8. Summary and Conclusion

Diabetes mellitus is a group of diseases characterized by an elevated blood glucose level (hyperglycaemia) resulting from defects insulin secretion, in insulin action, or both. Diabetes mellitus is not a pathogenic entity but a group of aetiologically different metabolic defects. The word “diabetes” is derived from a Greek word that means, “to siphon or drain off”, the most obvious sign of diabetes being excessive urination. “Mellitus” comes from a Latin word that means “sweet”. Diabetes mellitus (particularly Type 2 diabetes) is a major and growing health problem in almost all countries. Globally, the prevalence of diabetes in adults aged 20 years and above was estimated to be 4% in 1995 and is projected to rise 5.5% by 2025. The first mention of diabetes in Indian literature was found in the works of the physician Sushruta, goes as far back as 1000BC. Ancient physicians diagnosed diabetes by tasting the patient’s urine for sweetness as well as other symptoms observable upon examination. The Sushruta Samhita, an Ayurvedic textbook written between the fourth and fifth century B.C., describe two types of diabetes. Thus, even 2500 years ago, Ayurvedic physicians recognized and categorized clinical entities corresponding to insulin-dependent diabetes mellitus (IDDM) and Non-insulin-dependent diabetes mellitus (NIDDM).

The revival of interest in natural drugs and the herbal products started in the last decade mainly because of the widespread belief that ‘green’ medicine is healthier than synthetic products. This is mainly due to the increasing evidence/realization of the health hazards associated with the harmful side effects of many synthetic medicines and also the hazards associated with indiscriminate use of modern medicines such as antibiotics, steroids and other synthetic drugs. Rediscovery of the connection between plants and health is responsible for launching a new generation of botanical therapeutics that include plant-derived pharmaceuticals, multicomponent botanical drugs, dietary supplements, functional foods and plant-produced recombinant proteins. In this context, it is worthwhile to mention about the discovery process that had led to isolation of metformin from Galega officinalis, also known as French lilac, which is the only ethical drug approved from treatment of NIDDM derived from a medicinal plant historically used to treat diabetes. India is a very rich biodiverse country with lots of traditional information for the use of plants in treatment of diseases in form of documented literature and oral tradition. But much of the traditional information have not been validated and proved scientifically, because of which there is a lack of global acceptance. Hence urgent
screenings of these plants are required to stand in the global market. Ethnopharmalogical approach has shown high success rate in comparison to the random screening method for testing bioactive reagents from plants.

There is high potential for ethnomedicine guided phytopharmaceutical research. New technologies are constantly being developed to isolate and identify the components responsible for the activity from these plants. Another possibility is the qualitative and quantitative variations in the content of bioactive phytochemical. This is considered to be a major impedemence in herbal drugs particularly from those plant species that are cross pollinated and collection are made from wild sources from plants, beginning with screening of the plant extract using high throughput bioassay based on the ethnopharmalogical approach (choosing plants being used by the ethnic/tribal communities) is the order of the day.

In the present study, three plants viz., *Amaranthus spinosus* – leaves (ASEt), *Strychnos potatorum* – seeds (SPEt), and *Saraca asoca* – flowers (SAEt) which an traditionally used for the treatment of diabetes, were taken up.

Effect of 50 % aqueous alcoholic extracts of all the three selected plants on serum glucose, lipid profile and antioxidants status in STZ-nicotinamide induced diabetic rats were studied. *A. spinosus* caused a significant reduction in serum glucose and had well antioxidant activity with showing significant lipid lowering activity. *S. potatoum* caused significant defense against oxidative stress. It also caused a significant serum glucose lowering effect along with very moderate lipid lowering effect. *Saraca asoca* showed mederate antioxidant activity in STZ induced oxidative stress. It also caused a trivial serum glucose lowering effect along with very moderate lipid lowering effect. The serum glucose, lipid lowering and antioxidant activity of the plants was found to be in the following order, ASEt> SPEt> SAEt. Thus from this study, it can be concluded that *A. spinosus*, is found to be the most effective in this group of plants for antidiabetic activity studied. All the plant extracts also showed significant antioxidant potential in *in-vitro* models with the decreasing order of scavenging ability. There was maximum amylase inhibition by the extracts with *A. spinosus* followed by *S.potatorum* while *S. asoca* did not possess any inhibition of the enzyme.

Variety of reasons has been cited for the need for scientific evaluation and standardization. The leads for a significant number of modern synthetic drugs have originated from isolated plant
ingredients, as the search for newer entities begins from either derivatizing existing drugs or from traditional or contemporary medicinal systems. Therefore, it is important to undertake phytochemical investigations along with biological screening to understand the therapeutic dynamics of medicinal plants and also to develop quality parameters. Scientific validation of herbal drugs through standardization with reference to the identification of phytochemicals is essential for herbal drugs. The purpose of standardization is to control the content of one or several marker compounds, which are believed to be responsible for the said therapeutic activity. However, standardization should also entail information on the manufacturing steps that ensure product consistency among different batches.

In this present work, pharmacognostical and phytochemical investigation was carried for all the chosen plants. Physicochemical parameters viz., ash values and extractive values of each plant were recorded as quality parameter. Qualitative as well as quantitative HPTLC fingerprint profile was used for the standardization of the extracts having biological activity. Quercetin was used as the chemical marker for the standardization of the all extracts. Qualitative HPLC profile showed different components with its relative percentage. Unlike synthetic organic medicinal compounds that exhibit predictable pharmacological activity at a given dosage, the world of botanicals is quite different in the sense that it is not always known with certainty what constitutes the active ingredient(s). It is generally believed that the reported pharmacological action of a botanical is due to more than one constituents acting synergistically with other constituents present.

All plant extracts subsequently studied for detailed toxicological effects including acute and sub acute toxicity studies based on the OECD guidelines. *A. spinosus* extract was found to be safe even at high dose. The effective dose was found to be 500 mg/kg/day, where as *S. potatorum* and *S. asoca* were found to be safe at 200mg/kg and 100 mg/kg body weight respectively.