

RESEARCH PAPER

Study on antibacterial activity of root extract from mangrove plants

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ABSTRACT

The antibacterial activity of the roots of mangrove plants, *Avicennia marina*, *Bruguiera cylindrica*, *Exoecaria agallocha* and *Salavadora persica* was evaluated against Gram positive and Gram negative pathogenic bacteria including Gram positive nonpathogenic spore bearer *Bacillus* species. Soxhlet extracts of petroleum ether, methanol, chloroform and water were prepared and assessed for the antibacterial activity using agar diffusion method. All of the plant extracts showed promising antibacterial activity against Gram positive pathogenic bacteria and spore bearer non pathogenic *Bacillus* species too. All methanol extracts showed inhibition against Gram positive bacteria while some extracts of petroleum ether gave inhibition against gram positive organisms except *Bruguiera cylindrica* and *Salavadora persica*. However, only the chloroform root extract of *E. agallocha* exhibited antibacterial activity against both Gram negative and gram positive bacteria. None of the aqueous extracts exhibited inhibition against any of the bacterium tested. The root extract of *Exoecaria agallocha* in chloroform was characterized using TLC which revealed the presence of alkaloids and saponins.

Key Words : Antibacterial activity, Zone of inhibition, Mangroves, Soxhlet extraction

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Mangroves are the characteristic intertidal plants distributed in tropical and subtropical coastlines which create a unique ecological environment that is composed of rich assemblages of species being a valuable source of useful metabolites for medicinal usage (Chapman, 1976; Lin, 1984; Tomlinson, 1986). Mangroves produce from their trunks aerial roots that become embedded in the mud and form a tangled network, this serves both as a prop for the tree and as a means of aerating the root system. Such roots also form a base for the deposit of silt and other material carried by the tides, and thus land is built up which is gradually invaded by other vegetation. The mangrove forests also can protect inland coastal areas by absorbing the effects of storm and some tsunami waves. Mangrove plants are a rich source of steroids, triterpenes, saponins, flavonoids, alkaloids and tannins (Agoramoorthy *et al.*, 2007; Bandaranayake, 1995, 2002).

Extracts from *Rhizophora* and *Avicennia species* have been used for making tonics, wines and fruit drinks. The leaves, fruits and seeds of *Avicennia marina* have been used as vegetables. Bark of red mangrove trees have been used in folk remedy for a wide array of diseases (Duke and Wain, 1981; Morton, 1981). Headaches, snakebites, wounds, boils and many more conditions are traditionally treated with mangrove plants *e.g. A. illicifolius*. Skin disorders and sores, including leprosy, may be treated with ashes or bark infusions of certain species *e.g. Lumnitzera racemosa*. Root, leaf and stem extracts of *Rhizophora* trees have inhibitory properties, affecting the growth of various human pathogenic organisms. Among these are bacteria, fungi and viruses (Hernandez *et al.*, 1978). They have also antihelmintic, antifeedant, molluscicidal, and pesticidal properties (Kokpol *et al.*, 1984; Chandrasekaran *et al.*, 2009). Extracts from *Avicennia marina*

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