1. Introduction

“Nature itself is the best physician” – Hippocrates

Environment plays a key role in the evolution of human life. We are living in an era where globalization and advancement in science is going on side by side with the huge increase in population. Infectious diseases causes of morbidity and mortality among the population worldwide, especially in developing countries (Gowsiya et al., 2014). Since time immemorial human relied so much on plants for health and food needs. Thousands of higher plants and several hundred lower plants are currently being exploited by human beings for a medicinal purpose. Those plants that are widely used to treat diseases are called medicinal plants. Medicinal plants are generally considered as safe and provides valuable effect to human health (Anselem, 2004). In India, peoples follow the Indian system of medicine like siddha, Ayurvedha etc., which uses medicinal plants as a major element for treatment.

Modern medical system prepared plant based products based on the traditional knowledge. Human population now focusing towards natural medicine especially herbal medicine, which repairs and strengthen various systems of the body especially immune system and help to destroy pathogens without any toxic side effects (Bhuvaneswari et al., 2014). India is a land of rich biodiversity. Plants are the major biochemical factories and have been the components act as the restorative activities. Plants are directly used as medicines by a majority of cultures around the world. Modern medicine system uses about 25% of its medicine from medicinal plants. Studying medicinal plants help us to understand properties of plant metabolites and it uses for the human life.

*Mangifera indica* L. is the most popular fruit crop belongs to the family Anacardiaceae. Mango fruit is rockoned as the best among all indigenous fruits. All parts of the *M. indica* are commonly used in Indian system of medicine for a wide variety of remedies. Root, bark, leaves, seed kernel, flowers, unripe and ripe fruit are acid, coolent
and astringent to the bowels and have been employed to cure “vata”, “pitta” and “kapha”. Most of the parts of *M. indica* have also been employed traditionally for the treatment of leucorrhoea, dysentery, piles, bronchitis, biliousness, urinary discharges, throat troubles, vaginal troubles, cough, ophthalmic, eruption, asthma. It is also used as aphrodisiac, tonic, appetizer, beautifier of the complexion, laxative, diuretic, stomachic and antisyphilitic (Anonymous, 1962).

*M. indica* seed kernel (MISK) of this plant contributed about 17-22% of the fruit and not yet used for any commercial purposes. It is discarded as a waste. It is a fruitful source of phenolic compounds (Agarwal, 2005). Traditionally MISK is used to cure chronic diarrhoea, wound healing, to expel tapeworms and other worms in ulcer (Warrier, 1996). Mango seed kernel showed antidiarrhoeal activity, antioxidant activity and chelating activity (Maisuthisakul and Gordon, 2009). MISK is uses as antihelminthic. It is observed that people of India ate MISK in roasted form during starvation. Its powder is invoked as astringent in bleeding piles. MISK is also used along with honey to treat helminthic infections (Maisuthisakul, 2009).

Pharmacognosy is the study of medicine obtained from natural sources. It deals with standardization, authentication and study of crude drugs. Pharmacognosy has been done in identifying controversial species of plants, authentication of commonly used traditional medicinal plants through morphological, phytochemical and physicochemical analysis. The importance of pharmacognosy has been widely felt in recent times. Unlike taxonomic identification, pharmacognostic study includes parameters which help in identifying adulteration in dry powder form also. This is again necessary because once the plant is dried and made into powder form, it loses its morphological identity and easily prone to adulteration (Sumitra, 2014). Hence in this study pharmacognostic and physiochemical features of crude powder of MISK were done to understand its purity.

Communicable diseases are the main reason for morbidity and mortality among individuals (Nathan, 2004). There are different types of disease were caused to human.
There are four principal types of disease; they are pathogenic disease, deficiency disease, hereditary disease and physiological disease. Pathogenic diseases can also be classified as communicable and non-communicable. All these diseases are due to the action of microbes or its toxin and considered to be a major threat to human society. In recent days, pathogenic microbial diseases like gastroenteritis (diarrhoea, dysentery), peptic ulcer and metabolic disorders due to the form of stress, cancer etc., are frequently encountering humans. Different bacterial agents like *Escherichia coli*, *Klebsiella pneumoniae*, *Staphylococcus* sp, *Salmonella* sp and *Pseudomonas* sp, etc are mainly involved in respiratory and gastrointestinal infections. Some of the causative agents have the ability to survive in harsh condition owing to their multiple environmental habitats (Ahameethunisa et al., 2010). Most of these organisms possess multidrug resistance characters, which will be hard to cure. Hence in this study antimicrobial activity of the MDR isolates was assessed with MISKA E and MISKPE.

