1. INTRODUCTION

The interest in the therapeutic value of plants is as old as Man’s interest in his life. The Roman civilization emphasized the value of Men’s sana in corpore sano, which is popularly known as “A sound mind in a sound body”. India’s contribution to evolve a systematic body of knowledge towards rejuvenation of man precedes most of the established and well-known Western and Euro-centric systems.

In a much influential treatise by Lele (1986) titled, Ayurveda and Modern Medicine, there is a reference to the intimate communion between man and nature from which our knowledge of Herbal therapeutic practices has emerged. In the Atharva Veda Kand 8; Sutra 7.1, the following is recorded: “The boar knows the plant; the Mongoose knows the remedial herb; what ones the serpents, the Gandharvas know; those I call to aid. What herbs of the Angivasas the eagles know, what heavenly ones the Raghatas know, what ones the birds and the swans know, and what all the winged ones, what herbs the wild beasts know, these I call to aid for you. Of how many herbs the inviolable kine partakes, of how many the goats and sheep, let so many herbs, being brought, extend protection to thee.”

Popular knowledge of plants which can be used by humans is based on thousands of years’ experience. By “trial and error”, people learnt how to recognize and use plants including those with a magic religious function (Rodrigues et al., 2003). Traditional medicine or ethnomedicine is a set of empirical practices embedded in the knowledge of a social group often transmitted orally from generation to generation with the intent to solve health problems. It is an alternative to Western
medicine and is strongly linked to religious beliefs and practices of indigenous cultures. Medicinal plant lore or herbal medicine is a major component of traditional medicine (Bussmann and Sharon, 2006).

Traditional medicine (TM) occupies an important place in the health care systems of developing countries. The World Health Organization (WHO) estimates that more than 80% of health care needs in these countries are met through traditional health care practices. The people in developing countries depend on TM, because it is cheaper and more accessible than Orthodox Medicine (OM) (Sofowora, 1993; Luoga et al., 2000 and World Health Organisation, 2002). Traditional medicine is also acceptable than OM because it blends readily into the people’s Socio-cultural life (Tabuti et al., 2003).

Many infectious diseases are known to be treated with herbal remedies throughout the history of mankind. Even today, plant materials continue to play a major role in primary health care as therapeutic remedies in many developing countries (Zakaria, 1991). Plants still continue to be almost the exclusive source of drugs for a majority of the world’s population (Hamburger and Hostettman, 1991).

Medicinal plants represent an important health and economic component of biodiversity. It is essential to make the complete inventory of the medicinal component of the flora of any country for conservation and sustainable use. The conservation of the threatened and endangered medicinal species in the wild is indispensable (Rahman et al., 2004).
Pharmacology

Medicinal plants are still a major part of the traditional medical system in developing countries. Several herbal remedies are now being intensively used in therapy. The use of medicinal plants as antiinflammatory and antiarthritic drugs in medicine is a practice common in India, although in most cases the active principles of the plants are unknown. However, evaluation of the pharmacological effects of the herbal crude extracts can still be used as a logical research strategy in the search for new drugs.

In view of this fact, in the present investigation, the ethanol extracts of the leaf and bark of *Pleiospermium alatum* (Wall. ex Wight & Arn.) Swingle and aerial part of *Balanites aegyptiaca* (L.) Del were used to study the antidiabetic, antihyperlipidaemic, hepatoprotective, antifertility and antiinflammatory activities through animal model.

*Pleiospermium alatum* (Wall. ex Wight & Arn.) Swingle belongs to the family Rutaceae. It is widely grown in India. The juice extracted from hundred grams of fresh leaves of *Pleiospermium alatum* and hundred grams of fresh leaves of lemon grass (*Cymbopogon citratus* Stapf) is boiled in one litre of neem oil in a low flame for twenty minutes. This oil is applied on the joints, shoulders and the other affected parts. Hot water is sprinkled to get relief from rheumatic complaints by the Kanikkar tribals of Kalakad - Mundanthurai Tiger Reserve, Western Ghats, Tamil Nadu (Sutha *et al.*, 2010).

*Balanites aegyptiaca* (L.) Del belongs to the family Balanitaceae and is commonly known as desert date. It is an endangered evergreen xerophytic tree of
tremendous medicinal importance. It is distributed throughout the dry parts of India (Bhandari, 1995). *Balanites aegyptiaca* has been used in a variety of folk medicines in India and Asia. Various parts of the plants are used in Ayurvedic and other folk medicines for the treatment of different ailments such as syphilis, jaundice, liver and spleen problems, epilepsy, yellow fever and the plant also has insecticidal, anthelmintic, antifeedant, molluscicidal and contraceptive activities (Yadav and Panghal, 2010 and Kamble Kaveri and Rao, 2010).

**The present study attempts**

1. To study the pharmacochemical characterization of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanites aegyptiaca*.
   a. Ash and extractive values.
   b. Fluorescence analysis.
   c. Preliminary phytochemical screening.

2. The HPTLC profiles of ethanol extracts of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanites aegyptiaca* to confirm the presence of alkaloids, flavonoids, glycosides, saponins and steroids.

3. GC-MS analysis of ethanol extracts of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanites aegyptiaca* to identify the compounds.

4. To assess the antidiabetic activities of ethanol extracts of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanites aegyptiaca* in Alloxan induced diabetic rats.

