complex. Dextran concentration was determined by the phenol-sulfuric method and urea and N₂ by Kjeldahl. The chemical structure of the complex was studied by IR. Stability was determined at 25°C for 6 months. The effect of slow-release N₂ was determined by the application of the fertilizer in crops. The biofertilizer contains dextran obtained from *L. mesenteroides* and urea for agricultural use. It was produced with high yield (87%). It contains dextran 18% and urea 60%. It has -OH, -C-O-C- functional groups as determined by IR. It is stable at 25°C for 6 months and provides 27% N₂. Its application in agricultural crops shows that N₂ is released from the complex and absorbed by the plant. Results show that the biofertilizer is produced as high yield as compared with others synthesized in other countries, supplies 270g N₂/Kg and is able to stimulate leaf growth in agricultural crops.

59. DEVELOPMENT OF A MICROCOLORIMETRIC METHOD FOR THE DETECTION OF PHENOLIC LIPIDS IN CEREAL GRAINS

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A new microcolorimetric method was developed to quantify 5-n-alkylresorcinols (5-n-ARs) in cereal grains. Orcinol and olivetol were exposed at a wide range of concentrations to different organic solvents, concentrations of Fast Blue RR reagent and basifying reagents. Absorbance was measured in a microplate reader at 450 nm. The influence of temperature and sunlight on the stability of the reaction products was also evaluated. The reaction was optimized and results were compared with those obtained using the Fast Blue B reagent. Contents of 5-n-ARs were measured in ground and intact grains using both the optimized reaction and the Fast Blue B reaction. Absorbance linearly increased with olivetol and orcinol concentrations between 1–20 µg/ml using methanol or ethanol as solvent ($\lambda = 490$ nm), Fast Blue RR at 0.025% and K₂CO₃ at 5%. This reaction was completed after 15 min of incubation at room temperature. Content of 5-n-ARs determined by the new microcolorimetric reaction were similar to those measured by the Fast Blue B reaction in both ground and intact grains. The new microcolorimetric technique requires less time and allows processing of a larger number of samples than the reaction based on Fast Blue B.

60. EVALUATION OF OXIDATIVE STRESS IN STRAWBERRY PLANT CELL SUSPENSIONS

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Plants under biotic or abiotic stress react by producing a series of biochemical reactions that can lead to a defense response and the measurement of reactive oxygen species (ROS) such as H₂O₂ is very useful to study this plant response. In this work we present a system to study the intracellular level of H₂O₂ in plant cell suspensions. Mesophyll cells of 8-week-old strawberry plants (*Fragaria x ananassa*) of the cv Pájaro were used. 1.5g of leaves were washed, cut into squares, and homogenized in a potter with 10 mL of buffer W5. Cells were recovered by differential centrifugation. The level of H₂O₂ was measured by fluorometry and cellular viability was determined with Blue Evans dye. The suspension (1.5 x 10⁶ cell/mL) was evaluated for 24 hours. Results showed that the initial level of H₂O₂ decreased approximately 65% after a night in the dark at 25°C and cell viability decreased 8% 24 h after extraction. The system was induced with Paraquat (0.1 mM) showing a peak of H₂O₂ production 3 hours after the induction and the effect was completely suppressed when ascorbic acid (5 mM) was added 30 min previous to Paraquat. These results let us conclude that the system of cell suspension developed constitutes a useful and reliable method to study stress in plants.

61. PHYTOCHEMICAL PROFILE AND ANTI-LIPOXYGENASE ACTIVITY OF ALCOHOLIC EXTRACTS OF PLANT SPECIES FROM THE ASTERACEAE FAMILY

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The use of medicinal plants for healing purposes is an ancient and common practice still in use nowadays. Lipoxigenase (LOX) plays an important role in the physiopathology of inflammatory and allergic diseases since it is the enzyme responsible for the biosynthesis of inflammatory mediators. We evaluated the anti-LOX capacity of alcoholic extracts of nine plant species (*B. boliviensis*, *B. incarum*, *Ch. keidelii*, *C. atacamensis*, *N. armatum*, *P. lepidophylla*, *P. lucida*, *P. phylliciformis*, *T. absinthioides*) belonging to the Asteraceae family and its relation to their phytochemical profile. Tinctures of plants collected in the Argentine Puna were analyzed. Total polyphenols content varied between 64-160 µg Gallic Acid Equivalents (GAE)/mg, non-flavonoid phenolic compounds varied between 53-153 µg GAE/mg, flavones/flavonols between 6-28 µg Quercetin Equivalents/mg and flavonones/dihydroflavonones between 24 and 51 µg Naringenin Equivalents/mg. Species from the genus *Parastrephia* presented the highest inhibitory activity on LOX with IC₅₀ values between 219 and 253 µg/ml, *P. lepidophylla* being the most active one. This could be related to the higher levels of total phenolic compounds and flavones/flavonols found in this species. The results indicate the potential use of *Parastrephia* extracts as a natural anti-inflammatory.

62. FORMULATION DESIGN, QUALITY CONTROL AND IN VITRO ASSAYS FOR A SEMISOLID PHARMACEUTICAL FORM CONTAINING L. PLANTARUM CULTURE SUPERNATANT AS ACTIVE PHARMACEUTICAL INGREDIENT

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Bacterial resistance mechanisms are closely related to biofilm formation. Because of these mechanisms, 80% of bacterial infections become chronic. In previous works we reported anti-pathogen activity of supernatants from *L. plantarum* ATCC 10241 (SLp) against *P. aeruginosa*, safety compared with conventional treatments, total chemical composition, minimal inhibitory concentration and dosage. The aim of this work is the development of a topical dosage form (cream) of low-cost, efficient, stable and safe to convey SLp. Stability studies were conducted: pharmacotechnical and microbiological assays. The formulation designed complies with the requirements of all pharmacotechnical quality control tests and showed good microbiological stability, indicating that the formulation has the right proportions of excipients. The organoleptic characteristics were rated as very good by ten healthy volunteers. In antimicrobial activity tests, two strains of bacteria commonly found in chronic infections, *P. aeruginosa* and *S. aureus*, were used. The qualitative results found indicate that SLp conveyed as a cream maintains its antimicrobial activity.

63. VOLATILE METABOLITES OF *Ipomoea cairica* ON *Staphylococcus aureus* BIOFILM

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Ipomoea is the largest genus in the flowering plant family Convolvulaceae with 52 species in Argentina. The genus comprises climbing or creeping plants. Antimicrobial effects have been reported for many species of *Ipomoea*. Nevertheless, this is the first report on the activity of *Ipomoea cairica* on biofilm. The aim of this study was to investigate the chemical composition of extracts (E) from leaves (L) and flowers (F) of *I. cairica* and their activity on *Staphylococcus aureus* biofilm. E were prepared from L and F with ethyl ether and analyzed by GC-MS. E activity was determined on mature biofilm of *S. aureus* ATCC 6538 P. Considerable disrupting effects of EF were observed on the biofilm of *S. aureus* at 42 and 21 µg/mL (70-52%) while EL at the same concentrations showed 63 and 50% reduction, respectively. β-caryophyllene (24%), palmitic acid (14%), germacrene D (10%), β-elemene (7%), β-bisabolene (6%) and caryophyllene oxide (2%) were the major constituents of EL. EF contained β-caryophyllene (17%), caryophyllene oxide (9%), palmitic acid (7%), and β-bisabolene (3%). The greater activity of EF could be attributed to the higher concentration of caryophyllene oxide, which is known to have antimicrobial properties. *I. cairica* is a promising source of metabolites active against the main mechanism of bacterial resistance.

64. BIOACTIVE VOLATILE CONSTITUENTS FROM *Senecio punae*

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Plants of the *Senecio* genus are a rich source of pyrrolizidine alkaloids and sesquiterpenes of furanoeremophilane and eremophilane-type. *S. punae* was collected at Susques (Jujuy province, Argentina) at 3600 m.a.s.l. The ether extract (E) prepared from the aerial parts was analyzed by chromatographic and spectroscopic techniques. Fractionation of E by column chromatography afforded a fraction (F) containing a 90% of eremophila-7(11), 9-dien-8-one (D) and other oxygenated sesquiterpenes as minor compounds. F was further processed to give compound D. This compound was previously isolated from *Petasites hybridus* and *Cacalia hastata* both belonging to the tribe Senecioneae. E, F and D were evaluated at 250 µg/mL, against *Oryzaephilus surinamensis*, a cosmopolitan pest capable of feeding on a variety of stored grains. E showed no toxic effects but acts as repellent and antifeedant; F resulted to be an attractor and D was no toxic for the insect. E would provide a potential adjuvant in bio-repellent formulations in order to reduce grain infestation. We also evaluated the antibacterial activity and antibiofilm ability of E, F, D, and mixtures with the antibiotic oxacillin (OXA) on *S. aureus* ATCC 6538 P and a methicillin resistant strain. D associated with OXA (6 and 3 µg/mL, respectively) resulted the most active against both strains, showing a growth inhibition of 71-77% and a biofilm inhibition of 94%.

65. MOLLUSCICIDAL ACTIVITY OF FLAVONOIDS OF YELLOW FARINA FROM *Pityrogramma trifoliata*

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Ferns belonging to several genera of the family Pteridaceae produce lipophilic exudates known as farina. These exudates are mainly located on the lower leaf surface and their major constituents were found to be flavonoids. *Pityrogramma trifoliata* (L.) R. M. Tryon displays a farinose exudate that is yellow in some plants and white in others. An extract of the yellow farina of this fern displayed strong molluscicidal activity against the schistosomiasis vector snail *Biomphalaria peregriana*, with a median lethal dose (LD_{50}) of 17.5 ppm. The purpose of this work was to study the chemical composition of the yellow farina in order to isolate the compounds responsible for the observed molluscicidal activity. The farina was gently rinsed with ethyl acetate, yielding an orange extract which was subjected to bio-guided fractionation. The active fraction was purified by reversed phase HPLC, enabling the isolation of 2,6-dihydroxy-4-methoxychalcone (**1**), 2,6-dihydroxy-4-methoxydihydrochalcone (**2**), and 5-hydroxy-7-methoxyflavanone (**3**). Compound **2** was the most active, with an LD_{50} = 3.8 ppm, followed by **3** (LD_{50} = 37.5 ppm), and **1**, which displayed low activity at the tested concentrations (LD_{50} > 50 ppm). These results indicate that the presence of a double bond at C-2 as well as cyclization of the dihydrochalcone (**2**) to produce a flavanone (**3**) reduces the molluscicidal activity.

66. PARTICIPATION OF REACTIVE GROUPS OF SESQUITERPENE LACTONES (STLs) IN INHIBITORY EFFECT ON MEIOSIS IN AMPHIBIAN OOCYTES

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STLs are a varied group of secondary metabolites of plants that possess diverse biological activities, many of which are due to the interference of the function of cellular macromolecules by formation of covalent bonds between electrophilic structures of STLs and nucleophilic sites of biological targets. STLs have several groups with a potentially reactive structure (PRS). The aim of this work was to block PRS of STLs by treatment with Cys and analyze their inhibitory activity in the amphibian oocyte meiosis. Dehydroleucodine (DhL), Achilline and Enhydrine were incubated with L-Cys. Fully-grown oocytes of *Rhinella arenarum* were pre-incubated with different Cys-treated STLs. Resumption of meiosis was induced by the addition of progesterone and the oocytes were fixed and cut in order to observe the absence of the germinal vesicle. The treatment of DhL and Achilline with Cys allows the α,β -unsaturated carbonyl groups to be conjugated. For DhL, treatment with Cys removed the inhibition ability while with tAchilline the treatment had no effect. In the case of Enhydrine, treatment with lower concentrations of Cys did not alter the inhibitory effect on meiosis but with the highest concentrations tested the inhibitory effect disappeared. The activity of these lactones could be related to the combination of groups rather than to the reactive potential of a single group.

67. CHANGES IN THE ACTIVITY OF MILK AMYLASE DURING THE FIRST 30 DAYS POST- PARTUM IN YOUNG ADULT MOTHERS

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Amylase is one of main enzymes present in human milk. However, there is scarce information about variations in its concentration and its biological function in milk. The aim of this work was to determine the activity of amylase in human milk in young adult mothers with no problem deliveries and with healthy newborns. Milk samples were collected from a group of 10 mothers aged 27 ± 5 . The samples were obtained with their written consent. A commercial kit for blood serum amylase determinations was used. Results showed that samples from the early lactation period, 2-5 days, were higher (1989 ± 1482 U/L) than those from a later one, 6-47 days, (779 ± 634 U/L). Difference was statistically significant ($p < 0.0025$), and variation coefficients of the two groups (1-5= 58% and 6-47= 61%) showed that dispersion data was roughly proportional to the mean. When samples of mature milk were compared, individual expression of amylase showed great variation between mothers (ANOVA, $p < 0.001$). Present results coincide with those corresponding to European and African ones that show a) a great variability, b) higher activity in colostrum samples. The values obtained would be useful as a reference for interpretation of future work in this field.

68. PRESENCE OF LYSOZYME, AMYLASE AND LACTOPEROXIDASE SYSTEM IN COLOSTRUM WHEY OF SABLE ANTELOPE (*Hippotragus niger*)

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Within the Bovidae Family, information about composition and characteristics of colostrum and milk belong almost exclusively to two sub-families: Caprinae and Bovinae. With respect to the Hippotraginae sub-family, there is no information on these subjects except for some data concerning the gross composition of milk and colostrums from a few species. Previously we reported electrophoretic similarity between milk proteins of sable antelope and goat. The aim of this work is to expand information on this species to identify similarities and differences among members of the Bovidae family in order to improve work with specimens belonging to it in zoos and reserves. We determined activity of amylase, lysozyme (Lz) and lactoperoxidase system components (LPO) in the colostrum of an *H. niger* female at the end of gestation. The results showed: a) the presence of lower amylase activity than in Perissodactyla species, but similar to that observed in cattle, where it is relatively small; b) low bacteriolytic activity due to Lz, which was similar to that found in goats; c) LPO activity of ≈ 8 U/L, and thiocyanate (SCN^-) concentration ≈ 17 ppm. Although these results should be considered as indicative, they contribute to consolidate the concept of similarities within milk component functions in members of the Bovid family.

69.

INTENSIVE INDOOR BREEDING OF PIGLETS: WEANING, DISTRESS AND RECOVERY*Berardo D, Bianco M, Mayer N, Lafalla G, García G, Rodríguez N, Vivas A, Greco C, Ashworth G.**UNRC. E-mail: gashworth@exa.unrc.edu.ar*

Weaning distress affects the immune status, which may predispose animals to disease. We analyzed parameters of distress, immune status and recovery after weaning in intensive indoor pig farming systems with controlled light and temperature. We worked with 50 piglets before weaning and 12 days after weaning. The following were determined: total number of leukocytes (LT), lymphocytes (L) and neutrophils (N) and neutrophils/ lymphocytes (N/L) ratio, T cells response to mitogenic stimulation with ConA, plasma levels of IgG using ELISA and cortisol using RIA. Significant differences were found in all parameters analyzed between pre- and post-weaning with the exception of IgG and T cells. LT and N increased ($p=0.006$ and 0.0004 respectively). L was lower (lymphopenia) at weaning ($p=0.002$). The N/L ratio increased from 0.36 in the pre-weaning to 0.62 in the post-weaning period ($p=0.0006$). Cortisol levels increased ($3.5 \mu\text{g/dl}$) after weaning ($p=0.00017$) but did not represent distress. Probably, at twelve days after weaning, neutrophilia was responsible for higher LT counts. Lymphopenia and neutrophilia were responsible for the N/L ratio increase, possibly a response to high levels of cortisol at weaning ($10 \mu\text{g/dl}$, data not shown), normal values not being recovered at twelve days after weaning. The higher levels of cortisol could be a response to greater stimulation by the new social and housing conditions. In conditions of controlled light and temperature and appropriate management, piglets recover a good immune status at twelve days post weaning.

70.

DETERMINATION OF CALORIFIC VALUE AND METABOLIZABLE ENERGY OF DIETS FORMULATED ON THE BASIS OF RESIDUES OF CITRUS INDUSTRY*Albarracín PM, Borkosky D, Paz D, Barnes N.**FACET-UNT. Av. Independencia 1800. Tucumán. E-mail: nbarnes@herrera.unt.edu.ar*

Calorific value (CV), which is the caloric contribution of a diet, is calculated as the content of lipids (L), proteins (P) and carbohydrates (HC) by their respective released energy expressed in Kcal/g food. Metabolizable Energy (ME) is calculated as the contents of L, P, HC and fiber affected by their respective digestibility parameters for bovine cattle, expressed in Mcal/head/day. In this work, CV and ME are calculated for diets formulated on the basis of residues of citrus industry for bovine cattle and comparison with other diets reported in the bibliography is made. Two diets containing humid lemon rind as a major component (52%), yeast cream (35.2%), molasses (7.4%), mineral supplements and residues of dry pasta (4.6%), or maize (4.6%), were used. Nutritional analysis, according to official techniques, gave mean values of: proteins 15%, lipids 2.2%, fiber 18.5% and carbohydrates 20%. The values of CV and ME were 200 Kcal/100g and 1.63 Mcal/head/day, respectively. The statistical analysis did not show significant differences in CV between the proposed diets and diets already proven in the field. According to the requirements for bovine cattle in different stages (INTA Bordenabe), the proposed diets would be apt for "pregnant cows without recently-born calves" and for "bulls, before and during the service".

71.

PARASITIC INFESTATION AND BODY CONDITION IN NATIVE GOATS*Blanco MJ, Fernández J, Chueca CP, Cruz L, Marchetti C, Rodríguez Brito A, Pérez Carbajal H.**School of Agriculture and Animal Husbandry. Florentino Ameghino w/n, Finca El Manantial. UNT. E-mail: mjb_blanco@hotmail.com*

Parasitic diseases of gastrointestinal tract have a marked effect on the reduction in growth rate and loss of body condition. The term Body Condition (BC) refers to the degree of animal fatness. The aim of this work was the variation and evaluation of the parasite infestation in goats based on their body condition. We worked with 24 native goats, dewormed, with ages between six teeth and one tooth and fed with Rhodes grass and wheat pellets. Nutritional status was determined by the scale of body condition (BC): 1 (very poor), 2 (Poor), 3 (Good), 4 (Very good) to 5 (obese) and measured in: Period 1: Early Spring; Period 2: Early summer. Thirteen goats had a BC of 3 to 3.5 and eleven goats of 2.5 to 2. The faeces samples were analyzed by the method of Willis. The results were: Goats with BC 3 to 3.5: Period 1: ± 642 eggs per gram of faeces (egf); Period 2: ± 1478 egf. Goats with BC 2.5 to 2: Period 1: ± 1366 egf. Period 2: ± 4904 egf. Animals with a good body condition have a lower infestation in spring and in summer as opposed to poor body condition. In 2.5 BC animals in period 1 reduced their BC to 2 in period 2. Animals with BC 3 maintained their BC and others increased to 3.5. These animals had acceptable production levels and looked healthy despite their high parasite infestation.

