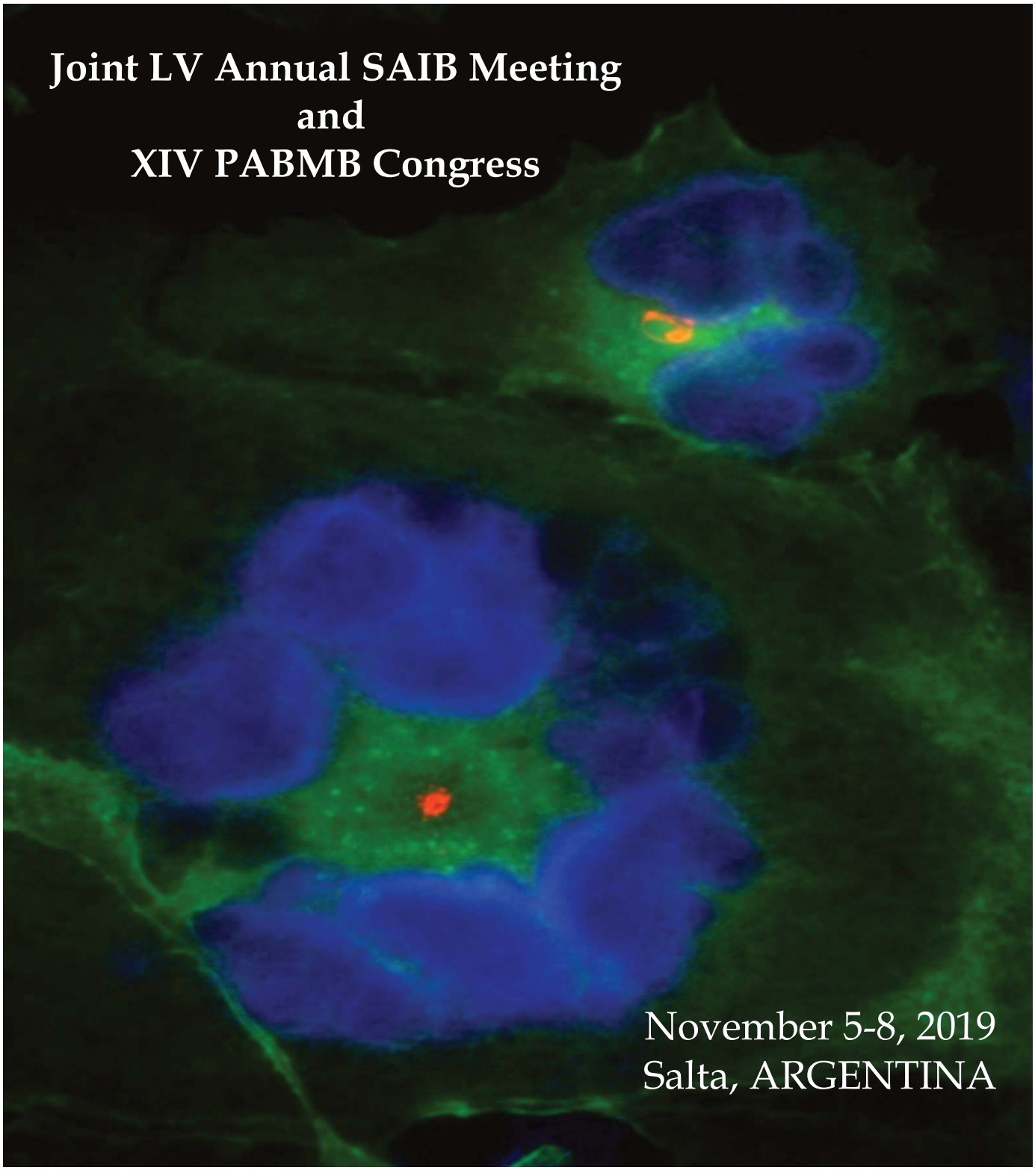
SAIB

PABMB

# Joint LV Annual SAIB Meeting and XIV PABMB Congress



November 5-8, 2019
Salta, ARGENTINA

flavonoids can form complexes with ion transition metals. Currently, the study of the antifungal properties of metal-flavonoid complexes is practically unexplored. In this work, the antifungal activity of some metal-flavonoid complexes was evaluated against three phytopathogenic fungi. This activity was quantitatively evaluated by contact assay using potato dextrose agar as culture medium. In *Sclerotium rolfsii*, solutions of Cu(II)-NGE (62 mmol/L), Cu(II)-NAR (32 mmol/L), Ni(II)-NAR (32 mmol/L) and Mn(II)-NAR (14 mmol/L) complexes were tested. Also, flavonoids NGE (124 mmol/L) and NAR (64 mmol/L) were assayed alone. For *Rhizoctonia solani* and *Sclerotinia sclerotiorum*, Cu(II)-NAR (32 and 16 mmol/L), NAR (64 and 32 mmol/L) and $CuSO_4.5H_2O$ (32 and 16 mmol/L) solutions were tested. To prepare these solutions, N, N-dimethylformamide/water 10 % (v/v) have been used as a solvent. The assays were realized with five replicates for each treatment. The results revealed that *S. rolfsii* was highly inhibited by Ni(II)-NAR complex (91 %), followed by Cu(II)-NGE (72 %), Mn(II)-NAR (36 %) and Cu(II)-NAR (3 %), whereas NGE caused only 24 % of inhibition and NAR not manifested antifungal activity. Solutions of Fe(III)-NAR (40 mmol/L), Co(II)-NAR (24 mmol/L) and Cr(III)-NAR (6 mmol/L) were also tested, but they not exhibited activity. *S. sclerotiorum* not presented inhibition by any of the compounds assayed. For *R. solani*, only the solution of $Cu(II)SO_4.5H_2O$ at 32 mmol/L caused significant inhibition (16 %). In conclusion, this study is probably the first reported about the antifungal activity of this kind of compounds, and it demonstrates that some of these coordination compounds have potential as new environmental friendly fungicides.

