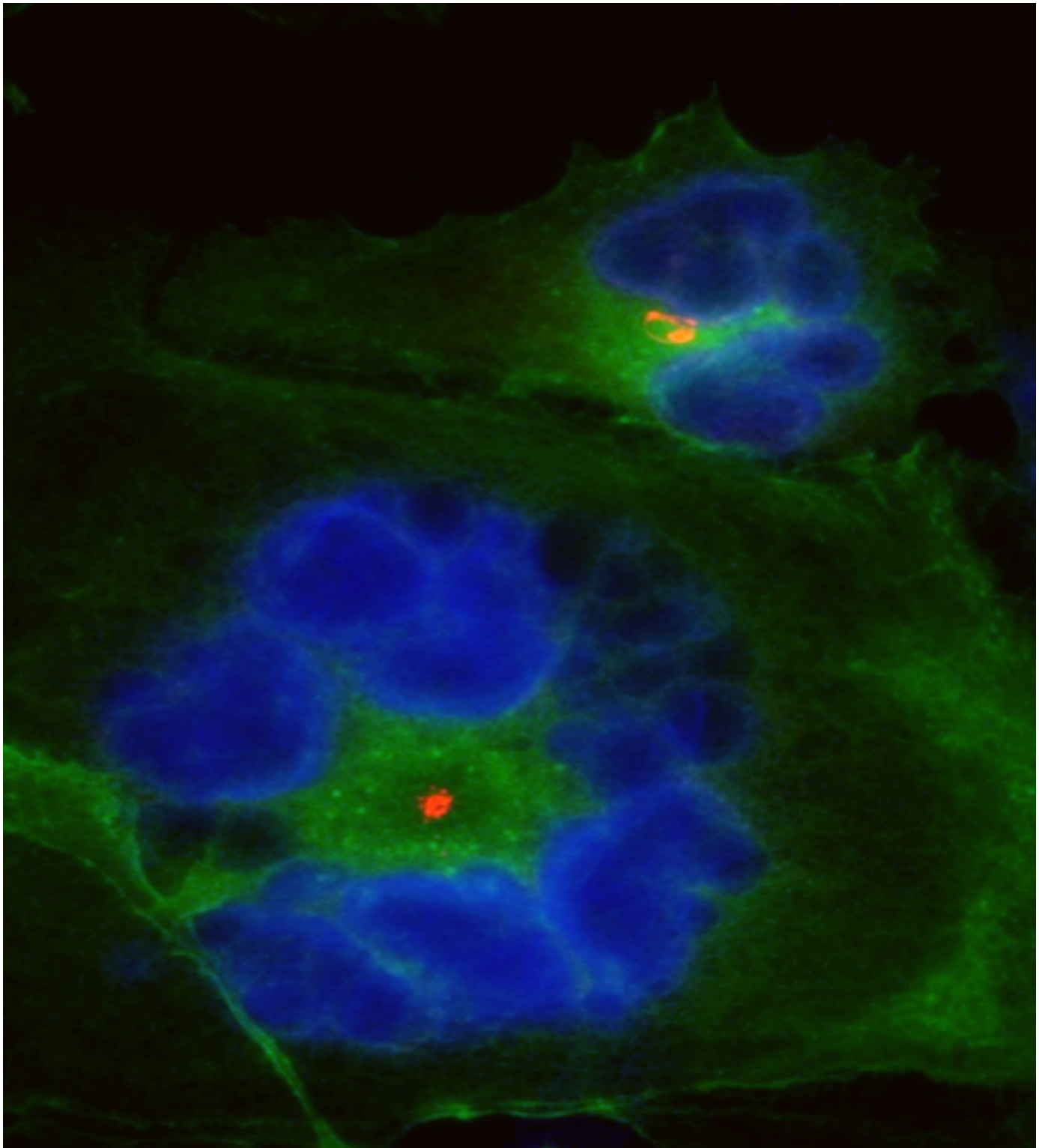
BIOCELL 43 (suppl.5), 2019
ISSN 1667-5746 (online version)



BIOCELL 43 (suppl.5), 2019
ISSN 1667-5746 (online version)

Cover page: The Synthetic Lethal Rosette

Aberrant mitotic phenotype found in BRCA1-deficient cells treated with the PLK1 inhibitor Volasertib. Cells become giant and multinucleated and acquire a flower shape, with nuclei arranging in a circular disposition around a cluster of centrosomes. Blue (DAPI: nuclei), Green (FITC-phalloidin: actin cytoskeleton), Red (γ-Tubulin: centrosomes).

Author: María Laura Guantay (CONICET fellow; Director: Gaston Soria)

Centro de Investigaciones en Bioquímica Clínica e Inmunología (CIBICI-CONICET), Facultad de Ciencias Químicas (Universidad Nacional de Córdoba).