72.

BEHAVIOR OF *Eisenia andrei* IN SUBSTRATES FROM CAMELIDS*Giunta SA, Jauregui HS, Cruz LB, Ponce RI.**Facultad de Ingeniería – Universidad Nacional de Jujuy. E-mail: sagiunta21@hotmail.com*

Vermicomposting is a technology that uses the earthworm *Eisenia andrei*, resulting from organic waste in a nutrient-rich substrate, meat and meal worms. The aim of this study was to characterize compost dung using as substrate camelid (llama) dung and prepared soil at a 3:1 ratio and to observe its effect on the reproductive behavior of the worms. Llama manure was obtained from a farm in the town of Humahuaca, Jujuy Province. The compost is stabilized within 30 days. The material used was saturated with tap water ($\text{pH}=7.4$) and inoculated with 100 adult worms in each replication per treatment. The experimental design was conducted in a randomized block with three replications. The conversion time of camelid dung into vermicompost manure was 71 days with a pH of 7.2. The microbiological analysis carried out showed 8.31×10^7 bacteria/g. At 90 days the count was made of different stages of worms. The growth rate of adult worms was 190.4%, of young worms 90% and hatchling worms 80, 45%. We estimated the number of offspring per capsule at 7 to 10 and the average weight of each capsule at 0.03 g. The average weight of non-clitallated earthworms (juveniles) was 0.27 g. and of adult worms 0.56 g. Analysis of variance showed high significance for both the substrate used and the worm stages, the substrate being suitable for the production of adult, young and capsules of *Eisenia andrei*.

73. DETERMINATION OF METHAMIDOPHOS IN AQUEOUS SOLUTIONS AT DIFFERENT PH AT 25°C

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Organophosphate pesticides are highly toxic so its benefit-harm balance is a priority for sustainable agro-food production. The most persistent are more likely to interact with elements of the ecosystem. The consequences depend on their toxicity and bioavailability. If the half-life and persistence is greater, they accumulate in soils or biota. They can be degraded by chemical and microbiological reactions in soil or water. Methamidophos Sherman (Chemiplant) is an insecticide acaricide used in the plantations of snuff for the elimination of red aphids in the area of the Caldera basin. The objective was to determine experimentally the half-life of methamidophos in different pH solutions to provide information to environmental studies. At pH (5) it is controlled by an NH₄Cl solution in pH (7) with NaCl and pH (9) with NaClO. All of them were supplemented with Methamidophos 60%, which was detected with a qualitative assessment test for phosphates. A volume (1 ml) of each solution for the determination of phosphate was added until it tested negative. The control solution was without additions. Neutral solutions showed the longest half-life, 16 days. Acidic solutions, 11.5 days and basic solutions, 8 days. The phosphates are easily hydrolyzed in basic solutions. At neutral pH, methamidophos remain active longer because the hydrolysis of the molecule is not favoured. These conditions may be similar in nature.

74. SUSCEPTIBILITY OF COTTON LEAFWORM (*Alabama argillacea* HÜBNER) TO CYPERMETHRIN, PYRETHROIDS
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The aim of this study was to determine changes in susceptibility of cotton leafworm populations to pyrethroids. The field trial was random blocks, with 6 treatments and 4 replications using Guazucho INTA III. The application was made when the commercial damage level was reached. The bioassay was totally random and it was conducted under laboratory conditions, using 40 second and third stage larvae per treatment. The treatments were the following discriminant doses of cypermethrin based on the commercial dose indicated by the manufacturer: T40, T80, T120, T200, T250 and control, T0. The vegetal material used in the bioassays came from lots with no chemical treatment. The evaluations were made at 2 and 24 hours. Statistical analysis showed no differences between the T0 and T40 doses. The other treatments, T80 to T250, showed statistical differences between them and the efficiency reached with these dose was not above 80%. With the Probit analysis at 24 hs, the following equation was reached: DL50, DL90 and their confidence interval, respectively: $y=4.893512+3.103919*\log X$; DL50=73.7 (37.8; 106.3) and DL90=194.5 (128.2; 705.0). These results suggest that an important loss of susceptibility to pyrethroids occurs in the leafworm, implying the need for a five-fold increase in the commercial dose to reach an adequate control.

75. BONE FILLING MATERIAL. AUTOLOGOUS BONE AS PREVENTION OF POST SURGICAL TOOTH SENSITIVITY

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The aim of this work is to achieve bone regeneration at the distal face of the second molar to reduce sensitivity after third molar surgery. This is accomplished by placing autologous bone graft recovered by a bone trap from the defect left by the extraction, increasing bone level, preventing gingival recession, periodontal pocket formation and stripping of the second molar root. It finishes with suture, placement of a semirigid plate and immediate radiographic controls, analyzing bone level, periodontal pocket and tooth sensitivity at 30, 60 and 90 days. Out of 10 patients who underwent surgery, 60% represent the experimental group where 66.6% used the rigid plate and 33.3% did not. Among those who used the plaque, 100% did not have recession or sensitivity while among those who did not use the plaque, 50% showed gingival recession and sensitivity and the other 50% had no symptoms. The remaining 40% represent the control group with no grafting and no plaque, 75% showed gingival recession and sensitivity, 25% had no symptoms. On the basis of all surgeries performed, we can conclude that the use of autologous bone graft and protecting plaque proved to be effective in achieving better gingival insertion.

76. STATISTICAL ANALYSIS OF THE EFFECT OF IRRIGATION SOLUTIONS ON BOVINE DENTINE

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The aim of this work was to compare the effect of four irrigation solutions on bovine dentine structure. For this *in vitro* study, 16 roots of bovine teeth (from 2- to 4-year old animals) were used. Crowns were removed and the teeth were longitudinally sectioned in vestibulo-lingual direction. The dental pulp was extracted. The half roots were submerged in 5 ml of 1%NaClO, 17% EDTA, 1% Ca(OH)₂, 0.2% chlorhexidine and distilled water for 30 minutes. Then they were processed for MEB. The average dentine surface was observed (1500/4000x) and its morphology and number of tubules by area (T/A), relative density (RD), greater diameter of the tubule (TD) and intertubular space (ITS) were analyzed using the Image Tool program. All assays were done in quadruplicate and 20 measurements per parameter and tooth were performed. For the statistical study a previous analysis of normality of the variables was applied to the T Test for independent samples (Kolmogorov-Smirnov), a error of 1% (SPSS11.0). T/A increased significantly ($p<0.001$) after treatment with NaClO; TD diminished with NaClO ($p<0.01$) and especially with Ca(OH)₂ ($p<0.001$) and with EDTA ($p<0.01$); chlorhexidine did not produce significant changes ($p>0.005$). NaClO modified the dentine structure in the tubular diameter, intertubular space and tubular density; Ca(OH)₂ could produce mineralization and EDTA could affect dentine by extracting the mineral part of the tissue.

Key words: irrigation solutions, bovine dentine, T/A, TD, ITS, RD.

77.
HISTOPATHOLOGICAL ANALYSIS OF 66 JAW CYSTS. UPDATE BY THE WHO CLASSIFICATION (2005)

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Odontogenic cysts (OC) and non-odontogenic cysts (NOC) of the jaws represent important lesions because of their frequency and because some of them are benign lesions with aggressive biological behavior. The aim of this study was to determine the frequency of OC and NOC, to establish Basic Criteria Diagnostics (BCDx) and update them based on the WHO classification (2005). A total of 267 cases of oral biopsies were analyzed between 2007 and 2011. Clinical parameters were studied: age, sex, localization and radiographic appearance and histopathological parameters were analyzed. Ages ranged between 7 and 78 years of age. 51.5% of the cases were female and 48.4% were male. Radiographic appearance was unilocular in Inflammatory cysts (IC), Dentigerous cysts (DC), Follicular cysts (FC), Nasopalatine duct cysts (NDC) and uni- and multilocular in Primordial cysts (PC). 66.6% were IC, 15.1% were DC and FC, 13.6% were PC, 1.5% corresponded to Eruption cysts and 3.03% to NDC. In IC the BCDx was the cyst wall (CW), in DC the CW, in PC, the Lining epithelium (LE) and in NDC the CW. BCDx in PC with parakeratinized LE associated with biological behavior enabled their characterization as parakeratinized PC, termed Keratocyst Odontogenic Tumor in the WHO classifications (2005).

78.
EFFECT OF TWO MOUTHRINSES ON THE SALIVARY PROTEIN PROFILE

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Introduction: The acquired pellicle is a thin membrane resulting from the adsorption of salivary proteins on the surface of the tooth. In a previous work, we suggested that sodium fluoride and chlorhexidine benefit the host since they are good buccal antiseptics and have low influence on proteins from non stimulated total saliva. **Objective:** To analyze the *in vivo* effect of sodium fluoride and chlorhexidine as mouthrinses on salivary proteins. **Materials and methods:** We worked with 6 healthy individuals. Total saliva was obtained by salivation. The mouthrinses are: 0.05% sodium fluoride and 0.12% chlorhexidine digluconate. Distilled water was used as control. The samples were collected before and after the mouthrinse at 1, 5, 10, 15, 30, 45 and 60 minutes. Salivas were centrifuged and total proteins were quantified by the method of Lowry, secretory IgA by radial immune diffusion and albumin by a turbidimetric method. The data were analyzed by ANOVA. **Results:** Both mouthrinses significantly decreased at 1, 5 and 10 minutes with respect to time 0 and the control for secretory IgA. For albumin, no statistical variations were observed for either both mouthrinse. **Conclusion:** Both mouthrinses would be recommended because of their great effectiveness in reducing plaque and gingival indexes, and for the maintenance of the integrity of the acquired film.

Key words: saliva, mouthrinses, salivary proteins.

79.
PROGNOSTIC VALUE OF BIOMARKERS IN BREAST CANCER PATIENTS

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Plasminogen activation (Pg) to plasmin (Pna) is mediated by urokinase-type (u-PA) and tissue type (t-PA) Pg activators. Their activity is regulated by the plasminogen activator inhibitor (PAI-1). The aim of this work was to determine the PAI-1 and t-PA as prognostic markers in Breast Cancer (BC) patients with and without response to therapy and their relationship with Ca15.3 and Prolactin levels (Pro). Seventy patients were separated into three groups: GA) 25 with breast benign pathology; GB) 19 with BC who responded positively to therapy; GC) 26 BC with a progressive disease after therapy. The results obtained for t-PA were 0.58 ± 0.24 ng/mL, 0.44 ± 0.22 ng/mL and 0.50 ± 0.21 ng/mL for GA, GB and GC. PAI-1 levels were 2.52 ± 1.10 ng/mL, 2.27 ± 1.29 ng/mL and 3.49 ± 0.54 ng/mL for GA, GB and GC. Ca 15.3 values were 9.44 ± 9.11 U/mL, 8.85 ± 4.29 U/mL and 34.89 ± 35.30 U/mL for GA, GB and GC. 10.98 ± 9.08 ng/mL, 7.73 ± 2.01 ng/mL and 17.53 ± 16.21 ng/mL being for GA, GB and GC serum Pro, respectively. A statistically significant difference was observed for PAI-1 in GC as compared with GA $P < 0.009$. Ca15.3 expression assessment was statistically significant between GC and GA $P < 0.02$. t-PA and Pro expression levels showed no significant differences. As a conclusion, PAI-1 high levels in BC patients responding negatively to therapy could be associated with a more aggressive tumor behavior and a worse prognosis related to Ca15.3 values.

80.
ADAPTATION OF BIOLOGICAL SAMPLES FOR DETERMINATION OF STEROIDS BY ECLIA

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The determination of steroids dissolved in saline matrix with ECLIA validated for serum protein matrix and with a definite reporting range can lead to inexact and imprecise results. In this work we adapted a procedure for steroid extraction from biological samples to reach the reporting range for serum matrices using ECLIA. In order to analyze the influence of the matrix, a volume of high protein pattern was diluted 1/10 with Ringer and another portion with universal protein diluent DUP/ECLIA (1/10). Testosterone and progesterone were determined. The samples consisted of saline solution (Ringer) containing steroids from the incubation of *Rhinella arenarum* ovarian follicles. We investigated a consistent adaptation in: steroids extraction with dichloromethane (DCM), reversible emulsion, centrifugation, removal of the aqueous phase, dry DCM evaporation and final stripping of the steroids with DUP. In order to reach the reporting range, different ratios of sample volumes to DUP were tested. Assays of steroid recovery were performed to assess adaptation. Quintuplicate samples were used to evaluate systematic error. The results indicated the need for the protein matrix since recovery was 66% in saline solutions and 97% when using DUP. The 2:1 ratio of saline sample to DCM and the 4:1 ratio of saline sample to DUP were optimal. The recovery range achieved was 95-100% and CV between 5.0-5.4%. These results are consistent with the validation of the automated homogeneous analysis system ECLIA. We conclude that the adaptation of the steroid samples in Ringer solution allows their correct measurement by ECLIA.

81. EVALUATION OF THE USEFULNESS OF PROSTATE ULTRASONOGRAPHY (PU) AND PROSTATE SPECIFIC ANTIGEN (PSA) IN PROSTATE CANCER (PC) DETECTION
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This study was conducted to analyze abnormal PU and PSA levels in men older than 50 years in Tucuman. 169 men (50-84 years of age) were included in the study. All of them underwent clinical evaluation and physical exams for symptoms in the urinary tract (SU), PU and PSA levels. The reasons for referral included PU and PSA: up to 60 years, 35x35x35 mm, serum PSA levels below 4 ng/mL; up to 70 years 40x40x40 mm, PSA until 4.5 ng/mL and > 70 years 45x45x45 mm, PSA until 6.5ng/ml. Out of the 169 patients, 48% had abnormal PU. Among these, 43.8% had PSA levels lower than 10 ng/mL of which 71.4% had SU, and 56.2% had PSA levels higher than 10 ng/mL out of which 55.5% had SU. 5 patients who had abnormal PU, PSA levels higher than 10 ng/mL had PC in its early stages, and 3 had SU. Out of the 79 men with normal PU, 7.6% had elevated PSA levels lower than to 10 ng/mL; among them, 1 patient had SU. Our study suggests that PU has a limited value to identify PC. SU do not contribute to PC diagnosis. PSA levels can increase the usefulness of PU for PC diagnosis.

82. EXPRESSION OF MMP-2 AND MMP-9 IN MEN EXPOSED AND NOT EXPOSED TO ARSENIC (As) WITH AND WITHOUT PROSTATE PATHOLOGIES

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The aim of this work was to analyze and compare the expression of Metalloproteinases 2 and 9 (MMP-2 and MMP-9) with the serum levels of Prostatic Specific Antigen (PSAs) exposed (GEx) and not exposed (GNoEx) to high concentrations of As in the drinking water. Forty-two males aged at least 50 were included in the study. The determination of arsenic in the drinking water was performed with the Gutzeit method. Protein expression of proMMP-2, MMP-2, proMMP-9, MMP-9 was measured by gelatin zymography. GEx and GNoEx were divided into GA, GB and GC according to whether the levels of the PSAs were <4 ng/ml, 4.1-10 ng/ml or >10.1 ng/ml respectively. The expression of MMP-9 and proMMP-2 of GAEx was greater than GANoEx. The expression of proMMP-9 and proMMP-2 of GCNoEx was higher than GA and GB together. MMP-9 was significantly increased in GBNoEx and GCNoEx compared with GANoEx. MMP-2 was similar in the three groups. ProMMP-2 and MMP-9 levels enable the differentiation of exposure to As in patients without pathologies. No differences were found in GB patients perhaps due to higher MMP activity in GNoEx. Our results suggest that expression of MMPs in men exposed to As in the drinking water, in GBNoEx and GCNoEx men may serve as a marker of malignant transformation.

83. ENDOTHELIAL ACTIVATION IN ADULT PATIENTS WITH METABOLIC SYNDROME

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Metabolic Syndrome (MS) is associated with insulin resistance and a high risk of cardiovascular disease. Endothelial dysfunction is the first stage of atherosclerosis and molecules such as E-selectin and von Willebrand factor (vWF) are considered early markers of endothelial activation. The aim of this study was to determine plasma levels of soluble E-Selectin (sE-S) and vWF in patients with MS and their association with anthropometric and biochemical variables. Fifty patients with MS (28F/22M) aged 42±11 years were compared with healthy subjects. In both groups the following were determined: body mass index (BMI), waist circumference (WC), fasting blood glucose, insulin, HOMA index, lipid profile, plasma sE-S, and vWF. MS patients presented elevated levels of sE-S (42.8±6.7 vs. 36.5±8.8 ng/ml; p=0.04) and FvW (114±17 vs. 89±12 U/dl, p=0.0001). They also showed higher values of fasting blood glucose, plasma insulin, HOMA index, and total cholesterol than the control group. sE-S was correlated with BMI (r=0.34, p=0.02), fasting blood glucose (r=0.42; p=0.004), insulin (r=0.52; p=0.0001), HOMA (r=0.55; p=0.0001) and negatively with HDL-C (r=-0.44; p=0.002). In addition, vWF was correlated with BMI (r=0.60; p=0.01), WC (r=0.60; p=0.003) and total cholesterol (r=0.40; p=0.04). The results suggest endothelial activation associated with obesity, dyslipidemia and insulin resistance in MS patients.

