Biologically Active Constituents from Selected Marine Sponges

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Abstract

Marine sponges are a prolific source of structurally diverse secondary metabolites with remarkable biological potential. In this study, we report the chemical investigation of the calcareous sponge *Leucetta* sp., collected from the Red Sea, a region recognized for its unique biodiversity and underexplored marine resources that may yield novel bioactive compounds. Bioassay-guided fractionation of the organic extract was carried out using reversed-phase vacuum liquid chromatography (VLC), size-exclusion chromatography, and final purification on high-performance liquid chromatography (HPLC), leading to the isolation of three compounds. Their structures were elucidated through detailed spectroscopic analyses, including 1D and 2D NMR as well as mass spectrometry. The isolated compounds were subsequently evaluated for antimicrobial activity against *Escherichia coli, Staphylococcus aureus,* and *Candida albicans*. The results revealed variable levels of activity, highlighting their potential as scaffolds for future drug discovery. The structural features and biological properties of these metabolites are presented and discussed.

Keywords

Red Sea sponges, *Leucetta* sp., Bioactive compounds, Structural determination, Antimicrobial activity.