GBMeeting
ENCONTRO DAS PÓS-GRADUAÇÕES EM GENÉTICA, BIOLOGIA MOLECULAR E MORFOFUNCIONAL
29, 30 e 31 de janeiro de 2024

HONEY FROM NATIVE BRAZILIAN STINGLESS BEES: AN UNEXPLOITED SOURCE OF ANTIMICROBIALS

José Fhilipe de M. da Silva [a*], Elizabeth Bilsland [a], Carlos Filipe R. de Matos [a]
[a] *Synthetic Biology Laboratory, Instituto de Biologia, Universidade Estadual de Campinas*
*e-mail: j272430@dac.unicamp.br

New infectious diseases and the development of resistance to existing drugs threaten our society. Worryingly, there is a decline in the discovery of new compounds with antimicobial action that could replace inefficient drugs, especially those derived from microbial secondary metabolites. As a result, more than three decades have passed without the emergence of new classes of antibiotics. This occurs due to the difficulty of culturing many microorganisms in the laboratory and the low production of their metabolites in vitro, since many biosynthetic genes are silenced under these conditions. With the turn of the last century, a promising area in biological research, known as Synthetic Biology, gained traction. This uses computational modelling and genetic engineering techniques to optimise living organisms for multiple purposes, such as the production of secondary metabolites with antimicrobial activity. Thus, a strategy that has been adopted in the present work is the bioprospection of insect microbiome to uncover novel antimicrobial substances, This will be combined with Synthetic Biology to optimize the expression of biosynthetic genes to allow for an enhanced production of compounds of interest. We chose to screen for antimicrobials produced by microorganisms living in symbiosis with native Brazilian bees, as they have a higher resistance to pathogens when compared to European bees. Furthermore, there is a scarcity of literature regarding the metabolites produced by these microorganisms, presenting a high potential for the discovery of new bioactive metabolites. We purchased twelve commercial honeys from eleven different bee species as a source of microorganisms. These were diluted and plated onto fifteen different culture media to allow the growth of a large variety of fungi and bacteria. Thus, we isolated a total of 378 microorganisms were isolated from all twelve honeys. To verify the antimicrobial activity of the prospected microorganisms, antibiogram tests were performed on plates containing an *Escherichia coli* and *Saccharomyces cerevisiae*, We observed that 103 isolates (27%) showed activity against *E. coli* and 137 (36%) against *S. cerevisiae*. We are now performing 16S and 18S rDNA PCRs and sequencing to identify the microbial species of interest, which will be followed by inhibition assays against drug resistant bacterial strains and metabolomic analysis to identify potential novel secondary metabolites. The genomes of the 5 most promising strains will be sequenced with the goal of identifying the biosynthetic genes responsible for the production of the compounds of interest to allow the engineering of a antibiotic producer strain.

Apoio: **CAPES**