84. SICKLE CELL DISEASE IN TUCUMÁN

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Sickle cell disease (SCD) is characterized by the presence of hemoglobin S (Hb S) and sickle erythrocytes that result from the polymerization of deoxygenated Hb. The homozygous state causes moderate or severe hemolytic anemia, and the sickle cell trait or heterozygous state presents no clinical symptoms. Frequency and characteristics of SCD were evaluated in patients who were referred for diagnosis of anemia. 178 individuals were studied between August (2008) and November (2010). Hematological tests included blood count, reticulocytes, iron, transferrin, hemoglobin electrophoresis and sickling test. 57% (101) of patients had anemia and SCD was detected in 7.8% (5 children and 9 adults). Three children showed homozygous state with normocytic normochromic anemia [Hb= 88±17g/L, mean corpuscular volume (MCV)= 89.6±11fL, mean corpuscular Hb (MCH)= 30.5±5.3pg]. The results of the adults were: women (6): Hb= 119±12g/L, MCV= 81.3±8.5fL, MCH= 26.9±5.3pg; men (3): Hb= 141±11g/L, MCV= 84.3±2.3fL, MCH= 27.6±0.7pg, with normal iron levels. In five adults without anemia, blood smear revealed the presence of poikilocytosis with sickle cells. This work allowed the detection of 14 cases of SCD, out of which 11 patients had sickle cell trait. Although anemia was not evident in all patients, the detailed observation of smears enabled the detection of sickle-shaped red blood cells that are characteristic of this hemoglobinopathy.

85. HAEMOSTATIC ALTERATIONS IN INFECTED MALNOURISHED MICE: EFFECT OF NASAL TREATMENT WITH *Lactobacillus casei*

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The aim of this work was to evaluate the preventive effect of different doses of *Lactobacillus casei* (Lc) intranasally administered on haemostatic alterations induced by a septic process in malnourished mice. Malnourished mice (MN) received a balanced diet (BD) or BD for 7d with intranasal addition of different doses of Lc during the last 2d (BD+Lc10⁷, BD+Lc10⁸, BD+Lc10⁹ cells/d/mice). Experimental, MN and well-nourished (WN) groups were infected with *Streptococcus pneumoniae*. Malnourishment altered serum total proteins (TP) and haemostatic parameters. Renutrition with Lc improved them without significant ($p < 0.05$) differences between doses. After infection, the pathogen was detected in lung and blood. Mice treated with Lc had negative hemocultures and lower bacterial counts at 240 h post infection (hpi) while BD+Lc10⁹ showed significantly lower counts in lung. The infection altered Prothrombin Time, Activated Partial Thromboplastin Time, Fibrinogen, Platelet counts and TP in all groups. MN showed the greatest changes. Renutrition with Lc had beneficial effects, BD+Lc10⁹ showed a better behavior (TP_{12hpi} WN= 59.70±2.88 g/L; MN= 40.00±2.88; BD= 53.80±2.16; BD+Lc10⁷= 46.20±1.70; BD+Lc10⁸= 43.00±1.67; BD+Lc10⁹= 62.10±2.69). Intranasal addition of 10⁹ cells/d/mice of Lc was the most effective dose to favor pathogen clearance and recover some haemostatic parameters.

86. SUBCLINICAL HYPOTHYROIDISM IN POSTMENOPAUSAL WOMEN

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Thyroid disorders are common in women and increase with each decade of life. The most frequent form is subclinical hypothyroidism with high levels of TSH and normal thyroid hormones. **Objective.** To determine the prevalence of subclinical hypothyroidism in menopausal women and its relationship with body mass index (BMI) and waist circumference (WC). **Materials and Methods.** In 140 menopausal women without thyroid disease we determined height, weight, WC (cm) and BMI (weight/height²). The women were stratified according to 1) TSH (mIU/L) groups I) ≤4.05, II) >4.05; 2) BMI and WC groups I) Normal BMI (N) ≤25 and WC ≤ 88, II) BMI N and WC >88, III) Overweight BMI (OW) or obese (O) >25 and WC ≤88 and IV) BMI OW or O and WC >88. TSH was determined by IRMA, RV 0.17 to 4.05 mIU/L. **Results.** Univariate: 82% (115) with TSH ≤4.05; 71% had BMI >25 and WC >88. 89% were 60 years old at most. Bivariate: we found $p = 0.008$ between the proportions of patients with different levels of BMI, WC and age for TSH ≤4.05. **Conclusion.** The proportion of subclinical hypothyroidism found (18%) was lower than that reported in the literature without statistically significant differences with respect to WC and BMI. Differences were observed in those women with TSH ≤4.05, with different levels of BMI, WC and age. We propose performing routine TSH screenings to menopausal women to prevent metabolic and others diseases.

87. HISTOPATHOLOGY OF LIVER AND KIDNEY IN RATS AFTER ORAL CADMIUM ADMINISTRATION AT LOW DOSES

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This work evaluates the early toxicity signs in the liver and kidney of rats treated with cadmium (Cd²⁺). Wistar rats were intoxicated with 10mg CdCl₂/kg and sacrificed on weeks 4, 8 and 12. Samples were processed with histological techniques, stained with haematoxylin-eosin, PAS and Masson and Perls trichromic stain. Up to 4 weeks, controls and Cd²⁺ treated animals showed preserved histological characteristics in kidney and liver. After 8 weeks of treatment in liver can be observed dilatation of the central vein, sinusoidal congestion, Kupffer cells hypertrophy, steatosis and central perivenous fibrosis. Renal parenchyma showed vascular congestion of glomeruli, proximal convoluted tubules (PCT) with flattened epithelial cells and PAS+ material in the luminal space. In some tubular epithelial cells cytoplasmic degeneration and loss of limits were noticed. On the 12th week of treatment, the liver showed marked dilatation and congestion of the central vein and swollen hepatocytes. No iron deposits were evinced with Perls technique. The kidney showed hydropic degeneration and eosinophilic cytoplasm of the epithelial cells of PCT. Focal fibrosis of medium caliber vessels, marked glomerular capillary congestion and slight congestion at the renal medulla. The results demonstrate that the first histopathological signs appeared on the 8th week of treatment with 10 mg/kg Cd²⁺.

88. HISTOLOGY OF THE EPIDIDYMIS OF *Chinchilla lanigera* GREY

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Chinchilla lanigera has a low reproductive rate in captivity. Males have ± 30% of idiopathic infertility, which may reflect a dysfunction in sperm maturation. The study of epididymal function is important to evaluate the sperm function. There have been reports for other species of the correlation between the epididymal epithelium and changes undergone by the sperm and the influences of the intraluminal medium. The aim of this work was to study the histomorphology of the epididymis of *Chinchilla*. Epididymal samples were obtained from sexually mature males and fixed at 4°C in buffered formalin and routine histological techniques were performed. The seminiferous duct is surrounded by connective tissue, highly vascular, and with smooth muscle layers. The epithelium is pseudostratified, with principal cells (P), basal (B), clear, apical and halo cells. P cells are columnar with stereocilia, and vary in height along the duct. B cells have no contact with the lumen. In the epithelium intense secretory activity: apocrine secretion can be observed. The results show a similar histomorphology to that described for other mammalian species. The existence of intense secretory activity clearly demonstrates the role of the epithelium in the process of sperm maturation, suggesting that alterations in epididymal function could be the cause of unexplained infertility in this species.

89. OVARY HISTOLOGY IN *Leptodactylus latinasus* (ANURA, LEPTODACTYLIDAE), ITS RELATIONSHIP WITH FAT BODIES AND WITH ITS MODE OF OVIPOSITION

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Leptodactylus latinasus builds incubation chamber where it places the foam nest and the first larval stage develops. In anurans, ovary and the fat bodies are associated. Thus, the goal of this work was to describe in *L. latinasus* its gonad histology and its relationship with fat bodies to determine characters related to the reproduction mode. Twenty-nine *Leptodactylus latinasus* females were used. Histological staining was done with Haematoxylin-Eosin, Mallory's trichrome and Veroheff stain. Different degrees of alteration in the ovarian follicle were observed: 1) few non atresic vitellogenic oocytes 2) initial peripheral atresia 3) more invasive atresia to the center with alteration of the vitellus 4) almost complete lipid vacuolization, more apoptotic bodies, absence of follicular cells, size diminution. The intromission of fat bodies is remarkable, with vases, fibroblastic cells and macrophages. The atresic oocytes in gravid females would indicate that ovulation conditions were not optimal. The amplex and oviposition of the species studied takes place inside the mud incubation chamber, where conditions are appropriate for reproduction; thus, apparently, if the environment is not favorable, the ovary degenerates.

90. PARASITIC FAUNA IN A STRETCH OF THE BASIN ARIAS-ARENALES RIVER

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Research on parasites of fish and crustaceans native to inland waters are scarce locally. The aim of this work is to contribute to the knowledge of their parasitic fauna of their importance as environmental indicators. Samplings were performed on sections of the Arias-Arenales subbasin. Traps and flakes were used to catch fish and crabs were collected manually. The parasites were treated with routine techniques. In the San Lorenzo river were captured *Aegla sp* (n=3), with *Temnocephala sp* (n=8). In the Arias river: *Bryconamericus thomasi* and *Astyanax lineatus* (n=11) parasitized with *Spirocamallanus sp*; metacestodes and *Dactylogyrus sp*, with a prevalence of 45, 27 and 18% mean abundances of 0.6, 1.6 and 0.7, and mean intensity of 1.4, 5.7 and 16 respectively. In the Arenales river: *A. lineatus* and *B. thomasi* (n=5) with *Ichthyophthirius multifiliis*, *Dactylogyrus sp*, *Spirocamallanus sp* and metacestodes. In the Arias-Arenales confluence: *B. thomasi*, *A. lineatus* and *Trichomyxter corduvensis* (n=35) with *Spirocamallanus sp*; *Dactylogyrus sp*, *Henneguya sp*, *Ichthyophthirius multifiliis* and metacestodes with prevalence, mean abundance and mean intensity of 40, 74, 9, 23 and 6, 0.86, 23.2, 60, 0.5 and 0.2, 2.1, 31.3, 700, 2.1 and 3.5, respectively. Downstream, increased evidence of human activities mainly urbanization. In the Sarmiento crossing, the river has received industrial and sewage contributions, predominantly anoxia tolerant tubificids.

91. COMPOSITION OF THE DIET OF TWO SPECIES OF FISHES FROM THE ARIAS-ARENALES URBAN RIVER, PROVINCE OF SALTA, ARGENTINA

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Neotropical fishes have a high diversity and wide use of available resources, which makes them an ideal group to study trophic ecology. The aim of this work was to determine whether there are differences in the diets of two common fish species in an urban river. Samples were taken in two sectors: Site1 (Arias river); Site2 (Arias and Arenales river confluence). The fish were caught with different gears and fixed *in situ* in 10% formaldehyde for transfer and subsequent dissection. Diets were established with binocular scan of the stomach and intestinal contents of *Astyanax eigenmanniorum* (n=16) and *Bryconamericus thomasi* (n=3). We applied the relative importance index (IRI), the frequency of occurrence of each trophic category (%FOR) and numerical abundance (%N) for quantitative analysis of the trophic spectrum for each species. The species showed a food preference. Juveniles of *A. eigenmanniorum*, with standard lengths between 56.8 mm and 39.26 mm, consume, in order of preference: Algae, Rotifers, Diptera, Ephemeroptera, diatoms, Trichoptera, Coleoptera and Plecoptera. *B. thomasi*, ranging from 53.6 mm to 49.17 mm standard length, eat in descending order: algae, diatoms, Diptera, Ephemeroptera and Trichoptera. We inferred that these trends in preferences would enable coexistence in environments.

92. OLIGOQUETOFUNA OF THE NATIONAL PARK "CAMPO DE LOS ALISOS", TUCUMÁN, ARGENTINA

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The composition of the communities of the soil macrofauna and their status are indicative of the degree of conservation of the ecosystem. Earthworms are studied in this work in order to assess environmental conditions in regions that have been recovered after significant alterations in the past. National Park Campo de los Alisos (10,660 hs) is in the Chichigasta department, in the province of Tucumán. Collection was done manually in 10 sampling areas chosen at random and up to 1500 m a.s.l. The specimens were identified and deposited in the Colección Helmintológica of the Fundación M. Lillo. We found two species of the Fam. Megascolecidae: *Amyntas gracilis* (Rosa, 1891) and *Metaphire californica* (Kinberg, 1867), a species of Fam. Lumbricidae: *Octolasion cyaneum* (Savigny, 1826), and a species of the Fam. Ocnerothricidae: *Eukerria saltensis* (Beddard, 1895). The species found are common in areas with significant human activity. This first collection has confirmed man's influence on the spread of these introduced species. The results are interesting because until now there was no information on the oligoquetofauna in the Yungas region.

93. GORDIIDA (NEMATOMORPHA) DIVERSITY IN WATER STREAMS OF CAPAYAN (CATAMARCA, ARGENTINA)

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The objectives of this work were to survey Gordiida diversity in water streams of Catamarca, and to provide information about the geographical distribution of the species collected. 10 water streams were sampled in Capayan and they were given geographical reference in the field. Adults were collected by two persons who combined manual techniques, strainers, and wire nets, while walking along a 200m distance in each water stream, covering both stream banks. 11 species were reported: *Chordodes brasiliensis*; *Neochordodes meridionales*; *Noteochordodes achosmosus*; *N. cymatium*; *N. desantisi*; *N. saltae*; *N. talensis*; *Paragordius esavianus*; *P. varius*; *Pseudochordodes bedriagae* and *P. dugesi*. The species common to the 10 water streams was *Noteochordodes talensis*, while *Paragordius esavianus* was collected in only one water stream. Reports of *Neochordodes meridionales*, *Noteochordodes achosmosus*, *N. cymatium*, *N. saltae* and *Paragordius esavianus* represented new records, thus expanding the geographical distribution of these species in the province of Catamarca. These results contribute to the knowledge of Gordiida diversity and distribution in Catamarca, and in Argentina, which can be increased with future collection campaigns.

94. FUNGAL DIVERSITY IN RESERVA HORCO MOLLE AND PARQUE BIOLÓGICO SIERRA DE SAN JAVIER (TUCUMÁN, ARGENTINA)

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Reserva de Horco Molle and Parque Biológico Sierra San de Javier are protected natural areas located in the Yerba Buena Department, Tucumán. Phytogeographically, they belong to the "Yungas" Province, an ecosystem with a high biodiversity of flora and fauna. Studies on fungal diversity in the region are scarce and indicate that it is the reservoir of a large number of species not yet known. The aim of this study was to document the diversity of fungi in the protected area. Seasonal samplings were carried out in the study sites. The material was incorporated into the LIL herbarium and studied macro and microscopically for identification. We present the first listing of the mycobiota identified so far that includes 40 species. *Cercophora ambigua*, *Cosmopora pseudepisphaeria*, *Rosellinia dingleyae*, *Helicoma dennisii* are cited for the first time for Argentina. *Bactridium flavum*, *Endophragmiella pallascens*, *Cordyceps polyarthra*, *Trametes* cfr. *cingulata* are new reports for northwestern Argentina. These results are important because they allow us to know fungal diversity in protected areas and thus contribute to their conservation.

95. SENSITIVITY OF ENVIRONMENTAL FUNGI TO EXTRACTS OF THE GENUS *Baccharis*

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The interest in finding biologically active molecules against fungi is on the increase, not only because of their usefulness in the treatment of diseases but also to control their proliferation. Vegetables are an important source of antimicrobial agents. The species *Baccharis boliviensis* (*Bb*) and *Baccharis tola* (*Bt*), which grow in the Puna Argentina in extreme environments, could be a source of metabolites of antifungal action. The present work determines the antifungal effect of both plant species against environmental fungi belonging to different genera. Ethanol extracts (3.200 mg/ml of phenolic compounds) and 2 µl of spore suspension (5x10³ spores/ml) were used. The values of fungal growth were converted to their equivalent in inhibition percentage (%). Subsequently, we determined the Minimum Inhibitory Concentration (MIC) of the extracts (100-3200 µg/ml of phenolic compounds) and 2 µl of each (5x10³ spores/ml) spore suspension. *Scopulariopsis brevicaulis* was most sensitive, showing 100% inhibition with *Bb* and lower with *Bt*. Similar results were obtained with *Alternaria* sp. *Absidia* showed strong inhibition. The remaining strains had lower sensitivity. The extracts had MIC values between 1600 and >3200 mg/ml. The results show that both extracts might be used as antifungals against environmental fungi.

96. ANTIFUNGAL ACTIVITY OF ANACARDIACEAE EXTRACTS ON EAR ROT FUNGI

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The aim of this work was to quantify the antifungal activity of leaf extracts from *Schinopsis* on *Fusarium* species causing ear rot disease. Leaves from *S. haenkeana* and *S. lorentzii* were extracted with dichloromethane and ethyl acetate. The extracts were evaporated to dryness. The dry powders were dissolved in methanol and filtered. The fungicidal activity of the methanolic extracts was evaluated by the liquid broth microdilution method. Inhibitory concentration of 50% (IC50) was calculated. Leaf extracts from *S. lorentzii* had IC50s of 42 µg/ml (dichloromethane, *F. verticillioides* and *F. graminearum*), 100 µg/ml (ethyl acetate, *F. graminearum*) and 35.7 µg/ml (ethyl acetate, *F. verticillioides*). Extracts from *Schinopsis haenkeana* were less inhibitory of fungal growth. The isolation and structural elucidation of the antifungals from the dichloromethane extract of *S. lorentzii* are under way.

97.
TOXIGENIC POTENTIAL OF THE *FUSARIUM GRAMINEARUM* COMPLEX IN MAIZE FROM NORTHWEST ARGENTINA: GENOTYPIC AND PHENOTYPIC CHARACTERIZATION

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The mycotoxigenic genotypes and phenotypes of the *Fusarium graminearum* complex from maize of northwest Argentina were determined. Multiplex PCRs based on TRI3/TRI12 and single PCRs based on TRI7/TRI13 were performed using DNA of 14 strains of *Fusarium graminearum* complex (*F. boothii* and *F. meridionale*) isolated from maize of northwest Argentina. Mycotoxigenic phenotype was determined in rice medium. Multiplex and single PCRs indicated that 78% of strains (*F. meridionale*) had NIV genotype, while the remaining 22% (*F. boothii*) had DON or 15ADON genotypes. The chemical analysis distinguished *F. meridionale* strains as NIV producers only, DON/NIV producers or NIV/DON producers. Strains of *F. boothii* showed DON production only. Our results indicated for the first time that strains of the *F. graminearum* complex isolated from maize of northwest Argentina are really NIV and DON producers. Dominance of NIV genotype is unprecedented in Argentina and further research is needed to determine the real impact of the identified trichothecene chemotypes on food safety in northwest Argentina.

