The Investigation on Siderophore-like Organic Ligands from Marine-derived Fungi *Aspergillus terreus and Aspergillus tubingenis*

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Abstract

Marine microorganisms face a wide variety of ocean environments, including many part of ocean, where their growth is limited because of the lack of trace elements, including iron, zinc etc, which are present at sub-picomolar concentrations in seawater. Hence, many marine microorganisms' biosynthesize natural/organic products - siderophore-like compounds - that act as metal sponge and help bacteria seize the trace metals in seawater. Many microogranisms, including fungus, produce siderophores, which can efficiently chelate the ferric iron [Fe(III)] under low iron conditions, thereby add to microorganism growth and reproduction. In addition, these molecules display a wide range of structural scaffolds, hence specific properties that include, among others, bio-sensing, bio-control, weathering soil minerals, bioremediation, chelation, and facilitate faunal and floral growth. In our laboratory, we isolated two symbiotic fungi strains, *Aspergillus terreus* (MB-2014-HBr) and *Aspergillus tubingenis* (MB-2014-HBk) from a sponge, *Haliclona* sp. that we collected from Dongsha Atoll. The crude acetyl acetate (EtOAc) extract of these fungi exhibited positive siderophore-like effects as determined by chrome azurol S (CAS) assay. To further study the structural functions and chemical properties of these siderophores from marine microorganisms, the EtOAc extract of these fungi were subjected to column chromatography using Sephadex-LH-20. It afforded several fractions, which were combined based on their polarity. Furthermore, with the help of RP-HPLC-based chemical isolation and purification, we isolated twenty compounds from both extracts, out of which compound A-01, A-02, A-06, A-11, and A-15 from MB-2014-HBr exhibited siderophore-like (Iron-chelating) effects. Bioactivities of pure compounds from MB-2014-HBk are in under investigation