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Antibacterial activity of microalgae and medicinal plants against common bacteria causing diseases in fish, shellfish, canine and poultry

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Rapid growth of antimicrobial resistance is a major threat to human and animal health, and development of new drugs with effective microbicidal properties are in demand to the scientific communities. Cyanobacteria and medicinal plants inherit antimicrobial, antioxidant, anti-cancerous and anti-inflammatory properties. In the current research, we investigated antibacterial potential of crude ethanolic extracts from marine microalgae (*Chlorella* sp. and *Spirulina* sp.) and medicinal plants (*Aloe vera* and *Clinacanthus nutans*) against pathogenic bacteria isolated from chicken, dog, fish, and shellfish. Bacteria including *Salmonella* sp., *Aeromonas* sp. and *E. coli*, *Vibrio* sp. *Streptococcus* sp. and *Staphylococcus* sp., were isolated through colony morphology, Gram staining and VITEK-2 tests. Antibacterial activity was determined by disc diffusion assay. *Spirulina* sp. showed the highest inhibition zone of 19.3±0.58 mm against *Vibrio* sp. compared to other treatments, whereas *Chlorella* sp. exhibited maximum inhibition zone of 11.41±0.65 mm against *Staphylococcus* sp., *C. nutans* had antibacterial activity against *Staphylococcus* sp. and *E. coli* with the maximum zone of inhibition (14.21±1.08 and 15.10±0.21 mm), whereas *Aloe vera* against *E. coli* and *Vibrio* sp. with significant inhibition zone of 14.04±0.90 and 15.36±1.11mm, respectively. Minimum inhibitory concentration (MIC) of *Chlorella* sp. was found to be 20 mg/mL against all the test bacteria. *Spirulina* sp., *Aloe vera*, and *C. nutans* had MIC values ranging from 20-40 mg/mL. These findings highlight the antibacterial potential of native microalgae and medicinal plants against virulent bacteria that poses significant threats in poultry, canine and aquaculture.

Keywords: *Aloe vera*, Antibacterial sensitivity, *Chlorella*, *Clinacanthus nutans*, Sabah snake grass, *Spirulina*