98.
FRAGRANT CONSTITUENTS OF *Penicillium commune* AND THEIR ACTIVITY ON BIOFILM PRODUCING BACTERIA

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Penicillium is a genus of ascomycetous fungi of major importance both in the natural environment and in food and drug production. The aim of this work was to investigate the activity of fragrant fractions isolated from *P. commune* on *Staphylococcus aureus* and *Pseudomonas aeruginosa* in biofilm. From an AcOEt extract of *P. commune*, we obtained four fragrant fractions by column chromatography, and their antibacterial effects were analyzed on Gram (+) and Gram (-) bacteria. The most active fraction was also mixed with oxacillin to evaluate a synergistic effect on bacteria in biofilms. F1 at 100 µg/mL inhibited 87% of the growth and 90% of the biofilm of *S. aureus*. In *P. aeruginosa* we observed 39% growth inhibition (50 µg/mL) and 20% biofilm inhibition. The mixture of F1 (6 µg/mL) and oxacillin (3 µg/mL) was more effective than F1 and oxacillin alone on both bacteria. Volatile F1 was investigated by GC/MS. The main compounds were identified as hexanedioic acid monoester (16%), 3-Isobutylhexahydropyrrolo [1,2-a]pyrazine-1,4-dione (14.5%), a known antibacterial metabolite, and betulin (1.7%). F1 and its mixture with oxacillin showed activity against both bacteria in biofilms. This could be important for the control of bacteria and their main resistance mechanism, the biofilm responsible for recalcitrant chronic infections.

99.
STUDY OF LYMPHOCYTES AND CYTOKINES BY NASAL IMMUNIZATION OF MICE WITH PppA ASSOCIATED TO PROBIOTIC STRAIN

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Vaccine development using pneumococcal antigenic proteins is a new strategy in the fight against *S. pneumoniae*. Objective: To evaluate cytokine production and quantify T and B lymphocytes in lung and peripheral blood (B) of mice nasally immunized with pneumococcal Ag (PppA)+a probiotic (*L. casei*: Lc). Three successive doses of PppA+Lc (10⁹ cells/mouse) were used and also groups of animals immunized with Lc, PppA and PBS (Control:C) were included. On d 0 and 42 after the 1st nasal immunization (NI), samples were harvested. MM: Quantification of 1)TL(CD3+,CD4+,CD8+) and BL(IgA+,IgG+) in lung (L) and blood (B) by flow cytometry, and 2)cytokines in bronchoalveolar lavage (BAL) and serum(S):IL-4,INF-γ and IL-17(ELISA). Total TL was not modified by any of the treatments but PppA+Lc increased TLCD4+ and decreased TLCD8+. PppA+Lc increased IgG+cells in S(p <0.05) and the IgA+cells in L. Also, PppA+Lc increased cytokine levels in S and BAL (BAL:d42:IL-4=C=65±7,PppA+Lc=358±26,INF-γ: C=70±8,PppA+Lc=319±19). Vaccination with PppA+Lc induced activation of T in S and BAL, evidenced by increased production of cytokines. The IgG+cells in S and IgA+ cells in BAL were increased. Stimulation of humoral and cellular immune response induced by NI with PppA+Lc is important for the development of a vaccine against pneumococci using a probiotic strain as an adjuvant.

100.
CHARACTERIZATION OF INTESTINAL MICROBIOTA OF CHILDREN AND ISOLATION OF LACTOBACILLI WITH PROBIOTIC POTENTIAL

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The intestinal microbiota (IM) is a complex microenvironment and includes a variety of bacterial genera and species, lactobacilli being among the genera used as probiotics. Objective: To characterize the major bacterial genera present in the IM of eutrophic children and isolate strains of *Lactobacillus* for potential use as probiotics in human health. Stools of 15 healthy children were analyzed. MM: 1)Count by conventional techniques: total aerobes and anaerobes, enterobacteriaceae and lactobacilli. The number of bacteria was determined by plate count and the results were expressed as CFU/g of faeces, 2) Isolation of lactobacilli and evaluation of their morphology (GRAM stain), specific biochemical properties (API system), resistance to acid pH and bile. The results are expressed as mean total counts x g of faeces: Anaerobes: 2x10⁹ CFU/g, Aerobes: 5x10⁹ CFU/g, Enterobacteriaceae: 2x10⁶ CFU/g and *Lactobacillus*: 3x10⁶ CFU/g. We isolated 2 strains of lactobacilli with high resistance to acid pH and bile, a fundamental requirements for a strain to be defined as a probiotic. Further studies are necessary to assess their potential use in the development of products for preventive and/or therapeutic applications.

101.
INHIBITION OF *Listeria monocytogenes* WITH LEMON JUICE IN VEGETABLES READY FOR CONSUMPTION

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Minimally processed foods require the replacement of chemicals by biopreservers to ensure their safety and satisfy the consumer. Objective: To evaluate the inhibitory action of lemon juice on mesophilic aerobic bacteria and *Listeria monocytogenes* in vegetables ready for consumption. A) cut vegetables B) *L. monocytogenes* (CLIP) C) lemon juice. We determined 1) mesophilic aerobes, total and fecal coliforms, *Salmonella*, *S. aureus* and *Listeria* sp. 2) antimicrobial sensitivity of CLIP against pure and diluted lemon juice 3) inhibition of aerobic mesophilic and *L. monocytogenes* in vegetables with lemon juice 4) total and reducing carbohydrates, phenolic compounds, proteins and fatty acids in vegetables with or without lemon juice. 1) mesophilic aerobic bacteria 3×10^8 , *S. aureus* 2×10^2 CFU gr^{-1} , absence of *Salmonella*, *E. coli* and *Listeria* sp. 2) Inhibition halos of pure lemon juice: 40mm, dil -1: 26mm and dil -2: 20mm. 3) aerobic mesophilic bacteria was completely inhibited for 30 min in treated vegetables until day 5 (3.1×10^4) while in untreated ones the initial concentration remained until day 5. 1×10^6 CFU of CLIP were reduced by 4 log units with lemon juice for 60 min. Macronutrients decreased after 1 h with lemon juice. Phenolic compounds increased. Lemon juice inhibits aerobic mesophilic bacterial load, does not completely eliminate high inoculum of *Listeria* and macronutrient content decreases.

102.
ANTIMICROBIAL ACTIVITY OF *Lactobacillus* sp. FROM ORANGES

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Although lactic acid bacteria (LAB) are widely used to extend shelf-life and microbiological safety of food, little is known about this in citrus LAB. The aim of this work was to evaluate the antibacterial activity of LAB isolated from orange juice against pathogenic microorganisms in order to establish their potential use as biopreservatives. Inhibitory activity of *Lactobacillus plantarum* JNB21 and JNB25 and *Lactobacillus brevis* JNB23 was assayed by agar spot and well diffusion methods against six ATCC reference strains: *Escherichia coli* 25922 and 35218, *Staphylococcus aureus* 25923, *Enterococcus faecalis* 29212, *Klebsiella pneumoniae* 700603 and *Pseudomonas aeruginosa* 27853. Results were positive when inhibition halo formations around the LAB colonies or the wells were greater than 2 mm. Both *Lact. plantarum* strains inhibited the growth of all strains, showing clear zones greater than 5 mm. By contrast, the JNB23 strain inhibited growth, accounting for 60% of the analyzed strains, it being negative for *E. coli* and *K. pneumoniae*. The agar diffusion assay confirmed that the antimicrobial effect was due to the production of organic acids. In conclusion, *Lact. plantarum* strains displayed antimicrobial activity against all target strains to varying degrees, this activity being greater against *S. aureus* and *E. coli*. So, they were selected for further studies in order to determine their potential application in the preservation of fresh citrus juices.

103.
EFFECT OF THE MODIFICATION OF THE COMPONENTS OF A CULTURE MEDIUM ON BIOMASS AND NISIN PRODUCTION BY *Lactococcus lactis* CRL 1584

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L. lactis CRL1584, an indigenous strain from a *Lithobates catesbeianus* hatchery, inhibits the growth of *Citrobacter freundii*, *Pseudomonas aeruginosa* and *Listeria monocytogenes* by organic acids, nisin Z and H₂O₂, *L. lactis* being a probiotic candidate for raniculture. The number of bacteria added to the balanced feed should be high to promote adhesion and colonization and later protective effect on animals. We modified the components of LAPTg+Lactose as basal culture medium to optimize the production of biomass and nisin in *L. lactis* CRL1584. This study shows the results of one central point and 10 axial points of a complete central factorial design. The strain grew at 37°C, 24h, pH 6.8 in microaerophilia. The central point showed 9.76 Log CFU/mL of biomass and 2,160 AU/mL of nisin titer. The tryptone concentrations did not affect the biomass but decreased nisin production. High levels of yeast extract or peptone increased biomass with lower nisin values (720; 1,080), while low levels did not modify biomass but changed nisin production (540; 640). High sugar concentrations increased biomass, but not nisin. The results did not evidence a higher nisin production than the control, but high substrate concentrations produced an increase in biomass. The application of the complete design will allow us to determine optimal biomass and nisin production.

104.
SUSCEPTIBILITY OF BENEFICIAL LACTIC ACID BACTERIA AND POTENCIAL PATHOGENS TO ANTIMICROBIAL AGENTS USED IN RANICULTURE

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The design of probiotics for raniculture requires evaluating their functional properties such as resistance to chemotherapeutics frequently used for treatment/prevention of diseases in *Lithobates catesbeianus* hatcheries. The susceptibility of probiotic candidates' lactic acid bacteria (LAB) (*Lactococcus lactis* CRL1584, CRL1827; *L. garvieae* CRL1828; *Lactobacillus plantarum* CRL1606 and *Enterococcus gallinarum* CRL1826) to antibiotics and antiseptics used in raniculture was studied as well as the susceptibility to antiseptics of pathogenic bacteria: *Pseudomonas aeruginosa*, *Citrobacter freundii* and *Listeria monocytogenes*. The minimal inhibitory concentration (MIC) was determined according to the CLSI recommendations. The LAB strains were susceptible to most of the antibiotics, but they were metronidazole resistant. CRL1584 and CRL1606 strains were oxytetracycline resistant, and CRL1606 and 1828 strains vancomycin resistant while CRL1826 (ceftazidime resistant) presents vancomycin resistance genes, it being susceptible in phenotypic assays. The antiseptics MIC values of LAB and pathogens were higher than the concentrations routinely used in hatcheries. The results indicate that *L. lactis* CRL1584 and 1827 could be included in a probiotic product. Although the pathogens showed resistance to antiseptics, they were also sensitive to LAB antimicrobial metabolites.

105.
EFFECT OF POLYPHENOLS ON THE GROWTH OF WINE SPOILAGE BACTERIA

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In this work we investigated the effect of different fractions of polyphenols (PP) of red wine on the growth of *Lactobacillus hilgardii* 6F, a wine spoilage microorganism. PP fractions were obtained by successive extractions of red wine: fraction 2 (F2) contains procyanidins, catechins and flavanols; fraction 3 (F3), phenolic acids and quercetin. *L. hilgardii* was cultivated in wine broth (WB) at 30°C. PP fractions concentrated 1-, 2- and 4-fold (1x, 2x, 4x) were added to the WB. F2 and F3 contain 19.37 and 1.42% of total PP of wine. In WB, *L. hilgardii* grows with μ_{max} of 0.12 h⁻¹, increasing viable cells concentration in 1.58 log cycles at 72 h. *L. hilgardii* grows in WB+F2 (1x and 2x) with μ_{max} =0.17 and 0.14 h⁻¹, respectively, increasing the viability in 1.94 and 1.61 log cycles at 72 h. In WB+F2 (4x), *L. hilgardii* grows with μ_{max} =0.06 h⁻¹ and cell viability decreased by 18% compared to WB. In WB + F3 (1x) no significant differences in growth parameters were detected with respect to WB, while the addition of F3 (2x) and (4x) caused a decrease in μ_{max} (0.08 and 0.06) and loss of microbial viability of 13 and 25% respectively compared to WB. Results indicate that: i) PP stimulate or do not change the growth of *L. hilgardii* 6F at the concentration normally present in wines; (ii) PP of F3 2- or 4-fold concentrated produced a significant inhibition in the growth of *L. hilgardii* 6F.

106.
ISOLATION OF DAIRY BACTERIA AND ASSESSMENT OF THEIR β -GALACTOSIDASE ACTIVITY AS A CHARACTERISTIC OF PROBIOTIC AND TECHNOLOGICAL IMPORTANCE

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In recent years, probiotics have attracted the interest of both industry and consumers. An important probiotic property is the ability of microbial β -galactosidase to contribute to the intestinal metabolism of lactose by hydrolyzing this disaccharide inside the food and within the intestine. In addition to hydrolase activity, β -gal leads to the formation of prebiotic galactooligosaccharides by transglycosylation reactions. In this work, we isolated LAB and assessed their β -gal activity in order to select the strains with the ability to hydrolyse lactose and to produce GOS. Lactobacilli from artisanal cheeses were isolated in selective culture media and identified by biochemical tests. β -gal and the products formed from lactose were determined by a colorimetric method and HPLC. Thirty-five NSLAB belonging to facultative heterofermentative (60%), obligate heterofermentative (31.5%) and obligate homofermentative (8.5%) groups were isolated. β -gal activities ranged from 120 to 1450 nmols ONP min⁻¹ mL⁻¹. When exposed to gastrointestinal conditions some strains lost viability and β -gal in a significant manner. One *Lactobacillus plantarum* and *L. paracasei* strains were selected for further studies due to their high β -gal, gastrointestinal tolerance and hydrolase/transferase activities.

107.
HIGH-RISK HUMAN PAPILLOMAVIRUS (HR-HPV) INFECTION IN WOMEN LIVING IN VALLE DEL TAFÍ, ARGENTINA

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Infection with genital human papillomaviruses has been established as the primary cause of cervical cancer. HPV infections are classified as latent, subclinical, or clinical. Clinically apparent infections usually result in warts rather than malignancies. Latent infections are detected only with tests for viral DNA. The aim of this work was to determine the prevalence of high-risk human papillomavirus (HR-HPV) in women living in Valle del Tafi. Cervical cell specimens obtained from 85 women aged 14-65 were included. A structured questionnaire was used to gather information on risk factors for HPV infection and cervical cancer (according to IARC-WHO). Detection and typing of the viral DNA genome was performed by polymerase chain reaction, combined with a restriction fragment length polymorphism assay (PCR-RFLP). HPV DNA was detected in 43% of the clinical samples, with 25% of high risk types. We calculated HPV prevalence for age groups 14–24 years old: 34%, 25–34: 43%, 35–44: 11%, 45–54: 14% and 55–64: 2%. The most common high risk viral types were: 16, 58, 31, 33, 66, 52, 62. HPV prevalence was highest in women younger than 35 years of age, decreasing in older women. Viral infection/persistence is an important determinant of regional cancer incidence.

108.
HUMAN RESERVOIRS OF POTENTIALLY PATHOGENIC FUNGI IN THE HOSPITAL COMMUNITY

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Numerous studies have shown a steady increase in nosocomial fungal infections. Hands play an important role as a transmission vehicle of potentially pathogenic yeasts. The aim of this work was to determine yeasts in the hands and blood cultures from hospitalized pediatric patients with risk factors and from the hands of their parents or guardians, to study antifungal susceptibility of isolates and then, by comparing the results, to evaluate the possibility of the existence of carriers. Sampling was conducted of the hands of 103 patients and their guardians. The yeast isolates were identified by morphological and physiological studies. The identification was performed with API-20-AUX (Bio Merieux). The sensitivity to fluconazole, itraconazole, voriconazole and amphotericin B was determined by the agar diffusion method. In children, we isolated *Candida tropicalis* (31.15%), *C. parapsilosis* (29.5%), *C. albicans* (24.6%), and *Rhodotorula* spp. (14.75%) and in the parents *Rhodotorula* spp. (30.19%), *C. albicans* and *C. tropicalis* (each with 24.53%) and *C. parapsilosis* (20.75%). Yeasts were isolated from the blood cultures of 15 children. 80% of these yeasts coincided with the species isolated from their hands. Similar colonization rates were found in the parents/guardians. With the exception of 5 isolates from children's hands, all yeasts were sensitive to the antifungal agents.

109.
PRODUCTION OF AN EXTRACELLULAR LIPASE ACTIVITY USING MOLASSES DISCOLORED WITH MICROBIAL BIOMASS

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Lipases are enzymes that are able to catalyze both hydrolysis (in aqueous media) and synthesis (in media with low water activity) reactions. Our work focuses on the use of lipases for biodiesel synthesis, obtaining the biocatalyst by submerged fermentation using molasses pretreated with microbial biomass as the sole carbon source. The lipase-producing microorganism was identified as *Brevibacillus agri*. Lipase production was performed in submerged culture at 37°C and 150 rpm. A saline medium was supplemented with molasses which were previously discolored by different treatments using microbial biosorbents at pH 3, 7 and 9. The enzyme production was evaluated by determining hydrolytic and transesterification activities. The maximum hydrolytic activity (29.91 ± 2.13 U/ml) was obtained employing molasses pretreated at pH 9 with *S. cerevisiae* (3% ww/v) as microbial biosorbent, the yeast being developed in aerial culture and kept at -20°C. The maximum transesterification activity (0.64 ± 0.23 U/ml) was reached with molasses pretreated at pH 9 and with *Aspergillus niger* (3.5% ww/v) also developed on agar plates and kept at -20°C. Thus, our studies allow us to conclude that the use of partially discolored molasses favored the production of an extracellular lipase activity by *B. agri* E12.

This work was supported by grants CIUNT 26/D409 and PIP 297 CONICET.

110.
IDENTIFICATION OF VARIABLES THAT AFFECT THE MYCELIUM-BOUND LIPASE FROM *Aspergillus niger* MYA 135

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Lipases catalyze hydrolysis, esterification and transesterification of esters. Filamentous fungi have a great potential to produce many lipases. Thus, the uses of mycelium-bound lipases as biocatalysts have become an attractive process in the bulk production. Here, the identification of variables that influence both the hydrolytic and the synthetic activity of the mycelium-bound lipase from *Aspergillus niger* ATCC MYA 135 was carried out. *p*-nitrophenyl palmitate (*p*-NPP) and palmitic acid were used as substrates in transesterification and esterification reactions, respectively. In both reactions ethanol was selected as acyl acceptor. Hydrolysis was also determined using *p*-NPP as a substrate. Variables such as pH memory as well as the presence of PEG 20.000, MES, Tween 80, saponin, MgCl₂ and CaCl₂ were explored using the Plackett–Burman statistical design. Preincubation at pH 4 and the presence of PEG and MgCl₂ had a positive effect on hydrolytic (147.1 vs 91.6 mU/g without treatment) and transesterification (69.6 vs 42.3 mU/g without treatment) activity. Concerning esterification activity, preincubation at pH 4 and the presence of MES, Tween 80 and saponin had a positive effect on the enzymatic catalysis (an ester conversion of 46.7% vs 20% without treatment).

