21006 | Bioprospection of antibiotics and biofilm inhibitors from under-exploited filamentous fungi

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Abstract

In the past century, antibiotics revolutionized the way infectious diseases were treated, saving millions of lives. However, bacteria, in particular these infectious, may develop antibiotic resistance in such a way that the speed of development of new drugs does not follows the development of resistance. Filamentous fungi have a vast, largely unexplored metabolome, giving them great potential for novel antibiotic discovery. The One Strain MAny Compounds (OSMAC) approach is a valuable tool in this regard and aims to vary culture conditions to obtain a wider range of metabolites. In this study, five under-explored fungal species were used, aiming to identify compounds with antibiotic or antibiofilm properties produced by them. They were grown in different culture media, under deep fermentation for 7 and 14 days, with changing conditions of aeration and agitation, and the resulting supernatants were tested for their antimicrobial activity against Gram-positive and Gram-negative bacteria using the disk diffusion method. All fungi grew on the different media and under the diverse process conditions. It was found that *Coprinopsis spilospora* metabolites inhibited *Staphylococcus aureus* growth and demonstrated antibiofilm properties. They reduced the biofilm in 30% in crystal violet staining, metabolic activity by 82% in Alamar blue test, and viable cells counts by 96% in CFU counting. Co-culture and disk diffusion test results also showed that this supernatant has a slight effect against *Escherichia coli*. The pioneer results obtained in the present study highlight the relevance of bioprospection for antibiotic discovery.

Keywords: Antibiotic bioprospection; Biofilm control; Bioprocess; Filamentous fungi.

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