

Marine Fungi: The Untapped Diversity of Marine Microorganisms

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Received date: February 05, 2015, Accepted date: February 06, 2015, Published date: February 11, 2015

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Introduction

It has been very well established for more than half a century [1] that terrestrial bacteria and fungi are sources of valuable bioactive metabolites. It has also been noted that the rate at which new compounds are being discovered from traditional microbial resources, however, has diminished significantly in recent decades as exhaustive studies of soil microorganisms repeatedly yield the same species which in turn produce an unacceptably large number of previously described compounds [2]. Therefore, it is reasonable to expect exploration of untapped marine microbial diversity and resources will improve the rates at which new classes of secondary metabolites are discovered.

Secondary metabolites of marine fungi with a wide spectrum of biological activities are known, and these can be used within a wide field of applications.

The number of novel fungi isolated from marine habitats is still low as compared to their estimated high biodiversity [3]. Very little is known about the global diversity and distribution of marine fungi. The probability of isolating fungal strains belonging to new taxonomic groups from selected marine habitats and from marine samples in general remains high. Overall, the number of strains available from marine sources is limited and the knowledge of marine fungi in general is scarce [4,5].

Research on marine fungi has suffered neglect, although the fungi are extremely potent producers of secondary metabolites and bioactive substances [6]. In addition, marine-derived fungi have contributed an important proportion of the important bioactive molecules discovered.

Marine-derived fungal strains have been isolated, screened, and reported to produce novel antimicrobial compounds belonging to the alkaloids, macrolides, terpenoids, peptide derivatives and other structure types. A review covering more than 23,000 bioactive microbial products, i.e. antifungal, antibacterial, antiviral, cytotoxic and immunosuppressive agents, shows that the prolific producing organisms are mainly from the fungal kingdom. Hence, fungi represent one of the most promising sources of bioactive compounds [7].

The majority of novel fungal secondary metabolites originates from inorganic matter such as sediments, soil, sandy habitats and artificial substrates, whereas marine invertebrate-derived fungi contribute less

than the marine plants such as algae, sea grasses, mangrove plants and woody habitats. Research on marine-derived fungi up to 2002 has led to the discovery of some 272 new natural products and another 240 new structures were discovered between 2002 and 2004. Therefore, this provides significant evidence that marine-derived fungi have high potential to be a rich source of pharmaceutical leads [8].

The field study of marine microbial natural products from marine fungi is immature, but the growing and accumulating results have prompted the development the under-utilized group of marine fungi, a sustainable source of novel marine natural products with various applications.

Acknowledgements

This article was partly supported by "Marine Fungi" Project (no. 265926) from EU-FP7 (2011-2014).

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