I. INTRODUCTION

Marine bacteria are normal biota of the marine ecosystems and are found in various environmental niches such as marine sediments, open oceans and other marine surfaces including marine living organisms (Wilson and Stevenson, 1980; Nair and Simidu, 1987; Austin, 1992). Over the past decade, microorganisms have been recognized as an important and untapped resource for many unique novel bioactive compounds of clinical significance (Rosenfeld and Zobell, 1947; Grein and Meyers, 1958). Majority of such compounds that have found wide applications are basically isolated from terrestrial sources. However, microorganisms isolated from various marine sources are known to synthesize unique metabolites that are totally different from the terrestrial counterparts. In recent years marine bacteria are becoming a major source for several novel biologically active compounds (Fenical, 1993 and 1997; Kelecom, 1999).

All organisms in nature compete with each other for their survival in their biological niches. This survival strategy is very well established in the case of microorganisms. Such survival mechanisms are achieved by the production of toxin, inhibitory enzymes and several antimicrobial agents that inhibit the growth of the other bacteria in their surrounding habitat. Such inhibitory compounds are generally secondary metabolites and are synthesized primarily for their survival against the other microorganisms (Rosenfeld and Zobell, 1947; Grein and Meyers, 1958). These secondary metabolites however exhibit several important properties including antibacterial, anticancer and antitumor properties. Some of these secondary metabolites are also the main source for many antibiotics. These antibiotics are chemical compounds that can inhibit the growth or kill the bacterial cell (Gillespie, 2002) exhibiting various modes of antibacterial action. Generally they interfere with biological processes of microorganisms such as replication, protein and cell wall synthesis (Gardener et al., 2000). Thus marine bacteria represent certainly a great potential
reservoir for such scientific investigations and the reports on the antibiotics and other novel metabolites from marine sources are scarce (Ruiz-Ponte et al., 1999).

Antibiotic production by marine bacteria has been reported in some of the early works (Rosenfeld et al., 1947; Baam et al., 1966). Many of the earlier reports on novel secondary metabolites were on isolation of low molecular weight antibiotic compounds from various marine bacteria (Faulkner, 2002). Terrestrial bacteria synthesize several antibiotic proteins known as bacteriocins and many of them are well characterized. Similarly marine bacteria are also excellent source of various antibiotic proteins and polypeptides such as the nisin and subtilin (Tagg et al., 1976; Klaenhammer, 1988). Antibiotic proteins were also isolated from Alteromonas strains with a molecular mass of approximately 100 kDa (McCartney et al., 1994). Similarly an oligomeric protein with a mass of 190-kDa was isolated from an unidentified biofilm-forming marine bacterium D2.

One of the ways of discovering novel bioactive metabolites from marine microorganisms is through the isolation of new microorganisms. But the research over the years has demonstrated that only less than ten percent of the micro-organisms are cultivable and among them only about one percent have been found to have industrial and clinical importance (Hawksworth, 1991; Whitman et al., 1998).

The development of resistance to drugs by pathogenic bacteria is a major concern in the field of medical science in recent days. The overuse of antibiotics has caused an increase of multiple drug resistant organisms mainly that belong to the genera Pseudomonas, Acinetobacter, Streptococcus and Staphylococcus (Breiman et al., 1994; Goldman et al., 1996 and Chitnis et al., 2000). Microorganisms develop resistance to antibiotics because of mutations caused in their genome and by incorporating foreign genomic material like plasmids. Some of these strains are resistant to most used antibiotics, including methicillin, cephalosporins, and other beta-lactams that target peptidoglycan synthesis. Others have
gained resistance toward neomycin and streptomycin which attack the bacterial ribosome. Some of the strains of *Mycobacterium sp* that cause tuberculosis (TB) have been reported to be resistant to drug treatment. This is an event of great concern for the medical community since pathogenic organisms are becoming resistant to a large quantity of antibiotics. However the yield of novel metabolites is also decreasing and new sources of bioactive natural products must be investigated (Iwai and Takahashi, 1992). Isolation of new bacterial strains is being attempted using particular habitats and various techniques to screen for new bioactive compounds. Hence considerable research is necessary in order to find new chemotherapeutic agents from marine bacteria. Against this background the study was conducted to isolate microorganisms that produce antimicrobial compounds and to characterize the compound. The objectives of the present study are as follows.

1. Isolation and screening of marine bacteria for antimicrobial activity.

2. Extraction and purification of bioactive molecules produced by the bacteria with antimicrobial property.

3. Identification of bioactive molecules from crude extracts prepared from the marine organisms.