

Molecular - bioassay methods : complementary approaches for development and evaluation of anti infective marine product

ABSTRACT

The current trends in drug development employ biotechnological approach to expedite effective drugs discovery program. Molecular biotechnological approach, in combination with bioassay, is practical in attaining effective drugs since the two platform methods complement each other by target identification, as well as compound screening, profiling and validation. The research on antimicrobial properties of marine products, targeting membrane function through membrane permeabilizing ability, has been carried out using molecular- and cellular-based approaches. The molecular approach for the screening of membrane permeabilizing peptide gene in local marine organism was found to successfully amplify a conserved gene sequence of the antibacterial peptide gene. Bacterial membrane permeabilizing ability of the methanolic extract was indicated through alteration of mRNA nucleotides, genes coding for membrane development in *Staphylococcus aureus* (MRSA) and the non-methicillin resistant strains. The alteration of nucleotides affected the transportation of lysine to the phospholipid bilayer of bacterial membranes, resulting in incomplete membrane structure, eventual lysis and cell death. Through cellular approaches, the methanolic extract of marine organisms affecting membranes of *S. aureus*, were confirmed. In specific, the extract showed a good inhibitory activity against *S. aureus* through plate and tube methods, and the cellular assay illustrated the penetration of fluorescence dye in treated bacterial pathogens, similar to the pathogens treated with positive antibiotic controls. The research constitutes a scientific advancement in the field of medical treatment of drug resistant bacteria and a forefront study of drugs discovery program focusing on drugs target genes.

Keyword: Membrane permeabilizing; Drugs target; Antibacterial peptide gene