Isolation and identification of the antibacterial compounds from the marine bacterium TSI-5

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Introduction

A marine bacterium strain TSI-5 was isolated from marine sponge, which was collected from Dongsha Atoll, Taiwan (**Fig. 1**). The strain TSI-5 showed apparent antibacterial activity against the pathogen indicators, *Staphylococcus aureus* and *Candida albicans*, in which it showed more active against *S. aureus* than *C. albicans*. By processing the partition by methanol and hexane, two layers were gained and the antibacterial assay of them were done. The activity of the hexane layer showed much stronger than that of the methanol layer against two pathogen indicators (**Fig. 3**). TLC analysis of both layers showed several different compounds and TLC-bioauthographic analysis indicated that only specific spots show the antibacterial activity (**Fig. 4**). We are doing the isolation of the active spots from these organic layers of the marine bacterium strain TSI-5 (**Fig. 5 and 6**).

Background

Since the diversity and environmental conditions in an atoll are quite different from those in other ecological systems, microorganisms in such unexpected microbial biodiversity have adapted to survive and conquer the potential competitors in the harsh environments. Thus, they can produce certain natural products (NPs) with unique skeletons through their specialized metabolism, of which some can be potential activity to inhibit microbial competitors in their living environment. These microbial NPs are also regarded as an important resource for biotechnological and pharmaceutical applications. On the other hand, searching new antibiotics is necessary to counteract the spread of multi-drug resistant pathogens. Therefore, the exploitation of the potential chemical principles from unexplored microbial biodiversity, such as marine bacteria, marine-derived fungi might lead to the discovery of new antibiotics.[1]

Method

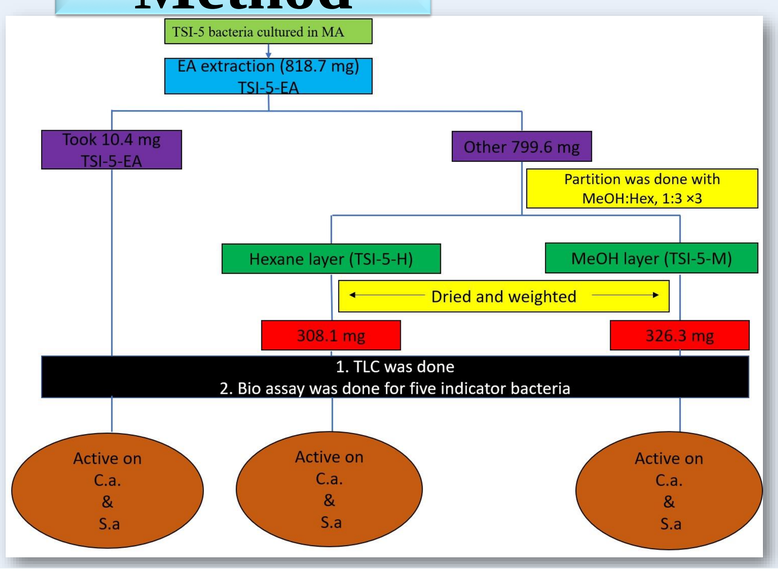

Figure 1: TSI-5 bacteria cultured in a MA plate

Preliminary antibacterial assay

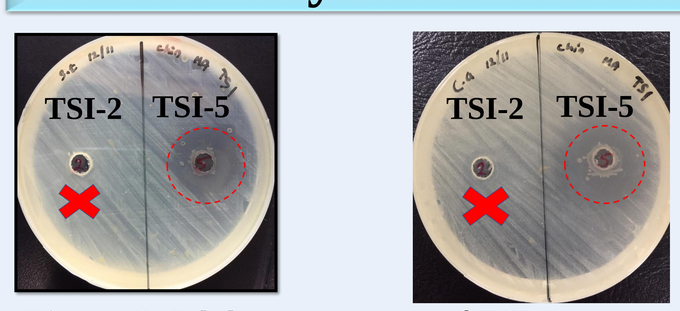

Figure 2: Inhibitory activity of TSI-5 against *S. aureus and C. albicans*

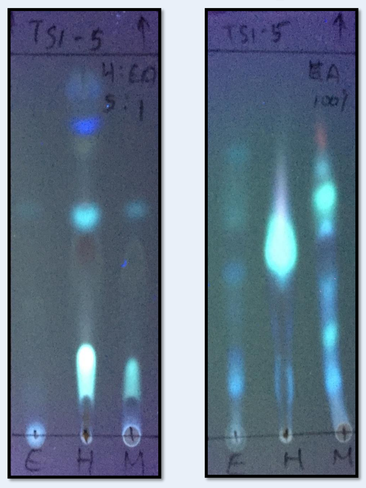

Figure 5: Normal phase TLC for EA, hexane and methanol layers accordingly

Figure 3: Antibacterial assay of hexane and methanol layers of TSI-5-EA against the pathogen bacteria *S. aureus* (A), *C. albicans* (B), *E. coli* (C), *A. baumannii* (D), *S. Typhimurium* (E)

