steroids, triterpenes, terpenoids, carbohydrates, glycopeptides, amino acids and inorganic ions. Even the discovery of widely used hypoglycaemic drug, metformin came from the traditional approach of using *Galega officinalis*. Thus, plants are a potential source of antidiabetic drugs but this fact has not gained enough momentum in the scientific community (Shukla *et al.*, 2002). Pharmacological researches conducted in last few decades on plants mentioned in ancient literature or used traditionally for diabetes have revealed anti-diabetic property. Scientific interest in 'alternative' or 'traditional system' in this area of diabetes mellitus have concentrated, mainly on the screening of plant drugs from all possible sources for their blood-sugar lowering effect. Very few plants have been studied in depth, for investigating their site and mechanism of action and for possible development as anti-diabetic drugs (Satyavati *et al.*, 1989).

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**CHAPTER-2**

**SCOPE AND OBJECTIVE OF THE PRESENT STUDY**

2.1. **Dietary modification with hypoglycaemic botanicals**

Botanicals, vitamins, antioxidants, minerals, amino acids and fatty acids (natural products collectively referred to here as nutraceuticals and dietary supplements) are an important source of new therapies for type II diabetes. These agents are marketed in the US under the Dietary Supplement Health and Education Act (DSHEA), passed by Congress in 1994. DSHEA defined a new category of food for regulatory purposes, termed dietary supplements, one that also includes concentrates, metabolites, constituents, extracts and combinations, and has resulted in major changes in the marketing and use of nutraceuticals. (Vijay *et al.*, 2000)
Botanicals have been used for medicinal purposes since the dawn of civilization. It is well documented that many pharmaceuticals, commonly used today are structurally derived from natural compounds found in traditional medicinal plants.

Chinese medical books written as early as 3000 B.C. spoke of diabetes and described therapies for this disease. These historical accounts reveal that type II diabetes existed long ago and medicinal plants have been used for many millennia to treat this disease. To date, the anti-diabetic activities of well over 1200 traditional plants has been reported, although scant few have been subjected to rigorous scientific evaluation for safety and efficacy in humans.

Mankind has a long history in the use of herbal medicines. Rig-Veda and Ayurved (4500-1600B) reveal that ancient Indians had a rich knowledge of use of medicinal plants. India unquestionably occupies the topmost position in the use of herbal drugs, utilizing nearly 600 plants species in different formulations. Great majorities of people in India have been depending on crude drugs for the treating of various diseases as evidenced from well documented indigenous system of medicines Ayurved and Unani. The Materia Medica of these systems contains a rich heritage of indigenous herbal drugs.

World Health Organization has researched numerous plants over the last decades looking for a way to reserve or manage this debilitation disorder. According to herbalist David Hoffman, past president of the American Herbalist Guild, there are many plants that are proven hypoglycemic. Plant products that increase the peripheral demand of glucose for growth and metabolize in a manner akine to growth hormone may promote weight gain in lean diabetics. Such products, even if they are not potent enough to be stand alone antidiabetic, can be useful adjuncts to insulin with a hormone sparing effect. Thus turning towards herbal source for
solution to diabetes was natural. The natural sources are thought to be safer and with lesser side effects (though there are many exceptions).

2.2. Objective

During the past decade, traditional systems of medicine have become a topic of global importance. Current estimates suggest that, in many developing countries a large proportion of the population relies heavily on traditional practitioners and medicinal plants to meet primary health care needs, (Unnikrishnan et al., 2007) although modern medicine may be available in these countries, herbal medicines have often maintained popularity for historical and cultural reasons. Concurrently, many people in developed countries have begun to turn to alternative or complimentary therapies, including medicinal herbs.

Although, there are numerous traditional medicinal plants reported to have hypoglycemic and antidiabetic properties, many of them proved to be not very effective in lowering glucose levels in severe diabetes. Further, most of the hypoglycemic agents used in allopathic medicine are reported to have side effects in the long run. Therefore, there is a need to search effective and safe drugs for diabetes (Pradeepa et al., 2008).

Herbal drugs are prescribed widely even when their biologically active compounds are unknown, because of their effectiveness, less side effects and relatively low costs. Diabetes mellitus ranks highly among top ten of disorders caused mortality throughout the world. With the rapid advancement of medicine, treatments without the side effect for the long-term control of this disorder become important. Alternative therapies have also received attention recently. A growing public interest in herbal medication of diabetes has been raised around the world. Application of medicinal plants in the control of diabetes has renewed and the WHO expert committee on diabetes recommended this alternative treatment.

In general, there is very little biological knowledge on the specific modes of action in the treatment of diabetes, but most of the plants have been found to contain
substances like glycosides, alkaloids, terpenoids, flavonoids etc., that are frequently implicated as having antidiabetic effects. The present work is undertaken to evaluate the long term antihyperglycaemic potential of *Sesbania sesban* and *Adenanthera pavonina* Linn. extracts in STZ-induced diabetic rats in comparison with reference drug Glibenclamide. Simultaneously evaluate its effect on diabetic complications like neuropathy and nephropathy as

**Evaluation of antidiabetic activity**

**Antidiabetic study**

- Acute study in normoglycaemic rats
- Chronic study in stz- induced diabetic rats
- Oral glucose tolerance test in STZ- induced diabetic rats

**Diabetic complications**

- Study of diabetic nephropathy in STZ- induced diabetic rats
- Study of diabetic neuropathy in STZ- induced diabetic rats

Simultaneously investigate the effect of chronic administration of extracts using following parameters;

1. Haematology
2. Serum glucose,
3. Oral glucose tolerance test (OGTT)
4. Glycosylated haemoglobin (HbA1c)
5. Lipid profile
6. Body weight