

琉球大学学術リポジトリ

いくつかの観点からの海洋天然物資源の研究

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Title: Investigation of the Marine Natural Resources with Various Aspects

Abstract

In this thesis, I, Viqqi Kurnianda, described studies on marine natural products from several viewpoints. The first project was on the confirmation of artifact formation. By exposing a known sesquiterpenoid **16** to sunlight in the presence of a pigment, a total of four derivatives **17-18** and **20-21** were obtained. Their structures were characterized with spectroscopic analysis and X-ray crystallography. Compound **21** was found to have a highly oxygenated structure somewhat similar to the antimalarial drug, artemisinin. The possible oxidation processes for **17-18** and **20-21** with singlet oxygen were also proposed.

In the second project exploring unique metabolites from marine resources, we conducted structure elucidation and preparation of derivatives from four groups of organisms. Structures of two sesquiterpenoids **24** and **25**, originally isolated by a former lab member from the nudibranch *Phyllidiella pustulosa*, were revised after precise spectral analysis. In a study aimed at making molecular probes from halichondramide (**34**), the remaining configuration at C-5 of halishigamide A (**35**) was determined and cytotoxicity of analogues were evaluated. The structures of two new steroid sulfates **47** and **48**, isolated from a red calcareous bryozoan *Calypsotheca* sp. collected in the mesophotic coral ecosystems (MCEs), were characterized. In addition, the structure of a new sesquiterpenoid **66** from a soft coral *Xenia* sp. was elucidated.

For the third project, I participated in two studies on biodiversity of two groups of marine organisms. Collaborating with American researchers, I contributed to their molecular networking study on the cembrane-class diterpenoids from the soft coral *Sarcophyton glaucum*. Chemical and genetic diversity of nudibranchs of the genus *Phyllidiella* was analyzed, following the results of three former students. By obtaining MS/MS data on isolated sesquiterpenoids **82-99**, the diversity of the nudibranchs was analyzed using GNPS.

In the last project, I examined the presence of gene clusters for terpenoids from the sponge *Luffariella variabilis* which is known to contain the sesterterpenoid, manoalide (**128**). After preparing metagenomic DNA from the specimen, it was submitted to next generation sequencing with MiSeq. The assembled contigs were analyzed with the database antiSMASH and several possible biosynthetic genes were identified.