BIOCELL 43 (suppl.5), 2019
ISSN 1667-5746 (online version)

MEMBERS OF THE SAIB BOARD

For the greenhouse experiment, pots were filled with 2 kg of contaminated soil and one *Sf* cutting and 6 *Fa* seedlings were planted per pot, for 3 months. Four pot replicates were prepared for each treatment, including control pots. At the end of the experiment, plants were harvested, and soil samples were taken for Gly and AMPA analysis by UPLC-MS/MS. Sixty-nine different colonies morphotypes, 23 from S and 46 from R (26 from *Fa* and 20 from *Sf*) were isolated. Seventeen of the isolates were able to grow on Gly as source of P and 14 were able to grow using Gly as source of C. Five of different bacterial morphotypes were able to grow using Gly as source of P and C. In the greenhouse experiment, Gly and AMPA initial content in soils were 5512 ± 1369 μg kg^{-1} and 2353 ± 181 μg kg^{-1}, (respectively). At the end of the assay, Gly final content was 325 ± 23 μg kg^{-1} (*Sf*) and 25 ± 2 μg kg^{-1} (*Fa*) showing both a noticeable decrease in planted soils. AMPA final content was also decreased in *Fa* (822 ± 104 μg kg^{-1}) while for *Sf* AMPA was enhanced (3853 ± 207 μg kg^{-1}). Gly detected in plant biomass was 513 ± 97 μg kg^{-1} (*Sf*) and 164 ± 50 μg kg^{-1} (*Fa)*. AMPA content in plants was 2385 ± 726 μg kg^{-1} (*Sf*) and 575 ± 87 μg kg^{-1} (*Fa*). In control pots, differences in contaminant content were not significant during the assay. Since *Fa* treatment showed decreased values of Gly and AMPA both in plant and soil, and five of different bacterial morphotypes were able to grow using Gly as a source of P and C, bioassays combining both bacterial inoculant and *Fa* are currently in course. The microbial-plant system could be considered a promising tool for the phytoremediation of Gly and AMPA.

BT-P13
GOAT MILK CHEESE ENRICHED WITH *SMALLANTHUS SONCHIFOLIUS* (YACON) ATTENUATES REDOX STATUS IN AN ANIMAL MODEL OF OBESITY

Díaz Miranda EN[1], Fabersani E[2], Gomez Rojas JR[1], Sánchez SS[1], Grau A[3,4], Oliszewski R[2], Honoré SM[1].
[1]INSIBIO (CONICET-UNT). [2]Fac. de Agronomía y Zootecnia, UNT. [3]Fac. Cs. Naturales- Instituto Miguel Lillo, UNT. [4]IER (CONICET-UNT).
E-mail: smhonore@gmail.com

Oxidative stress is a critical factor linking obesity with its associated complications such as diabetes, cardiovascular and hepatic dysfunctions. Excessive visceral fat increases oxidative stress in several organs leading to insulin resistance. Nowadays, the focus has been geared towards new functional foods to avoid the progression of metabolic complications. Cheese provides a valuable option as a food vehicle for prebiotic delivery. Also, phenolic compounds have been proposed as nutritional ingredients to improve the functional properties of milk and dairy products. This work investigated the effects of the addition *Smallanthus sonchifolius* (yacon) roots, a natural source of fructooligosaccharides (FOS) and phenolic compounds, to goat milk cheese on the antioxidant properties *in vitro* and *in vivo*. Cheese was elaborated from goat milk and *Lactobacillus bulgaricus, Streptococcus termophillus* (Chr. Hansen, Denmark) as starters. Yacon flour was added in a concentration of 20% (w/v). The centesimal composition of the product was determined. Wistar male rats (n = 30) were fed a standard diet (CD) or high-fat diet (HFD) for 12 weeks. Then HFD divided into four groups: HFD; HFD plus goat cheese (HFD-GC); HFD plus yacon flour (HFD-Y); HFD plus goat cheese + yacon (HFD-GCY). After 8 weeks of treatment, anthropometric, feeding, biochemical and oxidative stress parameters were measured. The formulation containing yacon had higher nutritional values (fats 21.6%, proteins 16%, and carbohydrates 18.54%), increased prebiotic FOS (4.55%), fibers (1.8%), and total phenolic content. The product had acceptable sensory attributes, high count (10^7 CFU/g) of viable probiotic microorganisms and high antioxidant activity determined as DPPH-free-radical scavenging activity ($p < 0.05$). Regular ingestion of the GCY provided substantial protection against oxidative stress, increasing serum levels of reduced glutation in HFD-fed rats. Moreover, GCY consumption increased superoxide dismutase, catalase and glutathione peroxidase antioxidant activities in the liver. Non change in body weight gain, fat pads weight or lipid profile was observed after supplementation with GCY to a HFD-animals ($p > 0.05$), however a tendency to improve has been observed. In addition, an improvement in fasting glucose levels and insulin sensitivity was detected ($p < 0.05$). Our results showed conclusive evidence indicating that GCY is an excellent functional food that avoids the oxidative impact of high fat feeding. Overall, yacon flour showed good potential as an antioxidant supplement for dairy products.