This work was supported by grants CIUNT 26/D409 and PIP 297 CONICET.

111.
ENZYMATIC MODIFICATION OF PECTINS BY TRANSESTERIFICATION

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Pectins can be used as carriers for controlled drug delivery. However, their aqueous solubility may contribute to undesirable premature release of the drug. One option to reduce this high solubility could be to enzymatically modify them without affecting their biodegradability. Lipases can catalyze synthesis reactions using polymers and fatty acids as substrates. Here, a strain identified as *Brevibacillus agri* E12 according to the comparative analysis of 16S rDNA sequence (EF635412) was used to obtain an extracellular lipase activity by submerged fermentation. Supernatant (200 µl) at pH 7.8 or 9 was dried with high (HM) or low (LM) methoxy pectin, using the whole pectin or the DMSO-soluble (DMSOs) fraction. Subsequently, it was incubated at 37 or 50°C with *p*-nitrophenyl palmitate (*p*-NPP) in *n*-hexane as reaction medium. Finally, 0.25 M Na₂CO₃ was added and absorbance was monitored at 405 nm. The highest transesterification specific activities were obtained with DMSOs HM pectin (1.56 ± 0.17 U/mg) and DMSOs LM pectin (1.41 ± 0.18 U/mg) using supernatant at pH 9. These results suggest that increasing the pH of the supernatant containing the enzyme activity favors the modification of DMSOs pectins by transesterification in the presence of *p*-NPP as acyl donor.

This work was supported by grants CIUNT 26/D409 and PIP 297 CONICET.

112.
ANTIOXIDANT CAPACITY OF STRAWBERRY POLYPHENOLS FROM TUCUMAN

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Free radicals are generated in the body by normal metabolic activity as well as by lifestyle factors such as smoking, exercise and diet and have been associated in the causation and progression of several chronic diseases. The aim of this work was to investigate the antioxidant capacity of two varieties of strawberry juices and their relationship with phenolic compound content. Total phenolics concentration was determined by the procedure of Singleton and Rossi while flavonoid and phenolic acids concentration was determined by the method of Zoecklein (1990). Antioxidant activity was determined by FRAP, DPPH and ABTS methods in juices and pure phenolic compounds. Total phenolic concentrations in Albion and Camarosa juices were 1188.4 and 1257.7 mg GAE/l, respectively. The clarification process was effective to remove approximately 80% of the phenolic compounds. In both juices, the flavonoid fraction was about 75% higher than the phenolic acid fraction. The juice of both strawberry varieties showed high ferric reducing power as well as ABTS and DPPH radical scavenging activity. Gallic acid showed the highest antioxidant activity among individual compounds. Our results indicate that phenolic compounds are the major contributors of these capacities and suggest that these juices could be proposed as new sources of safe natural antioxidants.

113. ANTINOCICEPTIVE ACTIVITY OF EXTRACTS AND ARROPE OF MISTOL FRUITS (*Ziziphus mistol*)

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The fruits of mistol and arrope were used in traditional medicine to treat different pathologies. We evaluated the antinociceptive activity of mistol extracts and arrope in rats. The results with the formalin test showed in the neurogenic phase that the aqueous extract had an activity of 61% similar to morphine 68%, whereas arrope showed 43% and ibuprofen 12%. In the inflammatory phase the aqueous extract, arrope and ibuprofen presented similar activity (50-55%). In the thermal test, the aqueous extract showed the highest antinociceptive activity at 90 min (116%), whereas morphine had a similar activity at 60 min. Arrope had only 34% at 90 min and ibuprofen lacked analgesic activity. In the test by acetic acid (peripheral level), both the aqueous extract and arrope inhibited pain (60-70%), less than morphine (92%) and ibuprofen (95%). In conclusion, the results showed that the aqueous extract and the arrope of mistol fruits evidenced antinociceptive activity, although a significant decrease in the analgesic effect at central level was evident in arrope, suggesting loss of activity of some compound present in the aqueous extract. The antinociceptive activity demonstrated might involve mainly opioid receptors and the inhibition of the synthesis of prostaglandins. Medicinal plants are believed to be an important source of new substances with potential therapeutic effects.

114. ANTIRADICAL ACTIVITY OF PEEL, PULP AND SEEDS OF *Annona cherimolia*

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The search for natural antioxidants, especially of plant origin, has increased in recent years. Epidemiological studies have revealed that an increased consumption of fruits and vegetables is associated with a decreased risk of development of several chronic and degenerative diseases. The method for measuring antioxidant activity are those that involve the generation of radical species, and the presence of antioxidants determines the disappearance of these radicals. The use of 2,2-diphenyl-picrylhydrazyl (DPPH) radical-scavenging model is recommended for measuring the antioxidant activity. In this work, the ethanol extracts of peel, pulp, and seeds of *Annona cherimolia* were tested for their antiradical activities against DPPH. All of them showed strong DPPH radical-scavenging activity similar to that of ascorbic acid, the most significant result being obtained in the presence of ethanol extract of the peel (54.4%) at 5 min from the beginning of the experiment. These preliminary results of the study of the antiradical activity of cherimoya fruit could promote studies of species of this family to evaluate the possibility of using them as natural sources for the development of dietary supplements.

115. PURIFICATION AND PROPERTIES OF AN α -GALACTOSIDASE FROM *Lenzites elegans*

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Introduction: White rot fungi degrade hetero-1,4- β -D-xylans, hetero-1,4- β -D-mannans, galacto-glucomannans and glucomannans. **Objectives:** Purification of an α -galactosidase from *L. elegans*, and study of its physicochemical and kinetic properties. **Materials and methods:** *Lenzites elegans* isolated from decaying wood was used. α -Galactosidase was isolated and purified from the culture medium. **Results and discussion:** The Mr of the enzyme was 158 kDa with two subunits (Mr = 61 kDa). The optimal temperature was in the 60-80°C range. Optimal pH was 4.5 and was stable from pH 3 to 7.5 after preincubation at 60°C for 2 h. It is a glycoprotein active against α -D-galactopyranosides. Galactose is a non-competitive inhibitor (Ki = 22 mM vs. *p*-nitrophenyl- α -D-galactoside and 12 mM vs. α -D-melibiose as substrates). Glucose was a competitive inhibitor (Ki = 10 mM). Hg²⁺, Ag⁺ and *p*-chloromercuribenzoate were inhibitors, suggesting the presence of -SH groups in the active site. The N-terminal end (SPDTIVLDGTNFDALN) suggests that it belongs to the glycosyl hydrolase family 36. **Conclusions:** This fungus may become a useful source of α -galactosidase production for industrial use.

116. ANALYSIS OF BIOACTIVE FRACTIONS OF *Phoradendron liga* (Gill ex H. & AM.) Eich. LEAF EXTRACT

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Lemon production in Tucumán could be sustainable and fungus-free if natural products were used to combat them. The ethanolic extract of *P. liga* and its subextracts showed this capacity. These were obtained by extraction with increased polarity solvents (ethyl ether, dichloromethane and methanol) and were purified by column chromatography (CC) (Sephadex LH20, methanol as mobile phase); CC eluents were analyzed by TLC (Silica gel F₂₅₄ plates, toluene / ethyl acetate / HCOOH / methanol 7:8:2:3 v/v/v/v as mobile phase) and the developed plates were revealed with UV-vis, FeCl₃, vanillin-sulfuric and NP/PEG reagents. The spots analysis suggests the presence of compounds such as naringin and neohesperidin (dihydrochalcone), mono- and di-glycosylated flavonoids, a non-glycosylated flavonoid, phenolic compounds, chlorophyll, auron, and a genistein type isoflavonoid (with and without glycosylation). The isolated flavonoids are proposed as responsible for the antifungal activities of *P. liga* ethanolic extract.

117.
DETERMINATION OF THE CONTENT OF ASCORBIC ACID AND ITS STABILITY IN COOLED CITRIC JUICE

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Ascorbic Acid (vitamin C) has manifold biological functions. It takes part in the maintenance of bones and blood vessels, protects vitamins A and E and some compounds of the B complex against oxidation, develops anti-infectious and antitoxic actions, and helps in the absorption of nonheme iron by the organism. Ascorbic acid is not synthesizable by the organism, but it enters it through foods, mainly citrus fruits. The objective of this work was to determine vitamin C concentrations of citrus, natural and commercial juice by means of volumetric redox in the presence of starch as indicator, and analyzing its stability during refrigeration at 8°C. Determinations were done in duplicate in representative samples of natural and commercial juice (powder and liquid) at the time of preparation and for 4 days at 8°C. In natural juice, vitamin C concentration fell remarkably until day 4, with loss of 80% in mandarin, orange and grapefruit juice, and of 42% in lemon juice. The dehydrated commercial juice presented low vitamin C content (5 to 12 mg/100ml) whereas the liquid juices presented values comparable to the one of natural juice (38 mg/100ml). The shorter the cooling time of the natural juice, the smaller the loss of Ascorbic Acid. However, in commercial juice, no significant differences were observed.

118.
EVALUATION OF POLYPHENOL CONTENT AND ANTI-OXIDANT ACTIVITY OF BERRIES CULTIVATED IN TUCUMAN

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Polyphenols possess antioxidant, antiinflammatory and anticarcinogenic properties. The current trend in food consumption is towards functional foods. The province of Tucumán is an important producer of berries. The aim of this work was to determine the content of total polyphenols and antioxidant activity in the principal varieties of strawberry and blueberry cultivated in Tucumán. The berries samples were provided by INTA. The determination of polyphenols was carried out by spectrophotometry and expressed in Equivalent Gallic Acid (EGA). Antioxidant activity was measured by the DPPH method. The concentrations of total polyphenols determined in strawberry, expressed in mg.kg⁻¹ of EGA, were 1626 in Camarosa, 1070 in Camino Real, 1628 in Festival, 1497 in Albion, 2182 in Ventana, 1141 in Elyana, 1182 in Carmela, 1175 in Macarena, 1602 in Sabrosa and 1157 in Fortuna. The contents of total polyphenols determined in varieties of blueberries, expressed in mg.kg⁻¹ of EGA, were 815 in Misty, 1547 in Jewell, 1717 in Palmetto, 1107 in Esmerald, 1109 in Prima Donna y 261 in Star. It is possible to conclude then that the varieties with greater polyphenols content are Ventana in strawberry and Palmetto in blueberry. A high correlation was observed between antioxidant activity and content of polyphenols determined in both berries.

119.
Ca⁺⁺/CALMODULIN PROTEIN-KINASE II (CAMKII) ACTIVITY DURING ACTIVATION OF *Bufo arenarum* OOCYTES

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The main intracellular signal that triggers the activation process is the increase in cytosolic calcium concentration, after sperm entry. Several Ca⁺⁺ dependent signaling pathways have been proposed as responsible for the biochemical and morphological changes during activation. One of them is CaMKII, a serine-threonine protein-kinase activated by Ca⁺⁺ and calmodulin and usually negatively regulated by proteinphosphatases. The aim of this study was to analyze the involvement of the CaMKII pathway in the activation of *B. arenarum* oocytes and its probable regulation via proteinphosphatase activity. Ovarian oocytes matured *in vitro* with progesterone were incubated with different concentrations of KN-93, a selective inhibitor of CaMKII, after 7% ethanol- or sperm-induced activation. Subsequently, we tested the effect of okadaic acid, a phosphatase inhibitor, on oocyte activation. Treatment with KN-93 significantly inhibited oocyte activation in a dose-dependent manner. Addition of okadaic acid resulted in an increase in oocyte activation levels. Results show that CaMKII participates in the activation of *B. arenarum* oocytes and that its activity would be modulated by phosphatases. Further assays are needed to identify the phosphatase subtype involved in this process.

120.
EFFECT OF UROKINASE AND VASCULAR ENDOTHELIAL GROWTH FACTOR (VEGF) ON THE EXPRESSION OF PLASMINOGEN ACTIVATION SYSTEM COMPONENTS IN THE BOVINE OVIDUCT

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The urokinase-type plasminogen activator (u-PA) is involved in extracellular matrix remodeling by plasmin generation. The u-PA activity increases when it is bound to its receptor, u-PAR; it is also balanced by the Plasminogen Activator Inhibitor Type 1 (PAI-1). It is known that VEGF is activated by plasmin and u-PA. In the bovine oviduct both systems were described: VEGF and its receptors as well as u-PA/ u-PAR/ PAI-1, although no evidence of the interaction between these molecules in the oviduct was reported. In this work we determined whether the expression levels of u-PA, u-PAR and PAI-1 were modified by the effect of u-PA or VEGF on the bovine oviductal epithelium. Culture explants of oviductal epithelial cells were incubated for 72 h and then stimulated with 50 nM u-PA or 1 ng/ml VEGF; explants without any of them were used as controls. After 24 h, cultured cells were processed to obtain total RNA. The semiquantitative RT-PCR analysis showed that u-PA upregulates u-PAR and u-PA mRNA levels, while it downregulates the expression of PAI-1; VEGF caused an increase only in the expression of u-PA. These results suggest that both systems are closely related and exert a fine control on the expression of plasminogen activation components in the bovine oviduct.

121. HYPOCALCAEMIA AND HYPOMAGNESAEMIA IN DAIRY CATTLE IN CENTRAL SANTA FE AND CORDOBA REGIONS

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We consider it important to determine calcium (Ca) and magnesium (Mg) concentrations in dairy cattle in productive establishments in the central Santa Fe and Córdoba regions during the transition period. Forty-four serum samples were taken from dairy cattle in a field in Córdoba and thirty-six samples from a field in the town of Esperanza, Santa Fe, were obtained from blood from the jugular vein of Holstein cows in the spring of 2009. Ca and Mg were determined by flame atomic absorption. The average values and standard deviation of Ca (mg.dL⁻¹) in antepartum were 7.47±1.22; 9.10±0.61 and in postpartum 6.63±1.36, 9.33±0.63 for Santa Fe and Córdoba respectively. On the other hand Mg (mg.dL⁻¹) in Santa Fe and Córdoba during antepartum was 1.83±0.38; 1.02±0.52 and in postpartum 1.87±0.24, 0.90±0.55. Although these animals were given additional calcium intake during antepartum, this was not enough to meet metabolic demands required during this period of production. This situation was reflected in hypocalcaemia, detected in both physiological stages of transition in dairy cattle from the field in Santa Fe. Hypomagnesaemia detected in cattle from Córdoba can be attributed to magnesium deficiency in the soil of the area; to this we should add heat stress and magnesium loss due to sweating during the period of the investigation.

122. RESEARCH OF TRACE ELEMENTS PRESENT IN TRANSITION DAIRY CATTLE SERUM AND FOOD

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The aim of this work was to determine the concentration of copper, iron and zinc in dairy cattle in Santa Fe central region, as well as the content of these elements in the consumed food. In this research, 180 serum samples obtained from jugular vein in animals of the Holstein Friesian breed in the spring of 2010 were used. Alfalfa and soiling samples were taken as well. The average values in serum were 0.82±0.17 mg.L⁻¹ of copper; 0.64±0.14 mg.L⁻¹ of zinc; 1.16±0.25 mg.L⁻¹ of iron and 8.93±0.51 mg.dL⁻¹ of hemoglobin. The contents of sulfates in water was 283.67±62.34 mg.L⁻¹. Concentrations in food were: 4.9 Copper/Molybdenum ratio (alfalfa) and zinc 25; 29.5 mg.kg⁻¹MS; iron 358; 1068 mg.kg⁻¹MS; copper 11; 13 mg.kg⁻¹MS, potassium 2.75; 2.89 mg.kg⁻¹MS, molybdenum 2.06; 2.75 mg.kg⁻¹MS in alfalfa and soiling respectively. The Copper/Molybdenum ratio in alfalfa was above level and the sulfate content in water was normal. Copper levels in serum were normal and this matched with the contents of trace elements in food. High levels of iron in alfalfa and molybdenum in soiling could be the cause of low zinc concentration levels, due to the competition in its absorption. Besides, potassium levels were higher than required in these animals, and this could be another cause of zinc imbalance. Hb and Fe values, important to study possible anemia, were within referential limits.

123. CHARACTERIZATION OF TWO THERMO-RESISTANT LIPASES PRODUCED BY *Bacillus licheniformis* P1

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Lipases (carboxyl ester hydrolases; E.C. 3.1.1.3) are a group of enzymes that catalyze hydrolysis and synthesis reactions which in many cases are conducted more efficiently at elevated temperatures. There has been increasing interest in thermophilic bacteria because of their thermostable enzymes. Adaptation of these bacteria to hot environments, production of heat-stable enzymes and their biotechnological and industrial applications are among the major areas of research on these microorganisms. In this study, two heat-resistant lipases were isolated and characterized from *Bacillus licheniformis* P1. The optimum growth temperature of this microorganism in LB medium was 55°C. The purified lipases were identified as Lip1 and Lip2. They showed an apparent molecular weight in SDS-PAGE of 15.4 kDa and 11.0 kDa, respectively. Both enzymes showed their isoelectric point in the zone of acidic pH. Substrate specificity was evaluated during hydrolytic reactions using *p*-nitrophenyl acetate (C2), caproate (C6), caprate (C10), laurate (C12), palmitate (C16) and stearate (C18). Lip1 showed high hydrolytic activity against substrates of medium and long chain (C6 - C18). In contrast, Lip 2 showed a marked specificity toward the hydrolysis of *p*-nitro phenyl caproate.

This work was supported by grants CIUNT 26/D409 and PIP 297 CONICET.

124. ESTERASE ACTIVITY *IN VITRO* OF INDIGENOUS LAB STRAINS ISOLATED FROM DIFFERENT NICHES OF SANTIAGO DEL ESTERO, ARGENTINA

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The aim of this study was to evaluate the specific intracellular esterase activity (Ue) of 10 strains of lactic acid bacteria, selected for their relevant biochemical properties in goat milk cheese technology in order to be included as constituents of selected cultures. Esterase activity *in vitro* was determined (U, amount of enzyme that releases 1 μmol of α or β-naphthyl derivative per minute) in cell-free extracts (using α and β as substrates-naphthyl derivatives of fatty acids from C2 to C12) and Ue (U / mg protein). The variability of the results shows that Ue is species and strain specific. Ue presented stereospecificity (strains showed higher activity against α-naphthyl derivatives). 3 *Lb. plantarum* and 2 *Lb. delbrueckii* subsp. *bulgaricus* strains were highlights for their high Ue on α- and β-naphthyl acetate and α- and β-naphthyl propionate. Ue on α- esterase naphthyl propionate was higher for *Pediococcus* strains and intermediate for strains of *S. salivarius* subsp. *thermophilus*. No activity on α-naphthyl laurate was observed. The strains studied could be considered in the design of selected cultures for their potential contribution to aroma and flavor, preserving the typical organoleptic characteristics of goat cheese.

