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**The Thesis Submitted for the Degree of M.Sc  
(in the field of Fisheries Science)**

***In vitro* antibacterial effects of plant  
essential oils on *Vibrio*  
*parahaemolyticus*, *Vibrio harveyi*,  
*Vibrio damsela* and *Yersinia ruckeri*  
*bacteria***

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## Abstract

For the charges effect of chemical drugs and limit their use, disposition use of medicinal plants has increased. With the expansion of aquaculture, the occurrence of bacterial disease is inevitable and in this study the effects of antibacterial essential oils of *Mentha* (*Mentha spicata*), cloves Hindi (*Eugenia caryophyllata*), *cuminum cyminum* and *Rosmarinus officinalis* on the bacterium, *Vibrio*, *parahaemolyticus* *Vibrio harveyi*, *Vibrio damsela* and *Yersinia ruckeri* been studied. Broth dilution method (Broth Micro-dilution) for determining the Minimum Inhibitory Concentration (MIC) used, and then by MIC, Minimum Bactericidal Concentration (MBC) was determined for each extract. In order to compare the effects of essential oils, the diameter of bacterial growth obtained by the disk diffusion method (Disk diffusion) were used. The results showed that *Vibrio harveyi* bacteria were more resistant than other and clove essential oils has a high power to inhibit bacteria. The lowest MIC and MBC is respectively 2 and 4 mg/ml for *Eugenia caryophyllata* and *Mentha spicata* against *Vibrio parahaemolyticus* and the highest MIC and MBC respectively were 8 and 16 mg/ml for *Mentha spicata* and *cuminum cyminum* essence against *vibrio harveyi*. The maximum diameter of bacteria inhibition zone is 12 mm for *Eugenia caryophyllata* essence against *Vibrio Damsla* bacteria. *Rosmarinus officinalis* was the low power of lethal bacteria. . On the basis of investigation, we can say, *E. caryophyllata* could be used as a source of new antibacterial agent for developing drugs to inhibit some fish pathogenic bacteria.

Key words : *Vibrio harveyi*" *Eugenia caryophyllata*" antibacterial"  
Minimum inhibitory concentration" Broth Micro-dilution