

F.19 - Promising Biological Properties of Secondary Metabolites Produced by the Fungus *Penicillium maximae* Isolated from Caatinga BiomeRafael Conrado¹, Tainah Colombo Gomes¹, Itamar Soares de Melo², Welington Luiz de Araújo³, Ana Olívia de Souza¹¹Development and Innovation Laboratory, Instituto Butantan (São Paulo, Brazil), ²Environmental Microbiology Laboratory, EMBRAPA Meio Ambiente (SP, Brazil), ³LABMEM, Department of Microbiology, Universidade de São Paulo (São Paulo, Brazil)

INTRODUCTION: The discovery of bioactive molecules produced by microorganisms, mainly from not very well studied environments, has great biotechnological relevance. The Brazilian biodiversity is very promising in the drug discovery process, and the fungi isolated by our group, from the Caatinga biome, are being studied as source of compounds with antimicrobial, antitumor or wound healing properties. **OBJECTIVES:** In this study, the main objective was to evaluate the antimicrobial and cytotoxicity properties of secondary metabolites produced by a fungus strain isolated from the Caatinga biome. **MATERIALS AND METHODS:** The fungus strain coded as AG2511, isolated from the Caatinga biome soil, was taxonomically identified based on morphology by scanning and transmission electron microscopy, and molecular analysis (ITS-1 and 5.8S-ITS-2 sequences). For secondary metabolites biosynthesis, the fungus was cultivated in potato dextrose broth for 15 days at 28 °C and 150 rpm. The metabolites were obtained by solid phase extraction (C18 cartridge and methanol as solvent). The crude extract was fractionated by high performance liquid chromatography (HPLC) in a C18 column and isocratic method with methanol. The cytotoxicity of the fractions (F1-F7) was evaluated from 125 to 500 µg/mL, on the human breast adenocarcinoma cell lines MCF-7 (ATCC HTB-22) and MDA-MB231 (ATCC HTB-26), on the pancreatic cancer cell line MIA PaCa-2 (ATCC CR61420), and on the human melanoma cell line SK-MEL-28 (ATCC HTB-72) by the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay. The antimicrobial property was assayed by antagonism or minimal inhibitory concentration assay (125-500 µg/mL), on at least fifteen species of phytopathogens. **DISCUSSION AND RESULTS:** The fungus AG2511 was identified as *Penicillium maximae*, and the fractions inhibited the growing of the phytopathogens *Bipolaris sorolaniana*, *Fusarium oxysporum*, *Fusarium solani* and *Fusarium verticilloides*. The fractions F6 and F7 were more effective and cytotoxic on all tumor cell lines. **CONCLUSION:** Due to its promising biological effect, the fractions are under purification process for obtaining the secondary metabolites.

Keywords: Secondary metabolites, *Penicillium maximae*, Caatinga**F.20 - Using TiO₂-Diatomite for Photodisinfection in Contaminated Wastewater**Paloma Otsuka Kotani¹, Daphne Montesuma Ferro¹, Laura Pavarin Tavares¹, Regina Affonso², Nilce Ortiz¹¹Centro de Química e Meio Ambiente, Instituto de Pesquisas Energéticas e Nucleares (São Paulo, Brasil), ²Centro de Biotecnologia, Instituto de Pesquisas Energéticas e Nucleares (São Paulo, Brasil)

INTRODUCTION: The urban pressure reduced water availability and quality through the years, promoting the development of water treatment and disinfection processes such as the Advanced Oxidation Process (AOP). A highly efficient catalyst with Diatomite as biotemplate and solar energy can enhance hydroxyl radicals (OH) production for disinfection and pollutants degradation. Preliminary TiO₂-Diatomite experiments with *Escherichia coli* provided valuable insights on its photodisinfection efficiency, legitimating its usage in the wastewater samples presented in this study. **OBJECTIVES:** Evaluate the use of TiO₂-Diatomite in photodisinfection process in contaminated wastewater. **MATERIALS AND METHODS:** TiO₂ synthesis used titanium isopropoxide sol-gel process with Diatomite powder, the filtration step followed the mixed water suspension, and the drying process lasted overnight. The wastewater samples were collected from a household washing machine and 0.05 g of TiO₂-Diatomite were added in the photodisinfection reactor. The total reaction lasted for 90 minutes in the solar chamber with all parameters controlled. The suspension aliquots were collected after 30 minutes of agitation and plated on LB agar at Petri plates. After incubation, the emerged colonies were counted through software (OpenCFU) and the data processed using R programming language. **DISCUSSION AND RESULTS:** The Scanning Electron Microscopy (SEM) micrograph of TiO₂-Diatomite presented enhanced surface area and microstructure obtained by biotemplate addition. The bacterial inactivation percentage was above 75 % for 1 hour of solar radiation exposure. Kinetics models indicated better correspondence with interparticle reaction. **CONCLUSION:** Photodisinfection kinetics studies provided more efficient bacterial inactivation with the addition of 0.05 g of TiO₂-Diatomite in the sample. The study presents an affordable and sustainable treatment using a viable renewable energy source for application in distant areas with contaminated effluents with the addition of a reagent easily obtained by government agencies.

Keywords: Diatomite, Photodisinfection, Solar energy / **Supported by:** CNPq