EVALUATION OF THREE FILAMENTOUS FUNGI AS POTENTIAL BIOTRANSFORMATION AGENTS
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Fungal biotransformation process consists in a green alternative for the generation of chemical modifications in the structures of substances, performed under mild conditions of temperature and pressure and with less use of solvents. This sustainable approach can be used to prepare derivatives of bioactive molecules with reduced use of chemicals as well to treat aqueous residues containing organic or inorganic contaminants, reducing their toxicity or their accumulation in the environment. Ibuprofen is a prescription-free nonsteroidal anti-inflammatory drug, widely used throughout the world. It is one of the medicines most commonly present in the water bodies, generating public health problems and affecting the ecological balance. In this work, three species of filamentous fungi, \textit{Aspergillus niger}, \textit{Penicillium janthinellum}, and \textit{Syncephalastrum racemosum}, were investigated for their ability to biotransform the pollutant ibuprofen, aiming at its degradation or transformation in derivatives unable to accumulate or harm human body. For this, the fungal biomasses were produced statically in potato dextrose broth (PDB) at room temperature (25 ± 3 °C). After full growth, the biomasses were removed by filtration, washed with sterile distilled water, and placed in contact with ibuprofen as an aqueous solution (5 mg.100 mL\textsuperscript{-1}). The contact was maintained for six days, under orbital stirring. After this period, the aqueous broths and biomasses were extracted from ethyl acetate, and the extracts obtained were subsequently analyzed by proton nuclear magnetic resonance in CDCl\textsubscript{3} (\textsuperscript{1}H NMR, 400 MHz) and the NMR profiles of ibuprofen, before and after contact with the fungi, were compared. From the analysis, \textit{P. janthinellum} showed to be unable to metabolize ibuprofen under the conditions employed, while \textit{A. niger} have modest action, based in some new low intensity signals observed in the \textsuperscript{1}H NMR spectrum. On the other side, promising results were observed for the extract obtained from \textit{S. racemosum} broth, based in the \textsuperscript{1}H NMR profile modifications. Signals at 3.73 ppm (1H, s) and 2.76 ppm (2H, s), absent in ibuprofen spectrum, were observed, as well as changes in the chemical shift of the signals referring to the aromatic hydrogen atoms at 7.23 ppm (4H, dd) and methyl hydrogens atoms at 1.24 ppm (6H, s). These signals, presenting at high intensity, indicated the capacity of \textit{S. racemosum} to make chemical transformation in the molecule of ibuprofen, a process that can be further developed for removing this drug from environmental aqueous matrices. (Acknowledgments: CNPq, FAPEMIG, INCT BioNat, and AUGM).