125.
USE OF NATIVE *Bacillus thuringiensis* RT TO CONTROL *Spodoptera frugiperda* IN MAIZE PLANTS

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Bacillus thuringiensis (*Bt*), which produces the delta-endotoxin, is widely used in the biological control of *Spodoptera frugiperda* (*Sf*) (Lepidoptera: Noctuidae), a key pest of corn in northwest Argentina. The native *Bt* RT (16S rDNA partial sequence deposited in GenBank, accession number EF638795) was used. Entomopathogenic cultivation was developed at 30°C in a fermentor (Labfors 3) with a working volume of 3 l, using a culture medium formulated with agro-industrial wastes. The product was applied on maize plants using an airbrush (n=15 for each condition). Bioassays were conducted in a climate chamber with third stage *Sf* larvae (corn biotype). The following lots were analyzed: a) uninfected plants, b) infected plants, c) infected plants sprayed with sterile culture medium, d) infected plants treated with *Bt*. After 7 days, the experiment was stopped and mortality was calculated according to the Henderson-Tilton formula, using as control treatment b. The dry weight of aerial parts of plants was also assessed. After 5 days of incubation, the culture reached 1,164 x 10⁶ crystals/ml, 83 x 10⁶ spores/ml and 76 x 10⁶ vegetative cells/ml. The mortality after 7 days was 76%. There were no significant differences between the dry weights of aerial parts of uninfected plants and those treated with *Bt*.

This work was supported by grants CIUNT 26/D409 and PIP 297 CONICET.

126.
CHARACTERIZATION OF METABOLITES WITH ANTI-FUNGAL ACTIVITY PRODUCED BY *Bacillus* IBA 33

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The main problem in citrus culture is sour rot disease (*G. candidum*), which is controlled by synthetic chemicals. Alternative systems for biological control of plagues are being implemented. The aim of this work was to characterize the metabolites of *Bacillus* IBA33 by stability to temperature and enzymatic digestion tests. Stability Temperature Test: The residual antifungal activity of metabolites was evaluated after treatment at 4°C (2 months) 40, 60 and 100°C (30 min). Enzymatic Digestion Test: Residual antifungal activity was evaluated after treatment for 2 h at 37°C with Trypsine (50 µg/mL), α-Chymotrypsin (10 mg/mL), Protease (10 mg/mL) and Proteinase K (20 mg/mL). Antifungal activity was evaluated by antagonism against *G. candidum* in microplates. Metabolites of *Bacillus* IBA 33 were resistant at 40 and 60°C and maintained the same antifungal activity as before treatment. At 100°C, residual activity was 50% lower. Metabolites of *Bacillus* IBA 33 were resistant to digestion with Trypsine, whereas with Protease α-Chymotrypsin and Proteinase K lost 25, 75 and 100% of antifungal activity, respectively. The results showed that metabolites have important thermal stability and also demonstrated the peptidic nature of the metabolites of *Bacillus* IBA 33.

127.
COMBINED ANTIFUNGAL ACTIVITY OF TRIPODANTOSIDE AND AMPHOTERICIN B AGAINST *Candida* SPECIES YEASTS

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Fungal infections caused by yeast pathogens are common in immunocompromised patients. *Candida* spp. represents the major group of yeasts recovered from these patients. The limited number of available antifungal drugs (azoles, polyenes and pyrimidine analogues), their toxicities and resistance make it necessary to find new antifungal drugs. The main constituent of *Tripodanthus acutifolius* (Ruiz & Pavon) van Thieghem leaves is tripodantoside (TP), a phenylbutanoid with no data about its antifungal effects. The antifungal activities of TP and amphotericin B (AMB), both individually and combined, were assayed against *C. albicans* (ATCC10231) and *C. tropicalis* (ATCC750) using the broth microdilution method. TP showed inhibitory effects against both strains at 20 µg.mL⁻¹. The association of TP+AMB resulted in additive effects against both strains when combined assays were performed. The combination of TP+AMB could diminish the AMB therapeutic doses and the toxicity associated with the use of AMB. The antifungal activity of TP supports the need for further studies of its action modes.

128.
ANTIBACTERIAL ACTIVITY OF PROPOLIS FROM NEUQUÉN, ARGENTINA

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Introduction: Propolis, which is produced by bees, is used to prevent bacterial and fungal infections in the hive. It is widely used in folk medicine because it contains high levels of bioactive compounds. **Aim:** To determine the antibacterial activity of ethanolic extracts of partially purified propolis (EPPP) from different areas of Neuquén, Argentina (Centro B, Note A and Confluencia). **Methods:** The susceptibility testing was performed using macrodilution assays. Dilutions of EPPP were mixed with Mueller Hinton agar medium in Petri dishes. Bacterial strains of Collection ATCC and local bacterial isolates (IEV) were used. **Results and Conclusions:** All extracts inhibited the growth of the tested strains. Centro B extract had the lowest minimum inhibitory concentration (MIC) for *E. coli* ATCC 25922 and *P. aeruginosa* ATCC 27853 (11.77 µg / ml). Confluencia extract had the lowest MIC for *E. coli* IEV301 (12.21 µg / ml) and Norte A extract was more bioactive against *P. aeruginosa* ATCC 27853 (MIC: 8.80 µg / ml). The highest MIC value was observed for *S. aureus* ATCC 29213. These are promising results suggesting that these extracts could be used to treat bacterial infections.

129.

IN VITRO ANTIBACTERIAL ACTIVITY OF A NEW FLAVONOID ISOLATED FROM *Tibouchina paratropica* (MELASTOMATACEAE)

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Previous studies of antibacterial activity of ethyl acetate subextract of *Tibouchina paratropica* (Griseb.) Cogn. Melastomataceae showed promising results against *Staphylococcus aureus* and *Escherichia coli* strains. Moreover, the subextract fractionation led to the isolation, among other compounds, of (E)-4,3', 4'-trihydroxy-6-galactosyl aurone, a flavonoid new to the chemical literature. The aim of this work was to evaluate the bioactivity of the isolated compound against strains of *St. aureus* and *E. coli*. We used plate the microdilution method to determine the minimum inhibitory concentration (MIC). All tests were performed in duplicate. The compound assayed was active against all strains tested. Highest increased activity appeared on *St. aureus* ATCC 25213, *St. aureus* isolated from a clinical sample and *E. coli* ATCC 35218 at 250 ppm. Results suggest that the compound isolated would be one of the flavonoids responsible for the bioactivity of ethyl acetate subextract of *Tibouchina paratropica*.

130.

COMPARISON OF THE INHIBITORY EFFECT BETWEEN CHLORHEXIDINE DIGLUCONATE AND *L. fermentum* SUPERNATANT ON CATHETER-ASSOCIATED URINARY *Klebsiella* BIOFILMS

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Catheters provide a surface for biofilm formation. Objective: To determine the inhibitory effect of chlorhexidine digluconate (clx) and *L. fermentum* supernatant (Lfs) on catheter-associated *K. pneumoniae* biofilm. The sensitivity of *Klebsiella* strains to clx and Lfs was qualitatively and quantitatively assayed. Capsule and type 3 fimbriae were studied. Kinetics of biofilm inhibition was examined in culture media and urine. HPLC was carried out for Lfs composition. Inhibition of *Klebsiella* on infected catheters treated with clx and Lfs was assayed with growth cultures and electron microscopy calculating the number of bacteria per area (μ^2). Sensitivity was assayed at different clx and Lfs concentrations. MIC and MBC for Lfs were 16 mg/ml and for clx 0.06 mg/ml. Lactic acid (11 mg/ml) was the predominant organic acid in Lfs. Highest *Klebsiella* biofilm production was observed after 10 h (OD: 1.236). The strain presented a capsule and type 3 fimbriae. The MIC for Lfs reduced biofilm formation by 73% and with 24.25 mg/ml by 90% after 10 h, while clx at 2 mg/ml (30 times MIC) showed a reduction of 80%. Biofilm formation in urine was inhibited by Lfs after 6 days and after 8 days by clx. Electron microscopy revealed that clx and Lfs inhibited adhesion. The *in vitro* results of Lfs are promising.

131.

INFLUENCE OF THE NUMBER OF MICROORGANISMS ON THE FORMATION OF BENEFICIAL VAGINAL LACTIC ACID BACTERIA BIOFILM (BLV)

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Lactic acid bacteria biofilms in genitourinary tract exert a protective role against colonization by pathogenic microorganisms. Previously it was found that *Lactobacillus reuteri* CRL1324, *L. rhamnosus* CRL1332 and *L. delbrueckii* CRL1510 form biofilm in MRS broth without Tween 80 (MRS-T), while *L. gasseri* CRL1263 does not express this property. The objectives of this work were to study the effect of the number of viable cells of BLV strains on biofilm formation and evaluate the structure of the biofilm formed. The biofilm was evaluated in MRS-T and LAPtg-T. The inoculums were prepared from 14 h cultures and adjusted to DO_{540nm} of 0.6, 1 and 1.5. Biofilm formation was quantified after 72 h of incubation. The morphology of the biofilm was monitored by fluorescence microscopy. *L. rhamnosus* CRL1332 formed biofilm in MRS-T and T LAPtg with the three cell concentrations, while *L. reuteri* CRL1324 did so only with the greatest number of cells and *L. delbrueckii* CRL1510 with different inoculums only in MRS-T. *L. gasseri* CRL1263 did not form biofilm in any of the conditions tested. Fluorescence microscopy showed that only *L. rhamnosus* CRL1332 and *L. reuteri* CRL1324 formed a homogeneous structure with an associated matrix. Each of the organisms under study requires different optimum conditions to form biofilm. The results lead to a deeper characterization of the chemical nature of the biofilm matrix.

132.

Enterococcus faecium* INHIBITS BIOFILM FORMATION BY *Listeria monocytogenes

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Introduction: The bacteriocins produced by Lactic Acid Bacteria are an alternative to chemical preservatives in foods as they can prevent the development of pathogenic and/or spoilage microorganisms. *Listeria monocytogenes* is a problem in the food industry mainly due to its ability to form biofilm. Objective: To evaluate the effect of sub-inhibitory concentrations of cell-free supernatant (CFS) from bacteriocin-producing strains on growth and biofilm formation of *L. monocytogenes*. Methodology: CFSs from *E. faecium* CRL1877, CRL1878 and CRL1879 were diluted (1:4; 1:16) to obtain sub-inhibitory concentrations of the bacteriocins produced. Their effect was evaluated on growth and biofilm formation of *L. monocytogenes* (Lm24, Lm152, Lm60, Lm139, LmFBUNT) according to Purkrtová et al. (2010). Results: Sub-inhibitory concentrations of CFS from CRL1879 retard growth and decrease the biofilm formed in Lm24 and LmFBUNT but only had an effect on biofilm forming by Lm139 and Lm152. Sub-inhibitory concentrations of CFSs from CRL1878 and CRL1877 decreased final biomass and the biofilm formed in Lm24, Lm152, Lm139 and LmFBUNT. With respect to Lm60, only the biofilm formed decreased with CFSs highest concentration. Conclusion: Sub-inhibitory concentrations of CFSs from CRL1877, CRL1878 and CRL1879 partially or completely inhibit biofilm formation by *L. monocytogenes* strains, hence it seems promising for future food applications.

133.

ANTIMICROBIAL ACTIVITY OF POMEGRANATE WASTE EXTRACTS AGAINST BIOFILM-PRODUCING BACTERIA IN THE FOOD INDUSTRY AND ITS EFFECT ON BIOFILM FORMATION KINETICS

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Microbial control and biofilm elimination both aim at avoiding spoilage of products and ensuring quality. To determine the antimicrobial activity of the ethanol extract of industrial waste of pomegranate (PIW) against biofilm-producing bacteria isolated from the food industry and its effect on biofilm production kinetics. Ethanol extracts from PIW were obtained by soaking pomegranate waste in 96% ethanol for 24 h. Extracts were assayed against biofilm-producing *S. cohnii* and *P. vulgaris*. MIC, MBC and death curves were determined. Sub-MIC PIW concentrations were used to determine biofilm formation kinetics. Chemical identification of the PIW with antimicrobial activity was carried out by TLC and UV-Vis spectroscopy. The extract presented highest inhibitory effect against *S. cohnii* with a MIC value of 1.1% corresponding to 28 mg of pomegranate waste/ml of ethanol. The MBC coincided with the CIM. The MIC for *P. vulgaris* was 10% (25 mg of pomegranate waste/ml of ethanol). PIW is bactericidal against *S. cohnii* and *P. vulgaris*, because it produced a decrease of 4 log units between 4 and 8 h of contact. 9.1 and 6.6% concentrations inhibited biofilm by *P. vulgaris* for 12 h. A 6.6% concentration inhibited biofilm formation by *S. cohnii* for 12 h and 9.1% for 16 h. Naringin was determined, which could be the active compound with antimicrobial activity.

134.

ANTIMICROBIAL RESISTANCE IN BACTERIA ISOLATED FROM PRODUCTION ANIMALSMacció F, Cecilia M¹, Gaudio MC¹, Allori JL².¹Facultad de Bioquímica, Qca y Fcia. Ayacucho 471. ²Fac. de Medicina-UNT. E-mail: crisallori@hotmail.com

Production animals are reservoirs of resistant bacteria. This study aimed at finding out antimicrobial resistance patterns in bacteria from faeces from cows and goats and from cow milk and determining phenotypic mechanisms of resistance to β -lactams and macrolides (MLs). Resistance of the strains was determined using the disc diffusion technique. Out of 332 strains isolated, 160 corresponded to *E. coli* (110 from cattle and 50 from goats). Among the cattle strains, 32% were resistant to ampicillin (AMP), 20.2% to tetracycline (TET), 10.9% to cefalotin (KF), 1.8% to cefazidime and cefotaxime, and 2 strains presented a broad-range β -lactam resistance. Among the goat-isolated *E. coli* strains, 12% were resistant to AMP and KF. The species isolated from milk were 32 *E. coli*, 14 *K. pneumoniae*, 16 *C. freundii*, 14 *P. aeruginosa*, 34 *S. aureus* and 62 SCN. The following resistance patterns were obtained: *E. coli*: 43.7% to TET and 18.7% to AMP and KF. *K. pneumoniae*: 28.6% to TET and *C. freundii*: 75% to KF and 62.5% to TET and cefoxitin. *P. aeruginosa*: 57.2% to colistin and 42.8% to aztreonam. 23.5% of *S. aureus* was resistant to TET and 11.7% to β -lactams and 4 strains to oxacillin; 2 strains presented MLs resistance. The clinical impact of the presence of resistance mechanisms makes it necessary to adopt strict regulations regarding drug use in production animals.

135.

 β -GLUCOSIDASE ACTIVITY IN *Oenococcus oeni* AS A TOOL TO IMPROVE THE SENSORY QUALITY OF WINES

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Oenococcus oeni plays an important role in winemaking by undertaking malolactic fermentation. Nevertheless, little information is available on its enzymatic activities related to wine aroma and flavor. The aim of this work was to investigate β -glucosidase (β G) activity during the growth of *O. oeni* MS20 isolated from Argentinian wine in conditions close to those found in winemaking. The cells were inoculated into MRS medium with tomato juice (15%), pH 4.8 (control), and modified by adding L-malic acid, 2 g/l, citric acid, 0.7 g/l and/or grape juice instead of tomato juice, 10%. Addition of SO₂, 80 mg/l was also evaluated. In whole cells one unit of β G activity (U) was defined as the amount of enzyme releasing 1 μ mol of substrate per min and specific activity as U per gram of dry weight. In control, MS20 strain grew 2 log units with a maximum growth rate of 0.084 h⁻¹. Organic acids and grape juice stimulated 7 and 42% both growth parameters, respectively. In control, β G activity was detected from the beginning of bacterial growth, it being maximum at mid-exponential phase (67 U/g). Addition of citric acid and/or grape juice positively affected β G activity, which was maximum for grape juice, around 45%. *O. oeni* MS20 could be considered for its potential application to obtain starter cultures which will give better sensory qualities to wines.

136.

TECHNOLOGICAL AND PHENOTYPIC IDENTIFICATION OF LACTIC ACID BACTERIA ISOLATED FROM FERMENTED GOAT MEAT SAUSAGES IN SANTIAGO DEL ESTERONediani MT¹, García L¹, Abraham M¹, Avalos C¹, López Alzogaray S¹, Fadda S².¹Departamento de Ciencias de los Alimentos, Facultad de Agronomía y Agroindustrias. UNSE. Av. Belgrano 1912. Santiago del Estero. ²CERELA-CONICET. Tucumán. Argentina. E-mail: terened@unse.edu.ar

Lactic acid bacteria have diverse functions in the processing of fermented meat. The objectives of this study were to phenotypically identify 150 strains of lactobacilli isolated from handmade sausages with different proportions of goat meat fermented spontaneously and to study their hygienic and technological properties. The species isolated were *L. curvatus* (28%), *L. sakei* (24%), *L. alimentarius* (13.33%), *L. casei* subsp. *tolerans* (9.33%), *L. plantarum* (8.66%), *L. brevis* (6%), *L. casei* subsp. *rhamnosus* (5.33%) and *L. farciminis* (5.33%). The increased capacity of sarcoplasmic juice acidification was achieved by strains of *L. plantarum* and *L. curvatus* and only by 19% of the strains of *L. sakei*. No amino acid decarboxylase activity against lysine, tyrosine or histidine was detected. 2 strains of *L. plantarum* and *L. casei* subsp. *rhamnosus* showed low lipolytic activity. No production of antimicrobial substances against *Listeria innocua* was detected. Simultaneous support was observed among the 3 selected strains. The proper choice of the studied strains in the formulation of a starter culture could help to ensure consistency, hygienic and sensory quality of the final product.

137.

