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Antimicrobial activity of bacteria isolated from Red Sea marine invertebrates

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Highlights

- Revealing the biodiversity of Red Sea marine invertebrates associated microorganisms by 16S rRNA sequence analysis.
- Isolation of bacteria and actinomycetes with antimicrobial activity from different Red Sea invertebrates.
- Detection of biosynthetic gene clusters (PKS and NRPS) in bacteria and actinomycetes associated with the Red Sea marine invertebrates.

Abstract

Marine invertebrates-associated microorganisms were considered to be important sources of marine bioactive products. This study aims to isolate marine invertebrates associated bacteria with antimicrobial activity from the Red Sea and tests their biosynthetic potential through the detection of PKS and NRPS gene clusters involved with the production of bioactive secondary metabolites. In this respect, fifty bacterial strains were isolated from eight different Red Sea marine invertebrates and screened for their antimicrobial activity against standard pathogenic bacteria (*Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, *Bacillus subtilis* ATCC 6633) and yeast (*Candida albicans* ATCC 10231) using the standard well diffusion assay. Five isolates showed antifungal activity against *Candida albicans* with no activity recorded against other pathogenic bacterial strains. On the other hand when these isolates were screened for the presence of biosynthetic gene clusters (PKS and NRPS) by PCR using five sets of degenerative primers, 60 % of the isolates were shown to contain at least one type of PKS and NRPS gene clusters, which indicates the biosynthetic potential of these isolates even if the isolates didn't express any biological activity in vitro. Moreover the 16S rRNA molecular

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