1. INTRODUCTION

Infectious diseases caused by the microorganisms are the major cause of morbidity and mortality throughout the world (WHO, 2004). Synthetic drugs are not only more expensive and inadequate for the treatment of microbial diseases but are also often with unwanted adulterations and adverse side effects. Therefore, in the present situation we are in need to search for new infection combating strategies to control microbial diseases (Sieradzki et al., 1999). Pharmaceutical industries are giving importance to the biologically active compounds which were derived from the traditional sources like soil & plants and less traditional sources like marine organisms which includes micro and macro species (McGee, 2006). The marine biodiversity provides an important source of chemical compounds which have large number of therapeutic applications like antiviral, antibacterial, antifungal and anticancer activities (Pereira et al., 2004).

The marine environment representing 50% of the global biodiversity and it is an enormous resource for new compounds. Sea weeds or marine algae are potentially prolific sources of highly biologically active secondary metabolites that might represent useful leads in the development of new pharmaceutical bioactive compounds. Seaweeds are marine macro algae and primitive type of plants, growing abundantly in the shallow waters of sea and estuaries. In ancient times, seaweeds have been used as food, fodder, fertilizer and as source of numerous medicinal drugs. At present situation, marine macroalgae are the raw material for industrial production of agar, algin and carrageenan but they are widely consumed as food in various parts of Asian countries (Adaikalaraj et al., 2011).
Marine organisms possess various structurally unique natural products with pharmacological and biological activities (Faulkner, 2001; Da Rocha et al., 2001; Schwartsmann et al., 2001). Among the marine organisms, the macroalgae (otherwise called as seaweeds) occupy an important place as a source of biomedical compounds (Selvin and Lipton, 2004; Manilal et al., 2010). About 2400 natural products have been isolated from marine macroalgae which belonging to the classes of Rhodophyceae, Phaeophyceae and Chlorophyceae (Faulkner, 2001). The antimicrobial activity was regarded as an bioindicator to detect the potent promising pharmaceutical capacity of macroalgae for its synthesis of bioactive secondary metabolites (Gonzalez et al., 2001; Smit, 2004).

Marine macroalgae are floating submerged large algae of shallow marine meadow. Macroalgae are the most nutritious plants on earth, since they are low in fats but contain vitamins and bioactive compounds like terpenoids and sulphated polysaccharides and they offer a good source of useful chemicals like alginic acid, mannitol, laminarin, fucoidin and iodine (Kim et al., 1997). Consuming macroalgae as food has been a long tradition in the Pacific and in Western countries as a source of thickening and gelling agents (Nagai and Yukimoto, 2003). In folk medicine, macroalgae have been used in eczema, gallstone, renal trouble, scabies, psoriasis, asthma, arteriosclerosis, heart disease, ulcers and cancer (Burtin, 2003).

Macroalgae are multicellular, eukaryotic and autotrophic organisms lacking a specialized vascular system (Padua et al., 2004). They have traditionally been classified according to the presence of their photosynthetic pigments. Although, much new taxonomic information has become available. Universally macroalgae are widely found
throughout the marine and fresh water environments of plant, soils, snow, rocks and plant surfaces which gives appropriate amount of light and moisture conditions (Vidotti and Rollemberg, 2004).

Many seaweeds or macroalgae are known to synthesize bioactive secondary metabolites which have antimicrobial activities. There are numerous reports of compounds derived from macroalgae with a broad range of antibacterial activities (Magallanes et al., 2003; Freile-Pelegrin and Morales, 2004; Oranday et al., 2004, Manilal et al., 2010). Numerous substances were identified as antimicrobial agents from algae: chlorellin derivatives, acrylic acid, halogenated aliphatic compounds, terpenes, sulphur containing heterocyclic compounds, phenolic inhibitors, etc. (Espeche et al., 1984).

There is an increasing demand for therapeutic drugs from the widely diverse biological natural resources. At present, the potential contribution of marine macroalgae on the discovery of new biologically active molecules is remarkably increasing day-by-day (Skulberg, 2000; Sithranga and Kathiresan, 2010; Bhatnagar and Kim, 2010). Marine macroalgae are considered as an excellent source of biologically active compounds which has a broad range of biological and pharmacological activities (Tuney et al., 2006; Patra et al., 2008). Marine macroalgae comprises of various natural source of a wide variety of beneficial drugs which plays a major role in pharmaceutical industries, food industries and cosmetics based applications which includes carotenoids, terpenoids, steroids, amino acids, phlorotannins, phenolic compounds, halogenated ketones, alkanes and cyclic polysulphides (Taskin et al., 2007; Guedes et al., 2011). Therefore, the use of algae have been increased in traditional medicine (Fitton, 2006). Many bioactive compounds of
marine macroalgae with pharmacological activity have been isolated and some of them are still under investigation to protect the various infections including life style related diseases. Some of these compounds are sterols, terpenoids, polysaccharides, peptides, proteins, vitamins, acrylic acid, terpenes, chlorophyllides, phenols, heterocyclic compounds, halo-genated ketones and alkanes and cyclic polysulphides (Priyadharshini et al., 2011).

1.1. OBJECTIVES OF THE PRESENT STUDY

The present study was undertaken to assess the impact of certain marine macroalgae against pathogenic bacteria and fungi. Since there were paucity of information on the effect of different solvent extracts obtained from various marine macroalgae against the above said bacteria and fungi following objectives were assessed:

1) Collection of five different marine macroalgae (Sargassum wightii, Caulerpa racemosa, Acanthophora spicifera, Padina gymnospora and Turbinaria conoids).

2) Collection of pathogenic bacteria (Staphylococcus aureus, Streptococcus pyogenes, Bacillus cereus, Proteus mirabilis, Shigella flexneri, Escherichia coli, Pseudomonas aeruginosa, Vibrio cholerae, Salmonella typhi, Klebsiella pneumoniae and Enterobacter faecalis) and fungi (Mucor racemosus, Aspergillus niger, Aspergillus fumigatus, Rhizopus stolonifer, Candida albicans and Candida glabrata) from MTCC.

3) Powdering and soxhlet extraction of the collected marine macroalgae using various solvents viz., hexane, chloroform, ethyl acetate, acetone and methanol.

4) To study the antibacterial activity and minimum inhibitory concentration (MIC) of collected marine macroalgae.
5) To study the antifungal activity and minimum inhibitory concentration (MIC) of collected marine macroalgae.

6) To isolate the bioactive compounds from most promising marine macroalgae using GC-MS.