CONTRIBUTION OF INDIGENOUS LACTOBACILLUS STRAINS TO STARTER CULTURES USED IN DAIRY TECHNOLOGYTaboada N¹, Bru E², Molina M¹, Aranda D¹, L. Alzogaray S¹.¹F.A. y A., UNSE. Av. Belgrano 1912 (s). Santiago del Estero. 4200 Argentina. ²CERELA-CONICET, Chacabuco 145, 4000 Tucumán, Argentina. E-mail: soledadla@arnet.com.ar

The purposes of this work were to characterize a number of lactobacilli strains, to obtain the groupings of the cluster analysis, to interpret the cluster structure and to select the relevant strains in dairy technology. 90 homofermentative and facultatively heterofermentative wild *Lactobacillus* strains were isolated. Morphological aspects, physiological and biochemical properties were studied. The technological characterization of the strains was done by determining acidifying, lipolytic and proteolytic activities, production of diacetyl and citrate utilization. Enzymatic activities were examined with the API ZYM test. The relationships among the strains were determined by cluster analysis; the simple matching coefficient, determined from the studied characters, was used as a similarity index; the clustering method was an unweighted group method, arithmetic average (UPMGA). All homofermentative strains had different properties. Strains showing a similarity level of 100% were isolated from different agricoecological zones and different sources. As most of the technologically important traits have been examined, this characterization will allow the selection of appropriate strains for the manufacture of artisanal goat milk cheeses with Denomination of Origin.

138.

FOLATE PRODUCTION BY LACTIC ACID BACTERIA ISOLATED FROM ANIMAL MILKSLaiño J¹, Juárez del Valle M¹, Rodríguez-Gómez JM², LeBlanc JG¹, Savoy de Giori G^{1,2}.¹CERELA-CONICET, Tucumán (Argentina). ²Cát. de Microbiol. Sup., UNT (Argentina). ³U. Complutense de Madrid (Spain). E-mail: lainoje@cerela.org.ar

Folates (vit. B₉) are essential for animal growth, especially during early childhood. Deficiencies are more common during this growth period because of higher nutrient demands. Some lactic bacteria (LAB) can synthesize B₉, making them useful for the elaboration of foods naturally enriched in folate. The aim of this study was to evaluate the ability to produce folate by novel strains of LAB. Strains (33) of *Lactobacillus* (*L.*) *plantarum*, *L. fermentum*, *L. reuteri* and *L. murinus* species, isolated from animal milks (dogs, pigs, etc.), were inoculated into a folate-free culture medium and incubated at 37°C for 16 h. Total, intra- and extra-cellular concentrations were determined by means of a microbiological assay using *L. rhamnosus* NCIMB10463 as the indicator strain. Only 24 LAB grew without B₉ and most of these produced it in a range between 3-82 µg/L; 12 strains excreted it with values >100 µg/L. *L. reuteri* (5 strains) and *L. plantarum* (1) produced the highest concentrations of total B₉ (>200 µg/L). The results showed that endogenous LAB found in animal milks are able to produce high concentrations of B₉. These could be administered as vitamin vehicles to deliver folates in the digestive tract of animals or used to elaborate novel bio-enriched products.

139.

PRODUCTION OF RIBOFLAVIN BY LACTIC ACID BACTERIA ISOLATED FROM ANIMAL MILKJuárez del Valle M¹, Laiño J¹, Rodríguez-Gómez JM², LeBlanc JG¹, Savoy de Giori G^{1,3}.¹CERELA-CONICET, Chacabuco 145. (4000) Tucumán, Argentina. ²Universidad Complutense de Madrid, España. ³Cátedra de Microbiología Superior, UNT, Argentina. E-mail: juarezdelvalle@cerela.org.ar

Riboflavin (vitamin B2) is an essential vitamin that is the precursor of two important coenzymes: FMN and FAD. These participate in numerous functions including energy metabolism, the synthesis of other vitamins, and various redox reactions. The aim of this work was to study the ability of newly isolated lactic acid bacteria (LAB) to produce riboflavin. *Lactobacillus* (*L.*) *plantarum*, *L. fermentum*, *L. reuteri* and *L. murinus* were isolated from animal milks (pigs and dogs) and inoculated into a commercial vitamin B2-free synthetic medium. From the 33 strains tested, 23 grew in absence of vitamin B2. The concentration of total, intracellular and extracellular riboflavin was determined by means of a microbiological method using *L. rhamnosus* ATCC7469 as the reference strain. *L. reuteri* (3 strains), *L. murinus* (1) and *L. fermentum* (4) synthesized the highest levels of B2 (total concentration >550 ng/ml), *L. reuteri* PDH3 was able to excrete the highest concentration (1090.4±58 ng/ml), whereas *L. reuteri* PDA3 produced the largest amount of intracellular riboflavin (525.6±18.6 ng/ml). These strains could be used as starter cultures in the elaboration of foods with increased riboflavin concentrations or added as probiotic supplements.

140.

GOAT PARASITISM IN THE TUCUMAN PROVINCE DURING THE SUMMER

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The aim of this study was to determine the level of parasitism in two goat flocks in the province of Tucumán. The survey was conducted between January and April 2011 in the Animal Research Institute of the Semiarid Chaco INTA in Leales and in the town of Taco Ralo, with a rainfall of 880 mm and 550 mm per year respectively. 50 goats were sampled in Leales and 27 in Taco Ralo. The samples were processed in the LABRYDEA (FAZ-UNT), where the analysis was performed using the technique of Stool Willis (NaCl saturated solution). We determined the number of eggs per gram of feces (EPG), the genera of parasites prevalent, the percentage of the total and monthly variations presented. The results obtained allowed us to understand the dynamics of parasites during the period under study. In Leales the level of parasitism increased from January to April while Taco Ralo it dropped sharply. This could be explained by the weather conditions in each locality. Leales maintained moisture levels during the period assayed, which favors the cycle of helminths combined with high temperatures, while Taco Ralo presented a drought. As to the kinds of parasites, there is a higher percentage of gastrointestinal nematodes with a preponderance of *Haemonchus* and to a lesser extent protozoa (coccidia) that persist in the environment, their control being important for young animals.

141. SENTINEL INFLUENZA SURVEILLANCE UNIT-TUCUMÁN DURING THE 2009 AND 2010 PANDEMIA

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Influenza viruses are constantly changing, which requires ongoing collection and characterization of the strains. In addition to the annual seasonal epidemics of influenza, pandemics have occurred at irregular intervals. Sentinel surveillance of influenza-like illness (ILI) is fundamental for public health decision-making. In Tucumán it was implemented in 2003. The aim of this study was to identify the viral agents associated with ILI in 2009 and 2010. Materials and methods: 6226 respiratory specimens were collected and processed by immunofluorescence for antigen detection: Influenza A and B, Respiratory Syncytial Virus, Adenovirus, Parainfluenza 1, 2 and 3. Influenza positive samples were sent to the National Reference Centre Malbran Institute for typing. Results: In 2009, 506 outpatients were IA 169 (33%). Principal associated pathology: ILI (86%), most affected age group 5-39 years. In 2114 inpatients: 185 were IA (8.7%). Pneumonia 41%, as the main associated conditions and under 1 year the most affected group. 2010: out of 785 outpatients, 237 were IA (30%), IB 36 (5%). Among these 80% were ILI and the 30-39 year-old group was the most affected one. Out of 2821 inpatients, 151 (5.4%) were IA and 22 (0.8%) IB. Principal associated disease, pneumonia 33%. The typing performed confirmed IA/H1N1 predominance in 2009 and IA H3N2 circulation in 2010.

142. ANALYSIS OF THE *TaqIB* AND -629 C/A POLYMORPHISMS OF THE CETP GENE IN FIRST DEGREE RELATIVES OF DIABETES TYPE 2 PATIENTS, WITH AND WITHOUT METABOLIC SYNDROME

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Metabolic Syndrome (MS) is an evident risk factor of cardiovascular disease and type 2 Diabetes Mellitus. *Cholesterol Ester Transfer Protein* (CETP) promotes the transfer of cholesteryl ester from HDL to LDL and VLDL, instead of TG. The most studied polymorphisms of this gene is *TaqIB* which is in linkage disequilibrium with -629C/A polymorphisms of the gene promoter. The aim of this work was to analyze the relationship between these polymorphisms and HDL-c levels. Using genomic DNA from individuals with and without MS, we identified -629 C/A polymorphism by ASO-PCR and *TaqIB* polymorphism by RFLP-PCR. The frequencies of the B2 allele of the *TaqIB* polymorphism in the w/MS and wo/MS groups were 0.57 and 0.50, respectively. The frequencies of the A allele of the polymorphism -629 C/A in both groups were 0.50 and 0.54 respectively. There were no significant differences in the allelic frequencies of the polymorphisms in both groups. In the wo/MS group, the individuals with the B2B2 genotype had higher levels of HDL-c than B1B1 and B1B2 (p<0.05) as well as the carriers of the AA genotype of the -629 C/A polymorphism (p<0.01). These results suggest that *TaqIB* and -629C/A polymorphisms would be associated in wo/MS individuals, but not in the w/MS, probably due to the metabolic alterations in the latter group.

143. STERILIZATION OF FLY LARVAE (*Lucilia sericata*) IN LARVAL THERAPY USED IN DIABETIC FOOT

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Larval therapy is a new alternative therapy used in the healing of diabetic foot wounds. This technique favors the removal of necrotic tissue, promotes tissue growth and fastens healing. For this purpose larvae of flies of the species *Lucilia sericata* (Calliphoridae) are used. The objective of this work was to sterilize the eggs and hatched larvae using different methods and to analyze the performance of each. We extracted eggs previously obtained in brood chambers, which were disinfected with two types of different solutions: 1. 0.5% sodium hypochlorite, formalin 10% and sterile saline solution. 2. As above but without formalin. The eggs were incubated in culture medium with 5% natural blood without fibrin at 30°C. They were evaluated daily and degree of contamination, egg hatching, larval numbers and activity were recorded. In all cases a control test was used. The results were promising. All repetitions performed were successful in terms of disinfection, which indicates that the two solutions are effective for the sterilization of eggs. With these results we propose the use of routine larval therapy, since it has been shown to be an easy and inexpensive technique with which serious problems of diabetic patients could be solved.

144. LIPID PEROXIDATION AND OTHER INDICATORS OF OXIDATIVE STRESS IN DIABETIC RATS TREATED WITH YACON ROOT

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Diabetes mellitus is a metabolic disorder associated with abnormally high levels of free radicals and disturbances of the antioxidant defense mechanisms, which causes oxidative damage to the bio-molecules. This oxidative stress plays a vital role in the development of diabetic complications. *In vitro* studies showed the antioxidant activity of tubers of *Smilax sonchifolius* [Poepp. & Endl.] H. Robinson (yacon) due to its content of phenolic components. In this study, we evaluated the effect of the sub-chronic treatment with yacon root flour on oxidative stress biomarkers in liver and kidney of diabetic rats, including superoxide dismutase (SOD), catalase (CAT), glutathione-s-transferase (GST), glutathione peroxidase (GPx), malondialdehyde (MDA) and glutathione (GSH). Yacon treatment produced a significant decrease in MDA levels and activity of SOD, CAT and GST in liver and kidney of diabetic rats. The levels of GPx and GSH, which play an important role in the protection against lipid peroxidation, increased significantly. This is the first report that demonstrated *in vivo* the antioxidant activity of yacon root flour, restoring the balance between generation and elimination of oxidant species. This natural product administered as a diet supplement could be potentially useful to prevent chronic complications of diabetes.

145. OXIDATIVE STRESS IN DIABETIC RAT KIDNEY: PROTECTIVE EFFECT OF YACON LEAVES

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Increased oxidative stress plays a major role in the pathogenesis of Diabetes mellitus. Free radicals are formed disproportionately, while impaired antioxidant defenses can promote the development of diabetic complications. Many plant secondary metabolites possess antioxidant activity and improve oxidative stress in diabetes. In a recent work we demonstrated that leaves decoction of *Smalanthus sonchifolius* [Poepp. & Endl.] H. Robinson (yacon) was effective to reduce postprandial glucose and useful in the treatment of diabetic animals. In this work, we analyzed the effects of a 30 day-treatment with yacon leaves decoction on lipid peroxidation and antioxidant system in kidney of diabetic rats. Superoxide dismutase (SOD), catalase (CAT), glutathione-s-transferase (GST), glutathione peroxidase (GPx), malondialdehyde (MDA) and glutathione (GSH) were measured in kidney homogenates, showing a significant decrease in SOD, CAT, GST and MDA levels, while GPx and GSH levels increased significantly in treated diabetic animals. Decoction from yacon leaves showed an important *in vivo* antioxidant activity in kidney of diabetic rats, protecting cells from lipid peroxidation. These data, together with the demonstrated hypoglycemic effect, make yacon leaves a good candidate for use in the prevention of renal complications in diabetes.

146. LEAD-INDUCED HEPATIC FIBROGENESIS

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Lead is an environmental pollutant, primarily as the result of anthropogenic activities. The nervous system, kidney and liver are the most susceptible organs to lead deposition showing that this pollutant has no single target system. Although morphological and functional alterations in these organs have been highlighted, cellular and molecular mechanisms involved in its pathobiology are not fully understood. Using a rat model of long term lead acetate exposure (0.06% lead acetate in the drinking water) we report that low levels of lead induced a significant increase in the extracellular proteins laminin, collagen IV and fibronectin, located in the perisinusoidal space. Moreover, phenotypic transformation of hepatic stellate cells into myofibroblast-like cells was evidenced at the ultrastructural level. A significant expression of α -SMA in the liver parenchyma, particularly Disse's space, was also observed. These changes indicated an activation of quiescent hepatic stellate cells. Furthermore, we determined that the TGF β 1 signaling pathway is involved in the toxic action of lead. In conclusion, low levels of lead exposure induced a phenotypic change in stellate cells, increasing the synthesis of the extracellular matrix in the liver. Lead triggered alterations are associated with the onset a fibrogenic process.

147. TYROSINE DECARBOXYLASE GENE DETECTION IN *Lactobacillus* ISOLATED FROM APPLES

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Tyramine is a biogenic amine (BA) frequently studied because of its potential toxicological effects. Despite its significance in cider making, there is little information about its potential production by LAB that constitute the microflora of apples. Molecular methods for rapidly and sensitively detecting the presence of potential decarboxylating bacteria are becoming an alternative to traditional culture methods. The aim of this work was to investigate the occurrence of the tyrosine decarboxylase gene (*tdc*) in *Lactobacillus* sp. isolated from apples in order to indentify potentially positive strains. The primers P1-rev and p0303 were used to amplify an internal fragment of the *tdc* gene in a conventional PCR. *Lactobacillus brevis* DSM20054 was used as positive control. Out of the 12 strains analyzed, 33% identified as *Lactobacillus plantarum* M60, *L. plantarum* M67, *L. plantarum* M68 and *L. brevis* M15 produced the expected amplification product (370 bp), indicating their potentialities to produce tyramine. The sequences comparison of amplified products to known sequences in databases confirmed these results, this being the first report of apple *Lactobacillus* sp. from the north of Argentine harboring the *tdc* gene. Thus, tyramine production might not be mainly relevant for their survival in the natural medium, which would be beneficial for biotechnology application.

148. EXPRESSION PATTERN OF *Xpax1*, *Xpax9* and *Xunc* genes AND THEIR PARTICIPATION IN THE SCLEROTOME OF THE AMPHIBIAN *Xenopus laevis*

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The anuran body plan diverges from that of other vertebrates. With respect to the skeleton, frogs are characterized by a truncated axial skeleton (AS) with absence of discrete caudal vertebrae (CV). However, the ability to form elements of the CV is present in some anurans, suggesting that the molecular machinery that regulates their formation is still present in this group and the absence of these elements could be due to alterations in the expression of a set of genes in the caudal region of the embryo. The AS develops from the sclerotome, a cell mass derived from the somites. Those cells take up positions around the notochord and neural tube for later differentiation to spinal cartilage and bone. Studies in fish, birds and mammals showed that *pax1*, *pax9* and *uncx* play a central role in the development of AS, promoting the proliferation of sclerotome and the formation of cartilaginous condensations. Loss of function of these genes results in severe abnormalities in the spine with absence of vertebral elements. In this work we characterize the expression pattern of the *Xpax1*, *Xpax9* and *Xunc* genes in *Xenopus* by *in situ* hybridization and RT-PCR. We found that these factors are expressed in the sclerotome. The gain of function approaches by overexpressing the *pax* genes suggest their potential role in the development of the *X. laevis* spine.

149.

PARACRINE AND JUXTACRINE SIGNALS DURING *Xenopus laevis* OOGENESIS

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The development of oogonia into oocytes is described as oogenesis. In many oviparous vertebrates the growth of oocytes is the result of a cell regulation process called vitellogenesis. This process is characterized by hepatic production of the glycoprotein vitellogenin (VTG) that is transported via the bloodstream to the ovary where it is incorporated by oocytes. In the amphibian ovary the three different stages, previtellogenesis, vitellogenesis and maturation, are regulated by three kinds of signals: endocrine (gonadotropins, estrogens), paracrine (TGF- β , BMPs and Activins) and juxtacrine, mediated by gap junctions (Ca⁺⁺, cAMP/IP₃). To analyse the participation of paracrine signalling, we determined the gene expression of Xepac and BMP signalling pathway components. The results showed the presence of Xepac, BMP2, 4, 7 and their receptors during *Xenopus laevis* oogenesis. To determine the role of IP₃ during vitellogenesis we performed assays with different inhibitors. Oocytes were treated with U-73122 (PLC specific inhibitor), heparin (to block IP₃ channels) and verapamil (to block L-type calcium channels). The results showed that the IP₃ signalling pathway is implicated in VTG uptake. Because of this, we suggest that oogenesis is a complex process coordinated by a cross-talk between the molecules of different signalling pathways.

150.

