

SIG1-3

Unveiling deep-sea fungal diversity, ecology and potential exploitation: examples from Mexican oceans

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Purpose: Fungi seem to be successful deep-sea colonizers, with remarkable abilities to adapt to adverse conditions. However, deep-sea fungal communities remain largely unexplored, particularly in the American waters. Herein, we explored deep-sea ecosystems in the Gulf of California and Gulf of Mexico, approaching deep-sea fungal diversity, ecological patterns and potential utilization.

Methods: Fungal isolates were obtained from both littorals using classical culture-based techniques. Preliminary taxonomic diversity estimates were obtained for the Gulf of California through Illumina metabarcoding. In addition, fungal isolates from the Gulf of Mexico were explored for their potential use as candidate species in oil bioremediation, analyzing by differential transcriptomics the genetic basis of hydrocarbons breakdown.

Results and conclusions: In view of their adaptations to bear environmental stress, high abundance, and diversity of ecological strategies, fungi might represent valuable genetic resources for exploitation. Our results on fungal ecological patterns in the recently discovered hydrothermal vents system from Pescadero Basin (including carbonate and sulfide chimney structures) suggest a remarkable fungal diversity. Moreover, we identified fungal isolates with the ability to tolerate and use hydrocarbons as the sole carbon source, presenting evidence from differential expression analyses. Overall, our findings highlight the importance of integrating culture-dependent and independent approaches in deep-sea fungal exploration. These efforts contribute to a better understanding of the deep-sea ecosystem dynamics, and the utilization of deep-sea derived fungal taxa as valuable genetic resources.