Diarrhoea is a symptom of frequent passage of semisolid or liquid faecal material through the gastrointestinal tract and involves both an increase in the motility of the gastrointestinal tract along with increased secretions and a decrease in the absorption of fluid and thus a loss of electrolytes particularly Na⁺ and water (Rang et al., 2003). It is one of the most clinical symptoms of gastrointestinal tract infection, but also can reflect primary disorders outside the digestive system. According the WHO, diarrhoea is one of the leading causes of mortality and morbidity in developing countries especially in children under five years, which kill around 1.8 million people globally each year (Anonymous, 2008). The major causative agents of diarrhoea in human include *Shigella flexneri*, *Escherichia coli* and *Salmonella* sp., (Toyin et al., 2012). Many synthetic chemicals such as codeine, loperamide, diphenoxylate, bismuth subsalicylate are available for the symptomatic treatment of diarrhoea whereas antibiotics are used for the reduction of microbial burden. These antibiotics have put at risk by the emergence of microbial resistance and symptomatic therapeutic agents create lots of side effects. The use of these chemicals is linked to side effects, including allergy, immune suppression, hypersensitivity, nausea, dry mouth abdominal discomfort and headache. To
overcome the problems of current therapy and there is a need of new antidiarrhoeal agent from a natural source. Hence *Mangifera indica* seed kernel is screened for its antidiarrhoeal activity.

In India, 1.2% of total mortality is attributed to Peptic Ulcer Disease (PUD). The age adjusted Death Rate is 12.37 per 100,000 of population India is rank 5 in the world. Peptic ulcer is an excoriated area of the gastric or duodenal mucosa, it is a chronic and recurrent disease (Guyton and Hall, 2000). It is generally accepted that peptic ulcer is caused by a lack of equilibrium between the gastric aggressive factors and the mucosal defensive factors (Muralidharan and Srikanth, 2009). Different factor that causes the PUD are bacteria and some synthetic drugs. Ulcer is addressed with proton pump inhibitors and selective H₂ receptor blockers. However these create side effects and execute their action within a limit. Moreover, the recurrence of ulcer after stopping the medication is very high. To overcome these problems, drug from the nature is best. Hence MISK is selected and screened for antiulcer activity in experimental animals.

Antioxidants may reconcile their upshot by directing reaction with Reactive Oxygen Species (ROS), quenching them and or chelating the catalytic metal ions. Numerous synthetic antioxidants like BHA, BHT are commercially accessible but are perilous and their toxicity is a problem of disquiet. These drawbacks of existing available antioxidant agents necessitate the development of newer generation photogenic drugs. Natural antioxidants are safe and also bioactive. Therefore, in the current years, substantial attention has been directed towards credentials of plants with antioxidant ability that may be utilized for human expenditure (Aman et al., 2011). Hence it is very essential to develop some cost effective herbal drugs without or less side effects to combat the burning stress related problems. *Mangifera indica* seed kernel is selected and screened for its antioxidant power.

Cancer is an abnormal growth and proliferation of cells. It is a frightful disease because the patient suffers pain, disfigurement and loss of various physiological processes.
Cancer may be uncontrollable and incurable and may occur at any time at any age in any part of the body. It is caused by a complex, poorly understood interplay of genetic and environmental factors. It continues to be the largest cause of mortality in the world and claims over 6 million (Kameshwaran et al., 2012). Cancer kills annually about 3500 cases per million populations around the world. A large number of chemo preventive agents are used to cure various cancers, but they produce side effects that prevent their extensive usage. Although more than 1500 anticancer drugs are in active development with over 500 of the drugs under clinical trials, there is an urgent need to improve much effective and less toxic drugs (Umadevi et al., 2013). Need of this point the *Mangifera indica* may play the important role to overcome this problem.

Medicinal plants synthesize and produce a variety of biochemical’s, many of which are extractable and used as chemical feed stock or as raw material for numerous scientific investigations. Numerous secondary metabolites of plant are commercially important and find use in a number of pharmaceutical compounds. The biologically active phytochemical’s are normally present in leaves, root, barks, flower, stem etc. but the plant parts such as rind of the fruit seed and fruit shell etc. are normally treated as a waste and only a few reports is recorded in this part. Hence biopotential of *Mangifera indica* seed kernel is studied to understand the phytochemicals responsible for bioactivity.

Having known all these facts an attempt was made in this study to look for pharmacognostic, pharmacological and phytochemical potentials of *Mangifera indica* seed kernel with the following aim and objectives.