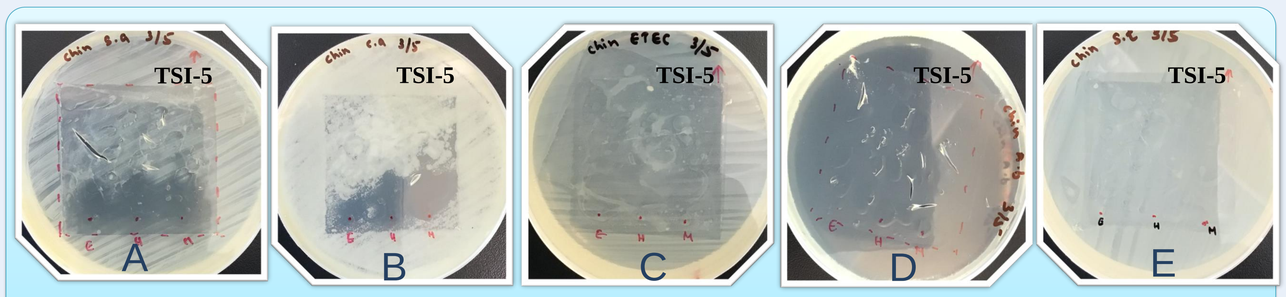

Figure 4: TLC-bioauthographic analysis for hexane and methanol layers of TSI-5-EA against the pathogen bacteria *S. aureus* (A), *C. albicans* (B), *E. coli* (C), *A. baumannii* (D), *S. Typhimurium* (E)

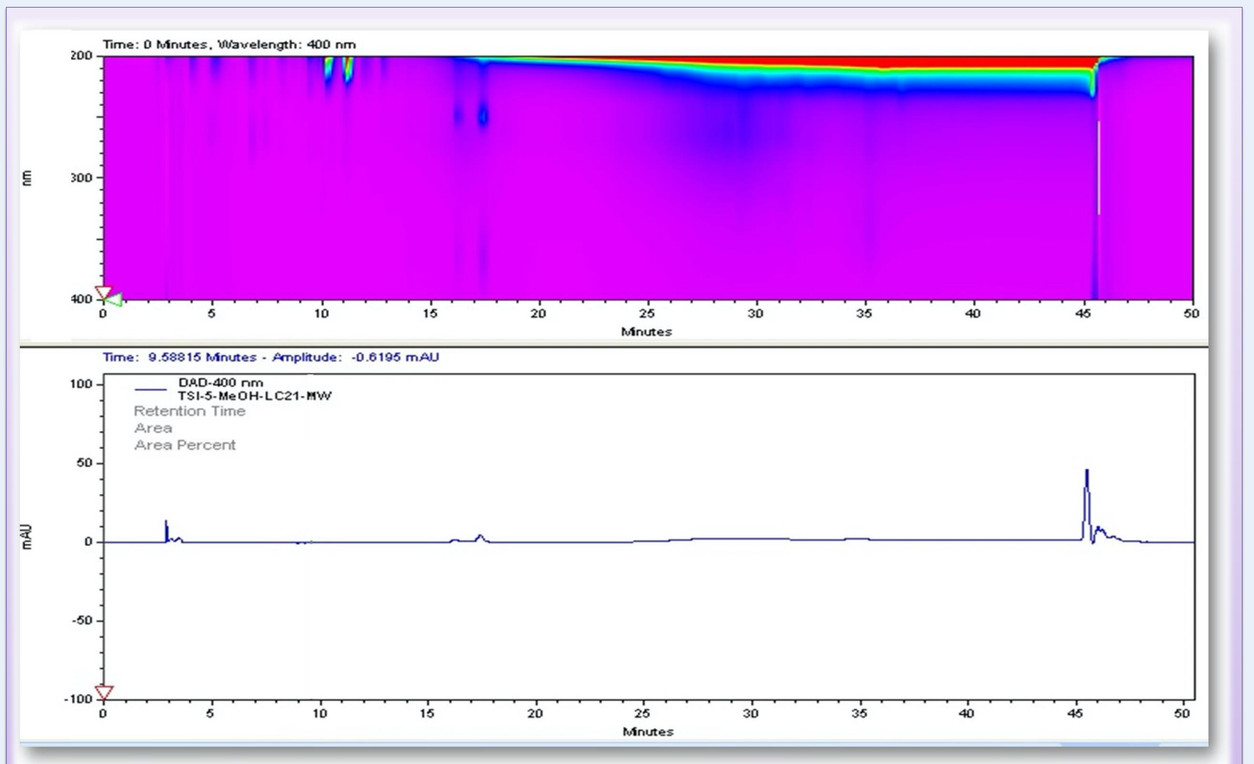

Figure 6: HPLC profile for the Methanol layer of the marine bacterium TSI-5 using gradient system of water and methanol as the solvent system

Future work

- Isolating the bioactive spots from these organic layers, identifying and elucidate the structures of the compounds in the bioactive extract of the marine bacterium TSI-5

References

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3. Penesyan, A., et al. Identification of the Antibacterial Compound Produced by the Marine Epiphytic Bacterium Pseudovibrio sp. D323 and Related Sponge-Associated Bacteria. *Marine Drugs*, 9(8), pp.1391-1402.