

Response of secondary metabolites of hadal fungi to high hydrostatic pressure

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Deep-sea microorganism adopts different strategies to cope with high hydrostatic pressure, low temperatures in extreme habitats. Deep-sea fungi with extreme living environments and unique metabolic pathways are important sources of bioactive compounds. However, as yet, the research of novel deep-sea bioactive compounds from the fungi is limited. Exploration of adaptation of deep-sea microorganisms has been mostly focused on bacteria. In our study, 43 fungi were isolated and identified from the Mariana trench. High hydrostatic pressure (HHP) assay was firstly performed here to identify the pressure tolerant of these hadal fungi. The phenotype and development of these fungi were affected by HPP treatment. The metabolic potentials of the extremophilic fungi were also explored. Secondary metabolites of 8 fungi were extracted after 10 days' growth under the treatment of 0.1, 20, and 40 Mpa. The compounds had high efficiency of antibacterial activity, which showing the potential of the hadal fungi as the novel biosource of natural products. The results of HHP assay indicated that stress had a significant effect on the activity of metabolites of hadal fungi, and could even change the antibacterial activity. Our results suggested the existence of fungi in the Mariana Trench sediment and gave a hint of the relationship between the high hydrostatic pressure and life process (vegetative growth and secondary metabolism) of hadal fungi under the extreme environment.