5. To assess the antihyperlipidaemic activities of ethanol extracts of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanites aegyptiaca* in Triton X-100 induced hyperlipidaemic rats.

6. To assess the hepatoprotective activity of ethanol extracts of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanties aegyptiaca* against hepatic toxicity induced by Carbon tetrachloride (CCl$_4$).
7. To assess the antifertility activity of the above said plant extracts.

8. To evaluate the antiinflammatory activity of ethanol extracts of leaf and bark of *Pleiospermium alatum* and aerial part of *Balanites aegyptiaca* on carrageenan induced oedema in rats.

**Antidiabetic**

Diabetes refers to Diabetes Mellitus or less often to Diabetes Insipidus. Diabetes Mellitus and Diabetes Insipidus share the name "Diabetes" because, both the conditions are characterized by excessive urination (polyuria). The word "diabetes" is borrowed from the Greek word meaning "a siphon." The 2nd-century A.D. Greek physician, Aretus the Cappadocian, named the condition "diabetes." He explained that patients with it had polyuria and "passed water like a siphon." When "diabetes" is used alone, it refers to Diabetes Mellitus. The two main types of Diabetes Mellitus; insulin-requiring type-1 diabetes and adult-onset type-2 diabetes are distinct and different diseases in themselves.

The non insulin-dependent diabetes mellitus is one of the most common disorders worldwide. It is a group of metabolic disorders characterized by hyperglycemia. The metabolic disorders include alterations in the carbohydrate, fat and protein metabolism associated with absolute or relative deficiencies in insulin secretion and/or insulin action. Along with hyperglycemia and abnormalities in serum lipids, diabetes is associated with microvascular and macrovascular complications, which constitute the main cause of morbidity and mortality of diabetic patients.

The prevention of diabetes is an urgent worldwide public health concern. Obesity and insulin resistance induced by over eating and physical inactivity typically
characterize the period preceding onset of type 2 diabetes. The caloric restriction and physical exercise have obvious importance. They stress that, actively promoting healthy eating and sleeping habits should be considered for the prevention of obesity and insulin resistance.

**Antihyperlipidaemic**

Hyperlipidaemic is defined as an elevation of one or more of the plasma lipids, including cholesterol, cholesterol esters, triglycerides and phospholipids (Goldstein *et al*., 1973., Harrison *et al*., 2003). An elevation of plasma lipids may be caused by a primary genetic defect or secondary to diet, drugs or diseases. Hyperlipidaemic, hypercholesterolemia, obesity, sedentary lifestyle etc., are the key risk factors leading to cardiovascular disorders (CVD) and also the most common causes of death in developed as well as developing countries (Reiner and Reiner, 2006; Yokozawa *et al*., 2003). Some of the major limitations in the effective pharmacological treatment of hyperlipidaemia are the constrains imposed on health care resources, particularly in the low and middle income countries (Bergman *et al*., 2005). There is a need to tackle this physiological problem as it is attaining grave proportions globally. In this scenario, the problem may be tackled by the use of natural agents due to their cost-effectiveness and minimal side effects (Oluwatosin *et al*., 2008).

**Hepatoprotective**

Liver diseases are one of the most severe ailments. They are mainly caused by toxic chemicals, excess consumption of alcohol, infections and autoimmune disorders. Most of the hepatotoxic chemicals damage liver cells mainly by inducing lipid peroxidation and other oxidative damage in the liver. They may be classified as acute
or chronic hepatitis (inflammatory liver diseases), hepatosis (non-inflammatory diseases) and cirrhosis (degenerative disorder resulting in fibrosis of the liver).

Inspite of tremendous advances made in allopathic medicine, management of liver diseases is still a challenge to modern medicine. The modern medicine little to offer for the alleviation of hepatic ailments, whereas, the most important representatives are the phytoconstituents (Chandrasekhar et al., 2004). Plant drugs are known to play a vital role in the management of liver diseases. About 80% of the world’s population relies on the use of traditional medicines which are predominantly based on plant materials (Satagopan, 2000). Numerous plants and polyherbal formulations are reported to possess hepatoprotective activites (Malhotra et al., 2001).

In order to develop satisfactory herbal combination to treat liver diseases, plants have antioxidant, stimulation of liver regeneration and cholorectic properties (Subramanian and Pushpangadan, 1999).

**Antifertility**

The options available to men for fertility control are much more limited compared to those for women. The male reproductive system, particularly the process of spermatogenesis, sperm maturation and transport and also the sperm-egg interaction are so complex that it has not so far been possible to find an effective intervention that can be converted into a product. Continued efforts over the past three decades to develop additional methods of male contraception have made some significant contribution in the field. However, there is still no method available in the field of male contraception that satisfies the essential criteria of safety, efficacy, economy and complete reversibility. Inspite of considerable development in
contraceptive technology, search for male antifertility agents in plants continues to be a potential area of investigation.

**Antiinflammatory**

Antiinflammatory refers to the property of a substance or treatment that reduces inflammation. Inflammatory diseases including different types of rheumatic diseases are very common throughout the world. Although rheumatism is one of the oldest known diseases of mankind and affects a large population of the world, no substantial progress has been made in achieving a permanent cure. The search involving screening and development of drugs for antiinflammatory activity is an unending problem. There is much hope of finding active anti-rheumatic compounds from indigenous plants, as these are still used in therapeutics despite the progress made in conventional chemistry and pharmacology for producing effective drugs (Handa et al., 1992).