## MI-P42

### PROTEOMIC ANALYSIS TO UNDERSTAND CR(VI) HOMEOSTASIS IN *STREPTOMYCES* SP. MC1

Sineli PE[1], Aparicio JD[1,2], Pernodet Jean-Luc[3], Polti MA[1,4]
[1]PROIMI-CONICET, Tucuman, Argentine; [2]FBQF, Tucuman, Argentine; [3]I2BC, Paris, France; [4]Fac. Cs. Nat., Tucuman, Argentine.
E-mail: sinelip@gmail.com

Chromium is a heavy metal widely used in a variety of industrial processes (leather tanning, steel production, metal corrosion inhibition). Hexavalent chromium is carcinogenic and presents higher toxicity than trivalent form since Cr(VI) is more water-soluble and mobile than Cr(III). Industrial effluents containing Cr(VI) are released into water courses, mostly without proper treatment, resulting in anthropogenic contamination. Over the last years, bacteria-mediated removal or stabilization of heavy metal into no or less toxic forms has become in an effective biotechnological process. In this sense, several physiological studies on *Streptomyces* sp. MC1, an actinobacteria isolated from a polluted soil in the province of Tucumán (Argentina), demonstrated be able to grow in presence of Cr(VI) and remove the metal both in liquid medium and contaminated soils. However, the molecular mechanisms involved are unknown in this actinobacteria. MS-based proteomics have become a powerful tool to understand the mechanisms that underlie physiological processes. In the present work, we use MS-based, label-free and quantitative proteomic analyses in order to identify enzymes involves in oxidative stress response caused by the presence of Cr(VI) in our actinobacteria strain MC1. Sampling points for proteomics analyses were established according to the growth of *Streptomyces* sp. MC1 in minimal medium (MM) amended with Cr(VI) at 50 mg $L^{-1}$ and MM without the metal (control condition). Cells were harvested after 18 and 24 h of incubation in control condition and MM with Cr(VI) respectively. These sampling points allowed obtaining comparable and metabolically active cells (exponential phase of growth). Cr(VI) removal was 10% at the time that cells were harvested (24 h). A total of 1981 different proteins were detected in the proteome. It represents approximately 22% of the predicted protein sequences for this strain. 518 of these proteins passed our significance parameters which 186 of them were up-regulated in the condition supplemented with Cr(VI). Analysis with the software BlastKOALA showed that up-regulated proteins were distributed in metabolic pathways that result essential for a correct cellular operation. Overall, the proteins were related to carbon and energy metabolism, genetic information processing, oxidative stress response and membrane transports. Interestingly, enzymes from pentose phosphate pathway increasing significantly their abundance in presence of chromium. About, 10 different oxidoreductases enzymes were up-regulated in presence of the metal. Regarding oxidative stress response, key enzymes like superoxide dismutase, catalase, mycothiol synthase, and mycothiol amidase were identified with an increment in their abundance. The proteome analysis performed in *Streptomyces* sp. MC1 allowed us to identify the proteins involves in the homeostasis of Cr(VI). These results serve as basement to study and improve the heavy metal removal by actinobacteria.

## MI-P43

### BIOPOLYMER-BASED FORMULATIONS TO IMPROVE THE EFFECT OF THE ANTIMICROBIAL PEPTIDE MccJ25(G12Y)

Pioli MA[1]; Slavutsky AM[1], Koltan M[2], Acuña L[3], Vincent PA[2], Corbalán NS[1]
[1] Instituto de Investigaciones para la Industria Química (INIQUI, CONICET-UNSa), [2] Instituto Superior de Investigaciones Biológicas (INSIBIO, CONICET-UNT), 3 Instituto de Patología experimental (IPE, CONICET-UNSa).
E-mail: nscorbalan@gmail.com

The antimicrobial peptide Microcin J25(G12Y) present advantageous features for its use as a food preservative, such us: temperature and pH resistant, *in vitro* and *in vivo* inactivation by digestive enzymes, no effect on coliform intestinal natural population and antimicrobial activity against important foodborne pathogens like *Escherichia coli* O157:H7, *Salmonella* and *Shigella*. It is known that the efficiency of antimicrobial peptides can decreases when they are added directly to the food since the presence of carbohydrates, proteins, fats, salts, enzymes and pH strongly influence the activity of these agents. To overcome this inconvenient the development of novel formulations like, microcapsules, hydrogels, lipid-based delivery systems, are all examples of carriers for peptide delivery that may improve the therapeutic index of antimicrobial peptides by protecting their activity and improving their bioavailability. In this report we analyze the activity of MccJ25(G12Y) included in two different carriers formulations, microcapsules and hydrogels. Two natural polymers were used to perform these formulations, brea gum was used as wall material for spray drying microencapsulation and a mix of brea gum/pectin to hydrogels preparation. *In vitro* activity for both formulations was assayed against different foodborne pathogenic and spoilage bacteria, in this assays we observed that the peptide activity was not altered by microencapsulation process or during hydrogel formulation. On the other hand the activity of microencapsulated microcin was assayed in a food model of beef burgers artificially contaminated with *E. coli* O157:H7 observing a significant decrease respect to the initial bacterial load. In summary our results reinforce the potential of MccJ25(G12Y) as a possible food biopreservant.

## MI-P44