

# **Antibacterial and anti-biofilm activities of naturally and synthetically obtained chemical constituents against gram-positive and gram-negative biofilm forming bacterial pathogens**

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## **Abstract:**

Marine organisms are taxonomically diverse yet unique, hence they are considered as a reservoir of potential bioactive secondary metabolites. The emerging rate of antibiotic resistance of pathogens is big thread to mankind, because biofilm formation assists as an obstacle that notably decreases the permeation of drugs into the biofilm and caused several health diseases and importantly, biofouling in submerged surfaces as well. This study is aimed to search new antimicrobial and antibiofilm agents from marine resources by the established bioassays of antimicrobial activity and anti-biofilm formation. Preliminary bioassay data suggest, the presence of target metabolites in the tested crude extracts. Furthermore, we employ chromatographic and spectroscopic techniques to isolates ten bromopyrrole compounds including two new and eight known from EtOAc extract of *Agelas* sp. sponge and four known metabolites from EtOAc extract of *Spongia* sp. sponge. On the other hand, we also synthesized six analogues of naturally occurring bioactive  $\alpha$ -pyrones. Our results showed that synthetic analogues of  $\alpha$ -pyrones and naturally obtained metabolites from EtOAc extracts of marine sponges (*Agelas* sp. and *Spongia* sp.) are structurally diverse and interestingly, possesses a vast range of antimicrobial and antibiofilm activities against gram positive and gram negative marine and hospital acquired biofilm forming bacterial pathogens.

**Key words:** Marine resources, secondary metabolites, biological activities