BT-P14
METABOLIC EFFECTS OF GOAT MILK YOGURT SUPPLEMENTED WITH *SMALLANTHUS SONCHIFOLIUS* (YACON) ROOT FLOUR IN RATS ON A HIGH-FAT DIET

Grande MV[1], Fabersani E[2], Coll Aráoz MV[3,4], Zannier ML[4], Sánchez SS[1], Grau A[4,5], Oliszewski R[2], Honoré SM[1].
[1]INSIBIO (CONICET-UNT). [2]Fac. de Agronomía y Zootecnia, UNT. [3] PROIMI (CONICET). [4] Fac. Ciencias Naturales e Instituto Miguel Lillo, UNT. [5]IER (CONICET-UNT). E-mail: rubenoliszewski311@yahoo.com

Overweight and obesity have increased dramatically in the world during recent decades, reaching epidemic levels. Currently, functional foods represent one of the most intensively investigated and widely promoted areas in the food and nutrition sciences in order to collaborate in obesity management. Yogurt is the most popular of fermented milk, rich in calcium and milk proteins with higher biological value and is an excellent delivery vehicle for functional ingredients such as fructooligosaccharides (FOS). *Smallanthus sonchifolius* (yacon) roots are considered the best natural source of FOS, and their consumption is associated with several health benefits. This study aimed to evaluate the effects of the addition of yacon flour on the quality parameters of goat milk yogurt and investigate the metabolic effects of its regular consumption on a high-fat diet-fed Wistar rats. Yogurt was elaborated from goat milk and *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. *bulgaricus* as starters and analyzed microbiologically weekly for 30 days (shelf life of commercial yogurts). Yacon flour was added at a concentration of 7% (w/v). The centesimal composition of the product was determined. For the experimental model Wistar male rats (n = 30) were divided into five groups (n = 6 animals per group) receiving the specified diet: standard diet (Control), high-fat diet (HFD), high-fat diet plus yogurt (HFD-yogurt), high-fat diet plus yacon flour (HFD-yacon), high-fat diet plus yogurt + yacon (HFD-yogurt + yacon), for 30 days. The formulation containing yacon flour had higher nutritional values (fats 4%, proteins 4% and carbohydrates 6.74%) and improved sugar profile (reduced lactose 0.94% and increased prebiotic FOS 4.55%) content. The final product had acceptable sensory attributes and a higher count (10^7 CFU/g) of viable probiotic microorganisms, with a shelf life of at least 30 days. Supplementation of goat yogurt + yacon to an HFD resulted in a marked attenuation of weight gain and a decrease in visceral fat pad weight ($p < 0.05$). Moreover, goat yogurt + yacon restored serum lipid profile, reduced fasting glucose

levels, HOMA-IR, and atherogenic indices of rats, improving the effects of goat yogurt or yacon flour alone ($p < 0.05$). Our results showed conclusive evidence indicating that goat yogurt + yacon is an excellent functional food that avoids the metabolic impact of high-fat feeding, representing a novel food product for the management of obesity.

BT-P15
EVALUATION OF ENZYMATIC ACTIVITIES IN LINDANE-CONTAMINATED SOILS DURING THEIR RESTORATION BY BIOREMEDIATION TECHNIQUES

Raimondo EE[1,2], Costa Gutierrez [SB1], Sineli PE[1], Fuentes M S[1], Benimeli CS[1,3]
1PROIMI-CONICET. 2Fac. de Bioquímica, Química y Farmacia. UNT. 3Fac. de Ciencias Exactas y Naturales. UNCA.
E-mail: enzo_er_25@hotmail.com

