



## STUDY OF AN INDUCED ANTIBACTERIAL BIOACTIVITY AND GENOME SEQUENCING OF A SOIL RARE ACTINOBACTERIUM

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Microorganisms, a rich source of natural products, co-exist in their natural environment. Therefore, interspecies interactions among microbes that lead to differential secondary metabolism may be commonplace. In this sense, co-culture between microorganisms can be highlighted as a promising tool to investigate the stimulation of silent gene clusters expression and find potentially new natural products [1]. Co-cultures were performed in solid media between a collection of several rare actinobacteria and a collection of several *Streptomyces* strains. In order to analyze if these interactions can trigger the biosynthesis of bioactive compounds in these strains, the multi-resistant actinobacterium *Amycolatopsis* sp. AA4 was used as indicator strain. Strains were cultivated in pairs on Tryptic Soy Agar for seven days at 30 °C. Colonies were overlaid with soft-LB-agar inoculated with the indicator strain and incubated overnight. Bioactivity was analyzed by visualization of inhibition halos. One promising strain, *Krasilnikovia* sp. T082, was chosen for the follow up study. This strain showed an inhibition halo when cultivated in pairs with several *Streptomyces* strains. To check if this induction capacity is specific to this genus, *Krasilnikovia* sp. T082 was cultivated in pairs with other actinobacteria belonging to different genera. This analysis showed that this capacity of induction is broadly spread throughout the Actinobacteria taxon. *Streptomyces* sp. SPB78 was selected for studying the mechanism of induction. This new bioactivity was also detected on liquid co-culture, and this cultivation method was selected for further study of the antibiotic and inducer compounds. It was shown that *Streptomyces* sp. SPB78 supernatant is enough for triggering this activity, and the compound(s) responsible for this activity is(are) polar. The inducer aqueous extract is being fractionated in HPLC attempting to elucidate the mechanism of this induction. The bioactive liquid culture of *Krasilnikovia* sp. T082 induced with *Streptomyces* sp. SPB78 aqueous extract is also being investigated in order to elucidate the structure of the antibiotic compound. Preliminary studies showed that this compound probably has peptidic nature and is polar. *Krasilnikovia* sp. T082 genome was sequenced by PacBio platform and analyzed by the Rapid Annotation Server (RAST) and antiSMASH pipeline. These analyses showed that this rare actinobacterium harbor in its genome many potential gene clusters related to secondary metabolism that are not described in the literature. This work shows that chemical and biological study of microbial interactions can be a useful tool for searching for bioactive molecules.

[1] Bertrand, S., Bohni, N., Schnee, S., Schumpp, O., Gindro, K. and Wolfender, J. L. 2014 Metabolite induction via microorganism co-culture: A potential way to enhance chemical diversity for drug discovery. Biotechnol. Adv. 32:1180-1204.