EXPERIENCE OF A BIOMOLECULAR MARKER IN CERVICAL UTERINE LESIONS (LCU)Sánchez Segura M, Elía A, González A, Holgado S.Proyecto CIUNT D146/08. Chacabuco 145. 4000. Tucumán. Argentina. E-mail: silviaholgado@hotmail.com

Evidence for persistent infections by high-risk (HR) oncogenic Human papillomavirus (HPV) subtypes show that this is a critical factor in cervical intraepithelial neoplasia (CIN) and invasive carcinoma (CA INV). p16INK4a is over-expressed in cervical cells transformed by HR HPV. The aim of this study was to define an overexpressions pattern of the oncogenic protein p16 in sample biopsies with LCU from a public subsector (PS) in Tucumán. Fifty-five patients with CIN and CAINV were selected from the Pathology Institute files (PS). Standard technical processing and p16INK4a protein kit determination immunohistochemistry (MNT) was used; parameters evaluated: p16 protein expression, intensity, distribution and association with the type of lesion. An exploratory cross-sectional study (distribution of univariate and bivariate frequencies) was performed. Study associations: Chi-Square test. Results: association between both diagnostic findings (HE, IHC). Expression of P16 revealed: moderate nuclear intensity in 100% of CIN III, intense in 88% of CA INV; epithelial expression (E): association between nuclear (N) and cytoplasmatic (C) distribution: mild in N and C (100%) moderate in N and C (60%) and intense in N and C (10%); CAINV E: 100% Intense in N and C. Conclusion: We were able to prove that IHC p16 expression can be used as a specific diagnostic marker of all degrees of CIN and CAINV.

151.

TESTING OF HEMATOLOGICAL PROFILE DURING BREAST-FEEDING TRANSITION IN DAIRY CATTLE FROM SANTA FE, ARGENTINA

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There is scarce scientific literature in Argentina with respect to bovine blood indicators, so the hematological profile of breast-feeding transition in dairy cattle from Santa Fe was studied. 251 whole blood samples were taken from the jugular vein in Holstein breed bovines from ten farms during 2009. EDTA was used as an anticoagulant and white blood cell count was performed in a Neubauer chamber, microtechnique for hematocrit, May Grünwald-Giemsa staining for leukocyte formula and colorimetric technique of cyanomethaemoglobin for hemoglobin determination. ANOVA was used for statistical data treatment. Average values and standard deviations were: Hto 35.69±4.13; 34.31± 4.85; Hb 11.38±1.54; 10.79±5.26; GB 8,166.82±2,656.54; 9,283.62±3,034.23; N 34.12±4.76; 35.46±6.65; E 2.25±1.42; 2.65±1.67; B 0.27±0.45; 0.36±0.51; L 62.29±4.79; 60.25±7.51; M 1.05±0.21; 1.15±0.96 in antepartum and postpartum, respectively. The values obtained from all hematological parameters were found within referential values quoted in international bibliography for animals of the same species in different transition stages. Since there is no hematological research at the regional level, the data recorded in this paper is very valuable. A slight increase in eosinophils count was observed during postpartum. This process is known as allergic phenomenon of sensitization in milk production.

152.

APPLICATION OF ATOMIC METHOD WITH HYDRIDE GENERATION FOR DETERMINATION OF SELENIUM IN BOVINE SERUM

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In the present investigation, atomic absorption with hydride generation for selenium determination in dairy cows serum was used. For the destruction of organic matter, serum was heated in a heating plate with nitric acid for 2 hours. We conducted a pre-reduction from Se (VI) to Se (IV) with the addition of 10 mL of distilled water and 10 mL of hydrochloric acid. The mixture was heated at 90°C for 15 min. Selenium standard solution was prepared with HCl 2.4 M so that the calibration curve was within the range of 0-40 $\mu\text{g L}^{-1}$. We prepared HCl 10% v/v as a transport solution and sodium borohydride 0.2 % m/v in NaOH. Absorbances were read at a 196 nm. The calculation of concentrations and conversion of specific unities from $\mu\text{g mL}^{-1}$ to $\mu\text{g g}^{-1}$ was performed using specific software. The converter was $C = A \times (50 \text{ mL} \times B^{-1})$, where A is the control concentration of Se in the sample, B is the volume or weight of the sample (mL or g), and C is the concentration of Se in the sample, $\mu\text{g mL}^{-1}$ ó $\mu\text{g g}^{-1}$ depending on B. The atomic absorption method with hydride generation technique is limited as regards detection of elements that are found at the rate of ppb; this method allowed us to determine Se in bovines serum samples at reference values between 20–100 $\mu\text{g L}^{-1}$. This technique is an alternative to the enzymatic method.

153. VITAMIN C INTAKE IN RATS CONTAMINATED WITH LEAD: ANALYSIS OF BONE MARKERS

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Objectives: The aim of this study was to analyze bone markers in rats contaminated with lead (Pb) after the intake of vitamin C (VC). Material and Methods: 12 adult Wistar rats fed with water and a lead-free balanced diet. The animals were divided into three groups: (a) group I, n = 4 (VC); (b) group II, n = 4 with lead in drinking water (500 ppm); (c) group III, n = 4 with lead (500 ppm) and VC. After 6 months, calcium (Ca), phosphorus (P) and alkaline phosphatase (ALP) were measured. Long bones were removed from animals (femur), wearing them and using the Cretin method to observe lead deposits. Results: lab markers, Calcium (mg / dl), group (a) 12.15 ± 2.76 , group (b) 9.63 ± 0.56 , group (c) 11.28 ± 0.94 ($p < 0,05$ between b and c group), Phosphorus (mg / dl), group (a) 6.9 ± 0.14 , group (b) 5.93 ± 0.30 , group (c) 6.98 ± 0.87 (NS), ALP (U / l), group (a) 227 ± 2.83 , group (b) 178.25 ± 1.26 , group (c) 240 ± 46.9 , (groups a / b ($p < 0.01$), groups a / c ($p < 0.001$)). The bones of rats receiving vitamin C showed signs of bone remodeling with increased vascularity and lamellae in bone tissues and presence of secondary bone cores. Discussion: In the animals that received vitamin C, there were histological signs of bone remodeling and mobilization of ALP levels. With regard to calcium, significant differences between exposed groups exposed to lead with and without vitamin C.

154. IMPORTANCE OF FECAL BILE ACIDS IN THE CHROMATOGRAPHIC DETERMINATION OF MAMMAL SPECIES

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Fecal bile acids follow species-specific patterns that can be characterized by TLC. We use TLC for the differentiation of feces from: Magnaorder Xenarthra (*Zaedyus pichiy*, *Chaetophractus vellerosus*, *C. villosus*, *Dasybus hybridus*, *Priodontes maximus*, *Tamandua tetradactyla*, *Myrmecophaga tridactyla*), Order Carnivora (*Puma concolor*, *Panthera onca*, *Lynchailurus pajeros*, *P. pardus ciscaucasica*), O. Artiodactyla (*Tayassu pecari*, *Mazama gouazoupira*), O. Perissodactyla (*Tapirus terrestris*). 1 gram of feces was extracted with benzene:methanol. Samples, standard bile acids and known feces were spotted on silicagel plates, eluted with toluene:acetic acid:water and revealed with anisaldehyde:glacial acetic acid:sulphuric acid. All Xenarthra species showed different bile acid patterns. Feces from *T. terrestris*, *M. gouazoupira* and *T. pecari* showed vegetal pigments that may interfere with bile acids; we found a characteristic bile acid pattern for each one. *P. concolor* had chenodeoxycholic acid; being different from *P. onca*. TLC confirmed visual identification of *P. pardus ciscaucasica* scats, determining two conservation areas. Fecal analysis revealed *L. pajeros* microvertebrate preys, confirming TLC identification. Through the TLC identification of fecal bile acids, we found an ecological tool for mammal conservation and distribution studies.

A			Berta C	3	Corbella RD	18
Abascal F	31	Bianco M	69	Córdoba-Virla MS	106	
Abdala D	153	Bischoff M	1	Correa M del V	21	
Abdala G	12	Biurrum C	130	Correa OR	31	
Abdala GC	11	Black de Décima P	2	Costas D	141	
Abdulhamid B	111	Black P	1	Costas L	111	
Abdulhamid MB	123	Blanca RL	43	Cozzitorti ME	Co12	
Abraham M	136	Blanca RS	43	Cruz L	71, 140	
Abregú AV	83	Blanco MJ	71	Cruz LB	26, 40, 41, 72	
Abud C	86	Blunda S	77	D'Angelo M	73	
Acevedo CO	121	Bobillo Odstreil N	153	Dantur Juri M	35	
Acreche MM	31	Bollati SA	57	Daud A	113	
Aguero G	85	Bonilla F	119	David RE	12	
Aguirre JC	Co5	Borkosky D	70	David RN	11	
Ajmat MT	119	Borkosky S	38, 65	Davies C	Co6	
Albanesi A	32	Borkosky SA	64	Davies D	Co6, 90	
Albarracín PM	70, 117	Brandán de Antoni EZ	9	Davies DA	91	
Albarracín R	2	Brandán de Weht CI	22	de la Quintana L	23, 24	
Alberto MR	61	Brandán EZ	30	De Marco N	25	
Albornoz P	48, 49, 50, 51	Brandan SA	44	de Moreno de LeBlanc A	Co14	
Alcaide M	89	Bru E	103, 137	De Pascuale N	8	
Ale CE	Co13	Budeguer AN	75	de Pedro A	45	
Allori JL	134	Budeguer R	42	de Villalobos C	93	
Allori Stazonelli E	Co2, 27	Bühler M	66	Debes M	48, 50	
Alvarez AR	Co5, 118	Bühler MI	104, 119	del Carmen S	Co14	
Alvarez C	108	C			Del Castillo V	114
Álvarez Colom O	114	Cabana R	Co11	Delgado LC	Co1	
Alvarez PS	118	Cabrera CA	62	Della Vedova MC	142	
Amado ME	42	Cabrera DC	14	Denmerová K	132	
Amani SM	39, 129	Caillou S	141	Di Marco L del V	Co16	
Andraca G	21	Cajal JC	75	Di Toto Blessing L	114	
Aragón HN	76	Camacho M	34	Díaz B	86	
Aranda D	124, 137	Canelada Lozzia MI	4	Díaz EI	79	
Araujo MS	154	Cangemi R	130	Díaz LP	83	
Arce OEA	57	Canseco Merino E	10	Díaz MJ	13, 15, 16, 17, 20, 57	
Arce P	Co11	Canteros FH	Co1	Díaz Ricci JC	98	
Aredes Fernández P	105	Carino S	77	Díaz Mora A	51, 60	
Arena M	63	Carrizo AE	125	Dip Mora A	77	
Arévalo RA	16	Carrizo E del V	7	Dode M	3	
Argüello J	8	Carrizo E	32	E		
Arias AJ	80	Carrizo SL	95	Elía A	150	
Arias M	48, 50	Carrizo TR	83	Escalante JR	34	
Arias NN	81, 82	Cartagena E	63, 64, 98	F		
Aristimuño E	113	Casanova Jesús V	55, 94	Facciuto MG	19	
Aristimuño Ficoseco ME	96	Castillo M	133	Fadda S	136	
Arroyo Aguilar A	98	Castro F	Co7, Co8, 68	Farías M	105	
Ashworth G	69	Castro GR	111	Farías ME	Co13, 112	
Avalos C	136	Catalán C	66	Fernández D	25	
Aveldaño C	44	Catalán CA	59, 96	Fernández Dattoli F	50	
Avila Hael N	48	Catalan CAN	53, 97	Fernandez EM	Co3, 28, 29	
Aybar M	133	Catania M	55, 94	Fernández F	Co8	
Aybar Odstreil A	77	Cazón AV	154	Fernández FM	Co7, Co9, 67, 68	
Aybar Odstreil I	87	Cazón L	8	Fernández J	71, 140	
Ayrault G	11	Ceballos RB	18	Fernández R	30	
B			Cecilia M	134	Fernández S	87
Baigori M	109, 125	Cerioni GA	Co3, 28, 29	Ferrari RR	Co5	
Baigori MD	110, 111, 123	Cerliani C	Co3, 28, 29	Ferreyra de Ruiz Holgado MME	33	
Baino	Co4	Cerutti G	58	Filipuzzi SD	142	
Bardón A	38, 63, 64, 65, 98, 114	Chaila S	10, 13, 14, 15, 16, 17, 20	Flores G	21	
Barnes N	70	Chaile AP	33	Flores J	50	
Barrera S	109	Chain FE	53	Flores LV	91	
Bartolucci CP	43	Chalco Vera JE	31	Fonio MC	83	
Belleze J	122	Chaya ME	75	Fornés L	19	
Beltran RE	11, 12, 74	Chehín R	L6	Fortuna AM	129	
Benavente AM	129	Chelala MS	75	Frenzel de Llomparte AM	Co10	
Benítez L	1, 35	Chueca CP	71	G		
Benítez LM	Co10	Cladera JL	54	Gachen G	68	
Benítez S	1	Coll Araoz MV	53			
Berardo D	69	Colomo MV	3			

Galindo GS	14	Jerez RM	117	Medina MF	87
Gallo EA	14	Jiménez C	84	Medina Pereyra P	Co7
Gamarro Fernández JJ	10	Jiménez CM	Co17	Medina R	124
Gandur MJ	153	Jiménez-Díaz M	120	Medina S	25
Garat L	13	Jorge E	36, 37	Meloni DA	11, 12
Garay F	12	Jorrat S	118	Mendoza L	64
García AM	14	Jorrat SL	Co5	Mercado C	30
García D	120	Juárez del Valle M	138, 139	Mercado MI	53
García G	69	Juárez J	Co2, 27	Mercado P	56
García I	86	Juárez M	87	Miceli DC	120
García JR	18	Juárez N	86	Michel AA	54
García L	136	Juárez Tomás MS	131	Milla F	54
García Moreno A	92	Juarez VD	154	Mistretta MG	118
García R	22			Molina A	Co11
García Rusco A	77	K		Molina M	124, 137
Gaudioso C	133	Kearney M	28	Mónaco ML	82
Gaudioso MC	130, 134	Kearney MIT	Co3, 29	Montanaro S	86
Genta ML	Co12, Co16, 118	Kirschbaum DS	51, 118	Montanaro SB	64
Genta SB	144, 145, 146	Komaid J	107	Montel Mendoza G	104
Giayetto O	Co3, 28, 29	Komaid JA	Co15	Montenegro S	L3
Gil MJ	45			Montero JG	92
Giménez G	49	L		Morla F	Co3
Ginel IH	13, 15, 17, 20	L. Alzogaray S	124, 137	Morla FD	28, 29
Giunta SA	26, 34, 40, 41, 72	Lafalla G	69	Müller HJ	7
González A	150	Laiño J	85, 138, 139	Muratore P	58
Gonzalez AM	39, 129	Latina CA	Co1	Muruaga N	63
González II	142	Lauthier JJ	Co6		
González J	6	Lazarini A	51	N	
Gonzalez L	99	Lazarte S	84	Nader MEF	131
González MC	4	LeBlanc JG	Co14, 138, 139	Nader-Macías ME	103, 104
González Moreno C	68	Leccese Terraf C	131	Namur JJ	57
González P	Co8	Lescano AJ	12	Nasif AMM	13, 15, 16, 17, 20
González R	6	Lescano JA	11	Navarro AR	126
Gonzalez S	100	Lizarraga J	58	Nediani MT	136
Gordillo MA	126	Lizarralde de Grosso M	35	Negrillo AG	75
Gramajo Bühler MC	88	Llanos C	117	Neske A	114
Grancelli S	4	López Alzogaray S	136	Nieto Peñalver CG	147
Grau A	53	Lopez Herrera CV	91	Nieva LB	73, 90, 91
Greco C	69	López ME	45, 76, 78	Núñez M	101
Grimolizzi OM	Co10	López S	86	Núñez WH	74
Guber RS	81, 82	Lorenzo Pisarello MJ	100		
Guillén SC	4	Loto D	50	O	
Gultemirian ML	106	Loto F	110, 125	Ochoa M del C	10, 14
H		Luna G	23, 24	Oddone G	8
Habib NC	144	Luna ML	121, 122, 151, 152	Ojeda MS	142
Hamann M	Co6	Luque C	48, 50	Olea MS	143
Haro C	84, 85	Luque ME	149	Olivera V	82
Hassan E	77	M		Ordano M	21
Helman S	36, 37	Macció F	134	Ortiz N	22
Heredia B	58	Maldonado LM	118	Ostrowski de Núñez M	Co6
Hermosilla C	119	Maldonado MC	126	Otero MC	131
Hernández C	30	Mangone F	48		
Hernández de Sánchez M	Co9	Manni C	152	P	
Hernández MA	52	Mansilla NJ	14	Páez JB	80
Hernandez R	39	Manso FC	54	Palacio G	Co4
Hernández-Molina LR	129	Manucha W	L4	Palacio MO	7
Holgado S	150	Manzur J	4	Palacios JM	106
Hongn S	Co4	Marchetti C	71	Papa E	107
Honoré SM	146	Marín JC	L2	Parellada E	114
		Martínez M	81, 82	Parra A	107
I		Martínez MA	109	Parra MV	32
Irusta G	L5	Martínez OG	52	Pasteris SE	Co13, 103, 104
Isla MI	61, 95	Martínez S	23, 24	Paz D	70
Issé B	84	Martos GG	60	Pece MG	10
		Maturano C	135	Pera LM	109, 110, 111, 123, 125
J		Mayer N	69	Pereyra NJ	97
Jaldo H	30	Maza M	Co2, 27	Pérez Aguilar R	83, 146
Jáuregui HS	26, 72	Medina C	39	Pérez Carbajal H	71
Jerez EF	19	Medina M	99, 100	Pérez E	67
				Pérez Hernández MV	63

Pérez MB	102	Saguir F	135, 147	Tefaha L	81, 82
Pérez ME	Co8, 68	Saguir FM	102	Teisaire ES	92, 143
Pérez Visňuk M	22	Sal GA	31	Terán Baptista ZP	Co15
Perlo B	151	Salas L	46, 47, 93	Terán M	56
Picón MC	92, 143	Salas MM	76	Terán ZP	80
Plasencia AM	18	Salazar SM	51	Teves I	8
Plitman FD	59	Salinas C	140	Toledo R	81, 82
Poch MJ	39	Salvucci E	132	Torres Carro R	61
Ponce RI	26, 40, 41, 72	Sampietro DA	Co17, 59, 96, 97	Torres Ortiz A	140
Ponessa GI	53		115, 127, 128	Tótaro R	45
Ponssa ML	89	Sánchez- Arreola E	129	Tracanna MI	39, 129
Porcel N	133	Sánchez Riera A	113		
Prado F	6	Sánchez RS	148	V	
Prado MM	83	Sánchez Segura M	150	Vaca GV	54
Pucci Alcaide A	89	Sánchez SS	144, 145, 146, 148, 149	Valdez JC	62, 143
Pucci Alcaide F	89	Sánchez Toranzo G	66, 88	Vallejo CV	112
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