1. INTRODUCTION

Plants play an important role in the life of human, as the major source of food, as well as for the maintenance and improvement of health and for the elimination of the enemies since ages. Plants are the basic source of knowledge of modern medicine. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from them, many based on their use in traditional medicine. Medicinal plants have the capacity to produce a large number of organic phytochemicals with complex structural diversity known as secondary metabolites. Some of these secondary metabolites are produced for self defence. Over the last 20 years, a large number of secondary metabolites from different plant species have been evaluated for their antimicrobial, hepatoprotective, anti-inflammatory and anticancerous activities.

The demand on plant based therapeutics is increasing in both developing and developed countries due to the growing recognition that they are natural products, non narcotic, easily biodegradable, pose minimum environmental hazards, have no adverse side effects and are easily available at affordable prices. Sixty per cent of the world population and eighty per cent of the population in developing countries rely on traditional medicine for curing many diseases (Grabley and Thiericke, 1999; Ali-Shtayeh et al., 2000; Shrestha and Dhillion, 2003). The natural products form an integral part of human life from ancient civilizations to
the current century and more than half of the drugs in the market are natural products or derivatives of them.

The World Health Organization (WHO) estimated that about 80 per cent of the world's population still realise on plant-based medicines for their primary health care. This in fact is a clear indication of the role of medicinal plants in the maintenance of health and treatment of diseases as therapeutic alternatives throughout the world, still in the late 20th and early 21st century (WHO, 2002).

Indigenous herbal remedies are widely used against many infectious diseases, but only few of them have been scientifically investigated with their active components isolated and characterized (Otshudi et al., 2000). In modern medical practice, the alarming worldwide evidence of antibiotic resistance causes an increasing need for new compounds that can act either by a direct antimicrobial activity or by inhibiting resistance mechanisms of microorganisms of medical importance. Medicinal plants represent a valuable source for this kind of compounds (Hatano et al., 2005).

There has been a revival of interest in herbal medicines. This is due to the increased awareness of the limited ability of synthetic pharmaceutical products to control major diseases and the need to discover new molecular structures, as lead compounds, from the plant kingdom. The basic molecular and active structures for synthetic fields are provided by rich natural sources. The relatively lower incidence of
adverse reactions to plant preparations compared to modern conventional pharmaceuticals coupled with their reduced cost, is encouraging both the consuming public and national health care institutions to consider plant medicines as alternative to synthetic drugs (Kinsel and Straus, 2003).

Now-a-days, herbal drugs are prescribed widely even when their biologically active compounds are unknown, because of their effectiveness, minimal side effects in clinical experience and relatively low cost (Valiathan, 1998). Reports are also available on the use of several plant by-products, which possesses antimicrobial properties, on several pathogenic bacteria and fungi (Deans and Svoboda, 1990; Diker et al., 1991; Heisey and Gorham, 1992; De Pooter et al., 1995; Lis-Balchin and Deans, 1996; Hili et al., 1997). Much work has been done on ethano-medicinal plants in India (Maheswari et al., 1986; Rai, 1989; Negi et al., 1993).

The use of natural remedies for the treatment of liver diseases has a long history and medicinal plants and their derivatives are still used all over the world in one form or the other for this purpose. Scientific evaluation of plants has often shown that active principles in these are responsible for therapeutic success. A large number of medicinal plants have been tested and found to contain active principles with curative properties against a variety of diseases (Lewis et al., 1977).

The 21st century has seen a paradigm shift towards therapeutic evaluation of herbal products in liver disease models by carefully
synergizing the strengths of the traditional systems of medicine with that of the modern concept of evidence-based medicinal evaluation, standardization and randomized controlled clinical trials to support clinical efficacy (Thyagarajan et al., 2002).

India is a varietal emporium of medicinal plants and is one of the richest countries in the world with regard to genetic resources of medicinal plants. The agro-climatic conditions are favourable for introducing new exotic plant varieties (Mahesh and Satish, 2008). Many infectious diseases are known to be treated with herbal remedies throughout the history of mankind. In India, herbal medicines have been the basis of treatment and cure for various diseases in traditional methods practiced such as Ayurveda, Unani and Siddha (Sukhder, 1997). Most of the medicinal plants contain tannins, gallic acid, quinine, flavonoids and alkaloids. Phytochemicals have an enormous therapeutic potential to heal many infectious diseases (Iwu et al., 1999).

Liver injuries are a major worldwide health problem. A high endemicity in developing countries is mainly caused by chemicals and drugs like paracetamol, excess consumption of alcohol, contaminated food, infections and auto immune disorders. Among the chemical damages, excess consumption of alcohol is one of the main causes of the end stage of liver diseases.

Over consumption of alcohol affects the liver causing both nutritional disturbances and damaging liver cells which leads to alcoholic liver disorders (Bouoneva et al., 2003).
The spectrum of alcoholic liver disease ranges from fatty liver to alcoholic hepatitis and ultimately fibrosis and cirrhosis (Tuma and Sorrell, 2004). However, alcohol consuming plays an essential role in the development of drug induced liver injury in the patient. Likewise, the increasing prevalence of multi drug resistant strains of bacteria and the recent appearance as strains with reduced susceptibility to antibiotics leads to the emergence of untreatable liver infections and the need to search for new antibiotics (Sieradzki et al., 1999; Tomoka et al., 2002).

