

**STUDY ON THE EFFECTIVENESS OF  
ANTIBACTERIAL EFFECT IN SELECTED  
MANGROVE EXTRACTS AGAINST FISH  
PATHOGENIC BACTERIA**

A dissertation submitted to the  
Faculty of Animal Science and Export Agriculture  
Uva Wellassa University  
in partial fulfillment of the requirement of  
the degree of  
Bachelor of Aquatic Resources Technology

By

**SUBHANI HARSHANI KUMARI BOKALAWELLA**

**Aquatic Resources Technology Degree Programme  
Faculty of Animal Science and Export Agriculture  
Uva Wellassa University  
2013**

## ABSTRACT

Mangrove plants and their major chemical classes were reported to possess biological effects. Therefore it is worth to screen mangrove plants extracts for the presence of new antibacterial compounds. Bacterial pathogens which affect aquatic animals and humans become resistant to antibiotics due to long term exposure. This study focused on the antibacterial efficacy of six species of mangroves (*Avicennia marina*, *Lumnitzera racemosa*, *Bruguiera sexangula*, *Acanthus ilicifolius*, *Rhizophora mucronata*, *Excoecaria agallocha*) against four pathogenic bacteria, *Pseudomonas fluorescens*, *Pseudomonas aeruginosa*, *Shigella flexneri* and *Listeria monocytogenes*. Most effective inhibitory activity shown mangrove plant was evaluated again by using its different parts. Mangrove parts extracts were obtained using 95% methanol as a solvent and the final compound was methanol free due to evaporation. Antibacterial susceptibility tests were carried out by using well diffusion assay method. The results were compared with Tetracycline as the positive control and solvent without extract as a negative control. Mangrove leaves extracts were effective against all bacterial pathogens tested except *Shigella flexneri*. It was resistant against Tetracycline and moderately susceptible for all mangrove leaves extracts (7.4 mm – 12.3 mm). The tested mangrove leaves extracts were effective against aquatic bacterial pathogens used ( $p < 0.5$ ) *in vitro*. *Rhizophora mucronata* parts extracts (root, bark, fruit and flower) also exhibited positive inhibition zones for all the tested bacterial species cultured *in vitro* ( $p < 0.5$ ). *Rhizophora* leaf, root and bark extracts possessed higher antibacterial potential when compared to the fruit and flower extracts. *Rhizophora* leaf extracts showed highest inhibition for *Listeria monocytogenes* ( $18.8 \pm 1.04$ ) and *Pseudomonas fluorescens* ( $17.8 \pm 0.41$ ) while root and bark extracts were effective against *Shigella flexneri* ( $15.0 \pm 0.88$ ) and *Pseudomonas aeruginosa* ( $16.1 \pm 0.51$ ) respectively. *Rhizophora* root extract has MIC value of ( $15 \text{ mgml}^{-1}$ ) against *Listeria monocytogenes* and ( $25 \text{ mgml}^{-1}$ ) against *Pseudomonas aeruginosa*. The results provided evidence that, the mangrove extractions of *Rhizophora mucronata* have antibacterial activity, particularly in the leaf extract, which can be used to treat aquatic bacterial pathogens as an environmental friendly natural compound.

**Key words:** Antibacterial resistance, Fish bacterial pathogens, Mangroves extracts, Minimum Inhibitory Concentration, *Rhizophora mucronata*.