Lindane is an organochlorine pesticide that, due to its persistence in the environment, is still detected in different matrices. Bioremediation using actinobacteria consortia and agriculture residues proved to be successful for the restoration of lindane-contaminated soils. Furthermore, soil enzymatic activities, including oxidoreductases and hydrolases, are used as sensitive indicators to evaluate the soil quality, due to their participation in a range of biochemical reactions that take place in the environment. The aim of this work was to select soil enzymatic activities in order to be used as indicators of efficiency during the bioremediation of lindane-contaminated soils. Bioremediation tests were carried out in microcosms formulated with different soil types, contaminated with 2 mg kg^{-1} of lindane, bioaugmented with 2 g kg^{-1} of an actinobacteria consortium, and biostimulated with sugarcane bagasse or filter cake in the following soil:amendment proportions (100:0, 98:2, 90:10), under previously optimized conditions. The microcosms were incubated at 30°C for 14 days, and periodic samples were taken to determine residual lindane by gas chromatography and enzymatic activities using the traditional techniques reported in the literature with slight variations. All appropriated controls were performed. At the end of the assay, the pesticide removal percentages were different among the treatments and soil types, and the enzymatic activities were greater at day 14 than at day 0. In bioaugmented soils, the enzymatic activities were greater than in non-bioaugmented controls. In addition, biostimulation of bioaugmented and non-bioaugmented microcosms increased the values of these biological parameters. However, it was observed that lindane had an inhibitory effect on dehydrogenase, fluorescein diacetate hydrolysis, acid and alkaline phosphatases activities, while catalase was stimulated by the pesticide. Urease was slightly inhibited or not affected by the presence of the pesticide, depending on the evaluated condition. Based on their sensitivity, catalase, fluorescein diacetate hydrolysis, and acid phosphatase were selected as appropriate indicators to assess the effectiveness of the bioremediation process in subsequent studies. The obtained results demonstrated that the simultaneous use of the actinobacteria consortium and the agro-industrial residues was suitable for the treatment of soils of different textural classes contaminated with lindane, which led to an increase in the enzymatic activities values, with a consequent improvement in the quality of bioremediated soils.

BT-P16
IRON AS A MULTIFUNCTIONAL FACTOR IN *ASPERGILLUS NIGER* MYA 135: FUNGAL MORPHOLOGY, LIPASE PRODUCTION AND LIPASE ENHANCER

Salvatierra HN[1], Vázquez SC[1], Baigori MD[2], Pera LM[2]
NANOBIOTEC UBA-Conicet[1]; PROIMI-Conicet[2] E-mail: liciapera@gmail.com

Filamentous fungi have been broadly used in biotechnological processes as cell factories due to their metabolic versatility. They are able to secrete high levels of enzymes, antibiotics, vitamins, polysaccharides, and organic acids. However, one particular obstacle with these kinds of microorganisms focuses on their morphological form. They can show linear filaments to highly branched structures, and in submerged culture, growth morphologies varying from compact pellets to dispersed mycelia. In turn, several fungal processes can be directly or indirectly affected. Those growth morphological patterns are generally induced by extracellular factors and accomplished by genetic and biochemical factors. In this connection, we previously reported that $FeCl_3$ decreases the mycelium-bound β-N-Acetyl-D-glucosaminidase activity (a relative marker of the wall lytic potential) from *Aspergillus niger* ATCC MYA 135 and yields a dispersed mycelium in its presence. Here, both the fungal morphology and the lipase activity obtained in the presence of an optimized culture medium supplemented with $FeCl_3$ were analyzed. The role of this salt as a lipase enhancer was assessed as well. Firstly, the extracellular lipase production was conducted in an orbital shaker at 30°C during 192 h by using a mineral medium supplemented with 1 g/L $FeCl_3$ and a final conidial concentration of about 10^5 conidia per mL. After 24 h of fermentation, 2 % (v/v) of olive oil was added as an inducer. Thus, the highest specific activity (15.51 ± 0.78 U/mg) was obtained at 96 h of cultivation. This activity value was 10-fold compared with its control without $FeCl_3$ supplementation. Secondly, a new fermentation of 96 h was conducted. The mycelium was examined by scanning electron microscopy displaying clumps structures with scarce ramified hyphae. The supernatant, collected by filtration, was also evaluated as a biocatalyst in hydrolytic and synthetic reactions as follows. The role of iron as a lipase enhancer was studied in native PAGE by using 1.3 mM of α-naphthyl acetate as a substrate. Released naphthol was bound with 1 mM Fast Blue to give a colored product. Preincubation of lipase bands during 30 min in the presence of 0.1 g/L $FeCl_3$ resulted in a significant increase of the activity signal. Additionally, the extracellular lipase activity was immobilized in silica gel by adsorption. The elemental analysis performed under SEM-EDX (Energy-dispersive X-ray spectroscopy) evidenced the presence of iron. This biocatalyst was assayed to produce biodiesel compounds in a solvent-free system using soybean oil and butanol (1:4) as substrates. After a three-stepwise addition of butanol, a biodiesel conversion of 93.36 % was reached. Therefore, it can be concluded that $FeCl_3$ acted by altering fungal morphology, increasing lipase production, and improving the performance of the enzymatic activity. This research was supported by the following funding sources: FONCYT (PICT 2015-2596) CONICET (P-UE 2016-0012) and UNT (PIUNT D606).

BT-P17
BIOAUGMENTATION OF A BIOMIXTURE WITH ACTINOBACTERIA FOR ATRAZINE REMOVAL