On a global basis, at least 130 drugs, all single chemical entities extracted from higher plants are modified further synthetically and are currently in use (Newman et al., 2000 and Westh et al., 2004). A wide range of medicinal plant parts is used in the preparation of extract as raw drugs and they possess varied medicinal properties. The different parts used include root, stem, flower and leaves. Although hundreds of plant species have been tested for hepatoprotective properties, the vast majority of species have not been given positive consequences. Systematic investigation was undertaken to screen the hepatoprotective properties of selected medicinal plants against liver damages.

To overcome this problem, bioactive compounds without side effects have to be identified from the medicinal plants. Large number of plants shown to exhibit biological and pharmacological effects belonging to a number of families including Zingiberaceae (Al-Yahya et al., 1990; Yamahara et al., 1990; Rafatulla et al., 1995), Celastraceae (Souza-Formingoni et al., 1991), Asteraceae (Alareon de la Lastra et al., 1994),
Caesalpiniaceae (Noamesi et al., 1994), Aizoaceae (Akhtar and Ahamad, 1995), Combretaceae (De Pasquale et al., 1995), Apocynaceae (Hussain and Gorsi, 2004) and Rhamnaceae (Borgi et al., 2007) have been studied in detail.

Among the various number of plants, the members of Rutaceae and Asteraceae are widely and abundantly distributed in this part of the world exhibit various biological and pharmacological activities. Only a few members have been studied for the pharmacological activities. Plants such as *A. marmelos* and *E. prostrata* are commonly used for various ailments.

*Aegle marmelos* (L.) Corr., belongs to the family of Rutaceae, and is popularly known as Bael tree (Gamble, 1935; Mathew, 1983). In Hindu mythology, leaves and wood of *A. marmelos* are used to worship Lord Shiva. This is a sacred tree amongst the Hindus. This tree is commonly found in Hindu temples. It is considered to destroy it; enormous quantities of the leaves are gathered for use during ritual ceremonies. In ancient times, it is frequently alluded to as an emblem of fertility (Jain and Sastry, 1979). The Hindu physicians have regarded the unripe or half ripe fruit as astringent, digestive, and prescribe it for stomach pain, diarrhoea and dysentery (Bakhru, 1997).

The root bark is used as a remedy in hypochondrias, melancholia and palpitation of the heart. The fresh juice of the leaves is taken with honey as laxative and used in asthmatic complaints. The small unripe fruit is consumed with fennel seeds and ginger in decoction for piles
(Kamalakkannan and Prince, 2005). The plant reported to have multiple therapeutic properties such as anti-inflammatory, antipyretic (Modi et al., 2012) and analgesic (Santhosh, 2013).

Eclipta prostrata (Eclipta alba) Hassk., commonly known as False Daisy, yerba de tayo and bhringraj, is a plant belonging to the family of Asteraceae. It is widely distributed throughout India, China and Brazil. In Ayurvedic medicine, the leaf extract is considered as a powerful digestive tonic, rejuvenative and especially good for hair. A black dye obtained from E. prostrata is used for dyeing hair (Roy et al., 2008). E. prostrata also has traditional external uses, such as for athletes foot, dermatitis, and hair loss. It is used as anti-venom against snake bite in China and Brazil (Kritikar and Basu, 1975), anticancer property (Chaudhry et al., 2011) and antidepressant activity (Mishra et al., 2013).

Today the modern drugs are larger in their number than the natural ones to treat various diseases. Modern science is now beginning to accept the use of standardized plant extracts for treating various disorders. In India, there are few numbers of medicinal plants and their formulations to treat this disorder. Because of this fact, efforts are being made to find suitable curative agents for the treatment of liver diseases in natural plant products (Mir et al., 2010).

In spite of the tremendous advances made, no significant and safe hepatoprotective agents are available in modern therapeutics. At present there is a dire need to develop plant based hepatoprotective drugs effective
against a variety of liver disorders. Hence the present study is aimed to investigate the hepatoprotective activity of *A. marmelos* and *E. prostrata* on alcohol induced albino rats.

**OBJECTIVES OF THE STUDY**

- To collect the leaf samples of medicinal plants such as *Aegle marmelos* and *Eclipta prostrata* from Poondi, Thanjavur District, Tamilnadu, India.
- To analyse the phytochemical constituents of medicinal plants by qualitative and GC-MS analysis.
- To study the hematological effects of *A. marmelos* and *E. prostrata* on alcohol intoxicated albino rats.
- To investigate the antioxidant efficacy of the above selected medicinal plants on alcohol consumed albino rats.
- To evaluate the hepatoprotective enzymes of medicinal plants on alcohol administrated albino rats and
- To examine the histopathological effects of medicinal plants on alcohol induced albino rats.
2. REVIEW OF LITERATURE

The present investigation tracked down the best evidence, by which to achieve the aim by surviving the past research work. The thorough search process was conducted through electronic data bases in publication related to

- Phytochemical analysis
- Haematological studies
- Enzymatic and non-enzymatic antioxidant activities.
- Hepatoprotective enzymes
- Histopathological studies

2.1. Phytochemical analysis

Plants remain a major source of medicinal compounds. About 20,000 plant species are used for medicinal purposes (Penos, 1983). Seventy four percent of plant derived drugs were discovered as a result of chemical studies to isolate the active substances responsible for their traditional use (Farnsworth and Soejarto, 1991). The plants, especially the higher plants contain a variety of substances, which are useful as food additives, perfumes, and in treatment of various diseases as medicine due to their versatile therapeutic potential (Mukherjee and Wahile, 2006).

*Aegle marmelos*

*A. marmelos* is available from many parts of India and other countries. Available literatures reveal that the whole plant, leaf, fruit,