Introduction

1.0 INTRODUCTION

Nature has bestowed on us a very rich botanical wealth and a large number of diverse plants. Medicinal plants have been used as sources of medicine in virtually all cultures; the use of traditional medicine has expanded globally and is gaining popularity (Devi et al., 2009). For thousands of years there are impressive numbers of modern drugs isolated from natural sources. The plants are known to contain various active principles of therapeutic value and possess biological activity against a number of diseases (Ayyanar, *et al.*, 2008).

Medicinal plants are potential source of drugs or herbal extracts for various chemotherapeutic purposes in both developing and developed nations of the world. Also the use of plant derived natural compounds used as alternative sources of medicaments continues to play major roles in the wellness of people all over the world. Over 50% of all modern clinical drugs are of natural product origin and natural products play an important role in drug development programs of the pharmaceutical industry (Ripa *et al.*, 2009).

Herbal medicines have been accepted universally, and they have an impact on both world health and international trade. The herbal products have been classified under 'dietary supplements' and are included with vitamins, minerals, amino acids and 'other products intended to supplement the diet (Madhuri *et al.*, 2009). Literature reports ethnobotanical records suggest that plants are the sleeping giants of pharmaceutical industry (Vardhini *et al.*, 2008). The medicinal plants, the backbone of traditional medicine are the potential sources of new compounds of therapeutic value and of lead compounds in drug development (Sathya *et al.*, 2008).

Diabetes is defined as a state in which homeostasis of carbohydrate and lipid metabolism is improperly regulated by the pancreatic hormone, insulin resulting in an increased blood glucose level. Diabetes is a progressive disease and is one of the major killers in recent times (Bhat *et al.,* 2008). In 1995, the World Health Organization reported that approximately 150

million persons worldwide had diabetes mellitus, and this number may well be double by 2025. Continuous use of the synthetic anti-diabetic drugs causes side effects and toxicity. Therefore, there is a need for discovering more effective and safe oral hypoglycaemic agents (Zhou *et al* 2009).

Application of modern science to traditional system of medicine has also given birth to compound like Metformin. More than 400 plants incorporated in approximately 700 recipes are used to treat diabetes mellitus in almost two thirds of the world population. A large number of animal studies to test the claimed activity have demonstrated the hypoglycemic property of these plants. In addition, clinical trials have shown some plants as useful antidiabetic agents, but the pure chemical compounds isolated from the crude extracts of these plants do not bear structural resemblance to the antidiabetic drugs in current clinical use nor have they similar mechanisms of action. But still the search for a novel antidiabetic drug can be achieved by application of modern scientific technology and recent knowledge on the physiological changes in case of Diabetes (Rout *et al.*, 2009).

Indigenous drugs, since long, have been used for the treatment of diabetes. Hundreds of plants are known to be useful in treating diabetes in different corners of the world. An antidiabetic agent could exert a beneficial effect in the diabetic situation by enhancing insulin secretion and or by improving/mimicking insulin action (Hossain, *et al.*, 2009). Nowadays, the consumption of botanicals have been increasing rapidly worldwide, because of the less frequent side-effects when compared to modern western medicine (Maiti *et al.*, 2009).

Plant extracts exhibit islet regeneration/protection properties and therefore has beneficial effects in diabetes mellitus that holds the hope of new generation of antidiabetic drugs (Bhat.*et al.*, 2009). Advanced phytochemical studies may provide interesting molecules that can renew the traditional pharmacological approach of insulinotropic agents. Plant fiber and polysaccharide compounds are fairly well known to reduce intestinal glucose and recommended as essential elements in the diabetic diet (Khalidi *et al.*, 2009)

Free radicals can also affect food quality, reducing its nutritional content and promoting the development of food deterioration. Therefore, antioxidant substances are required for the protection against the oxidizing agents. The development of alternative antioxidants from natural origin has attracted considerable attention and there is an increasing interest in the investigation of naturally occurring antioxidants from plants (Nickavar *et al.*, 2009). Antioxidants are vital substances that possess the ability to protect the body from damages caused by free radical-induced oxidative stress. Epidemiological and *in vitro* studies on medicinal plants and vegetables strongly have supported the idea that plant constituents with antioxidant activity are capable of exerting protective effects against oxidative stress in biological systems (Souri *et al.*, 2008)

Natural products like herbs, fruits and vegetables become popular in recent years due to public awareness and increasing interest among consumers and scientific community. Natural products that contain antioxidant properties include flavonoids and phenolics acids, carotenoids and vitamins. Constituents in natural products show many biological and pharmacological activities, including antioxidative, anti-inflammatory and antiviral effects (Hakiman *et al.*, 2009). Phenolic antioxidants, although a complex but powerful system, act by donating a phenolic hydrogen to produce an antioxidant radical that is stabilized by delocalizing the participating electron/ or intramolecular hydrogen bonding or by further oxidation (Ali *et al.*,2009).

Currently there has been an increased interest globally to identify antioxidant compounds to prevent the oxidative stress caused by photons and oxygen. The antioxidant activity of these compounds is mainly due to their redox properties, which allow them to act as reducing agents, hydrogen donators, singlet oxygen quenchers, and metal chelators (Singh *et al 2009).* Medicinal plant-based drugs have the added advantage of being simple, effective and offering a broad spectrum of activity with greater emphasis on preventive action. Medicinal plant products could also prove useful in minimizing the adverse effects of various chemotherapeutic agents and provides positive general health (Bnouham *et al.*, 2009).

The traditional use of medicinal plants can lead to the discovery of new potent pharmacological agents in the treatment of several diseases. Some 7,000 natural compounds are currently used in modern medicine and most of them had been used for centuries by traditional healers. However not all of the plants reported to be useful are entirely safe, and they emphasize the need for carefully planned scientific research to identify those plants with true therapeutic efficacy and safety (Mendiola *et al*., 2008).

With this background the present study has been formulated with the following objectives:

- To identify the hypoglycemic activity of *Aristolochia bracteolata* using adult Male AlbinoWistar rats as animal models.
- To establish the enzymic and nonenzymic potential of *Aristolochia bracteolata*
- To screen the free radical scavenging effect of the experimental plant in terms of invitro experiments.
- To determine the hepatoprotective action of the selected plant in the liver of Diabetic and treated animal models.