APRESENTAÇÃO DE PÔSTER - MICROBIOLOGIA

BIOACTIVE VOLATILE METABOLITES OF THREE SPECIES OF BACTERIA INHIBIT THE GROWTH OF THE SUGARCANE PATHOGEN FUSARIUM MONILIFORME

Maria Vitória Leite De Campos Rodrigues (mariavitoriarodrigues17@gmail.com)

Juliana Velasco De Castro Oliveira (juliana.velasco@lnbr.cnpem.br)

Leonardo José Da Silva (ljs@alumni.usp.br)

Brazil is a global agricultural superpower, and the success of this sector is due to its territory, which has a large arable area, climate, and natural resources available. One of the most important crops produced in Brazil is corn, a grain with high nutritional value, widely consumed by animals and humans; in addition, it can be used for the production of beverages and several bioproducts. However, corn production suffers many losses due to diseases caused by phytopathogens. Among them, we can mention Fusarium moniliforme sin, which is considered one of the most devastating agents among prevalent fungi in corn. The infection can start at the roots, favored by wounds from nematodes, and dissemination occurs through wind or rain. In general, disease control is through agrochemicals that can harm human and other non-target organisms' health, as well as contaminate soil and water resources. In this scenario, an alternative that would reduce the impacts of agrochemicals is the use of bacteria that produce volatile organic compounds (VOCs). VOCs are lipophilic molecules of low molecular weight, that can have antagonistic action against phytopathogens. Thus, the project aims to identify bacteria with antagonistic activity to F. moniliforme and to understand the molecular

mechanisms involved in this process. First, 68 bacteria (isolated from corn rhizosphere, root, stem, and leaf from Brazilian producing areas) were tested in a fungus-bacterium co-culture system, and 5 of which showed interesting inhibitions (by up to 58 %). Then, the ability of these bacteria to grow and inhibit the phytopathogen in 3 different culture media was evaluated. The best inhibitions were obtained with the bacteria 1-12F, 2-8E and 17-12A, in the Luria Bertani (LB), the richer culture medium. Using gas chromatography coupled to mass spectrometry (GC-MS) the VOCs produced by 3 of these bacteria are being analyzed. So far, 17 compounds have been identified being produced in LB, and they belong to different chemical classes, such as alcohols, ketones, esters, sulfides, pyrimidines, thioesters and alkanes. We evaluate the function of 5 VOCs and 1 of them were able to inhibit the fungus at 5 mM concentration (30 %). However, when we mixed these compounds in a lower concentration (0,5 mM), the inhibition occurred (XX%), showing a synergistic effect between them. In addition, the DNA of the bacteria was extracted and 16S rRNA gene was sequenced. As result, the species Paenarthrobacter nicotinovorans (1-12F), Curtobacterium oceanosedimentum (2-8E) and Bacillus cereus (17-12A) were obtained as best hits. There is no report about the antagonistic role of two of them, which make this research promising. The next steps consist of carrying out the RNA-seq of the fungus that had its growth inhibited, to understand how the VOCs are acting. All results derived from this study may be useful for the production of new bioinoculants, and to achieve a more sustainable agriculture.