

An evaluation antibacterial activity of nanoparticles synthesised using mangrove Extract¹Vorobyova Gerhart, Department of Microbiology, College of Dental Science, Ghana²Vasyliiev Skyla, Department of Microbiology, College of Dental Science, Ghana**Correspondence Author:** Vasyliiev Skyla, Department of Microbiology, College of Dental Science, Ghana.**How to Cite This Article:** Vorobyova Gerhart, Vasyliiev Skyla, “An evaluation antibacterial activity of nanoparticles synthesised using mangrove Extract”, IJDSDR – March – April - 2023, Vol. – 2, Issue – 2, P. No. 06 – 09.**Open Access Article:** This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract**

Introduction: Mangrove is a shrub or small tree that grows in coastal saline water mostly. The term is also used for tropical coastal vegetation consisting of special species. Mangroves occur worldwide mostly in the tropics and subtropics, mainly between latitudes 25° n and 25° s. The total mangrove forest area of the world was 137,800 square kilometers spanning 118 countries and territories

Materials and methods: The fresh leaves were washed thoroughly with tap water then surface sterilized with 1% of hydrogen peroxide. Then the sample was macerated in mortar and pestle.

Results and discussion: The antibacterial activity of the rhizophora extract was analysed using two types of assays, namely disc diffusion method and minimum inhibitory concentration (mic) assay. The disc diffusion test was done for different concentrations for the

selected clinical isolates (klebsiella, streptococcus and vibrio).

Conclusion: From this study, we can conclude that has good antibacterial activity against these microorganisms (klebsiella, streptococcus and vibrio) and further studies can be done in future.

Keywords: Mangrove, Antibacterial, Diseases.

Introduction

Mangrove is a tiny tree or shrub that primarily thrives in salty coastal waters. The phrase is additionally used to describe tropical coastal vegetation made up of Unique species. Mangroves are found all throughout the world, primarily between latitudes 25° n and 25° s in the tropics and subtropics.

The world's mangrove forests cover an area of 137,800 square kilometers, which is spread throughout 118 countries and territories. In tidal areas, mangrove swamps are as mangrove environments support a large

food web based on detritus and serve as essential refuge, feeding, and nursing grounds.

A variety of therapeutically useful substances found in marine invertebrates have showed promise in the treatment of a number of diseases.

Ascidians have produced high-toxin compounds that can change the resting membrane potential but not the development of toxin-formed channels. Mangroves also transport nutrients to nearby marine habitats, including seagrass beds and coral reefs. The bioaccumulation of metals in mangroves and salt marshes showed the highest accumulation in the monsoon season, followed by other seasons, as a result of washing of land-derived wastes containing metals primarily from industrial and agricultural sites, domestic wastes, and weathering action caused by monsoonal floods.

There are often several different bacterial classes in the mangrove habitat. Despite often having low nitrogen levels, mangroves in coastal locations are quite prolific.

Endophytes have been isolated from the root nodules, leaves, stems, and fruits of numerous plant species. They are significant microorganisms that survive inside of plants without harming their hosts. The majority of isolated endophytic bacteria are discovered in two distinct mangrove regions in Brazil, on the branches of the two main species of mangrove plants, a vicennianitida (white mangrove) and rhizophora mangle (red mangrove).

Strep to myces-type actinobacteria in particular are important producers of bioactive auxiliary metabolites. It has becoming increasingly difficult to detect new antimicrobials from actinobacteria separated from typical soil after a considerable amount of screening.

An assessment of the state of research on marine actinobacteria that produce pharmaceutically useful secondary metabolites is presented in this review.

Marine actinobacterial bioactive substances have unique chemical structures that could be utilised to create novel drugs to combat diseases with resistance.

Material and methods

Collection of plant material and preparation

The fresh leaves were surface sterilised with 1% hydrogen peroxide after being thoroughly washed with tap water. The material was then ground up in a mortar and pestle.

Bacterial suspension

The pathogenic bacteria klebsiella pneumonia, streptococcus and vibrio cholera was collected from the department of microbiology, the bacterial pathogens were cultured in muller Hinton broth for 24 hr. at room temperature. From this bacterial suspension was prepared with saline and the optical density was measured at 600 nm. The concentration of microbial suspension was fixed as 10⁸ cfu/ml. 1ml of suspension was spread over on muller hint on agar plate and incubated for 24hrs at ambient temperature.

Antibacterial activity

The antibacterial activity of actinobacterial extract was performed with disc diffusion method. Whatman filter paper discs (5mm) were impregnated with various concentrations (0.5, 1, 1.5, 2, 2.5 and 3mg/ml) of leaf extract using ethanol and methanol solvent. The inoculated plates were incubated for 24 hr. at room temperature and the inhibition zones around the discs were measured. All the results were expressed from an average of three with standard deviation.

Minimum inhibitory concentration

Minimal inhibition concentration of actinobacterial extract on ethanol and methanol was determined in 5 concentrations (0 -50 µg/ml / 0.001 to 0.1 mg /ml) with blank (extract in muller hint on broth). The inoculated

bacteria in test tubes are incubated for 24hr in ambient temperature then the optical density was observed.

Results

The antibacterial activity of the rhizophora extract was analysed using two types of assays, namely disc diffusion method and minimum inhibitory concentration (mic) assay. The disc diffusion test was done for different concentrations for the selected clinical isolates.

Discussion

Overall gram-positive microorganisms are viewed as more delicate than gram-negative microscopic organisms towards various antimicrobial mixtures on account of the distinction in the design of their cell dividers yet our outcome showed that the concentrates are successful against both gram-positive and gram-negative microbes. Previous research suggests that the unsaturated fat methyl ester concentrations of e. Agalloch leaves possess important antibacterial properties. Antimicrobial properties of substances are alluring apparatuses in the control of undesired bacteria, especially in the treatment of contaminations and in the treatment of food waste. The dynamic constituents of plants generally meddle with development and digestion of microorganisms in a negative .in the previous study, ethanol removal showed the presence of a few phytochemicals, making it more dynamic against bacterial strains in contrast with the fluid concentrate. The current study discovered more inhibition of staphylococcus aureus by ethanol concentrate of r. Mucronata and e. Agalloch a leaves. Screening revealed the antibacterial movement of chloroform unrefined concentrate and segment fractionated compounds from leaves of e. Agalloch and uncovered that contrasted with the unrefined con cent rate, segment fractionated compounds were more dynamic against s. Aureus and s. Pneumonia. albeit in his investigation, no endeavor was made with unadulte

rated concentrates, very encouraging outcomes were gotten against the mdr strains of staphylococcus aureus and salmonella typhi. The potential for using marine resistant actinobacteria to treat radionuclides was discovered in previous research. The morphing of big functional categories of organic pollutants that have been handled. Interactions between radionuclides and marine actinobacteria were also confirmed using actinobacterial cells. other studies like antibacterial activity, antifungal activity, anti-inflammatory activity on both marine as well as using nanoparticles from plant extracts are done.

Conclusion

This study examined the associated actinobacteria strep to myces species and came to the conclusion that it exhibited strong antibacterial activity. Sub sequent research can be conducted by separating out each component and examining it for different properties such as anti-fungal, antioxidant, and insecticidal activity. These findings can be used to improve the property and for medicinal purposes by comparison with other actinobacterial species.

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