Abstract

When a person has prolonged diabetes, the person is at risk of several ocular complications which include diabetic retinopathy, iris neovascularisation, and glaucoma, cataract, and microvascular abnormalities of the optic nerve. The most frequent complication is diabetic retinopathy. Diabetic retinopathy is manifested by focal closure of retinal capillaries, microaneurysms and associated punctate haemorrhages, serous exudates and, occasionally, cotton-wool spots secondary to acute ischaemia. Sometimes the macula is the site of oedema but, otherwise, the foregoing changes rarely cause serious visual handicap. Proliferative retinopathy is much more sinister since it involves the growth of new blood vessels in front of the retina where they are prone to bleed and, through concomitant fibroblastic activity, tear and detach the underlying retina. Retinopathy in diabetic subjects is basically a manifestation of small blood vessel disease and appears to be a function of the metabolic defect rather than the clinical type of diabetes. Thus it can complicate diabetes secondary to pancreatic disease (Duncan et al. 1958) as well as the more prevalent primary forms. Furthermore, there is accumulating evidence that the effects of diabetes on the retina can be delayed and perhaps even ameliorated if the blood glucose level is rigorously controlled (Waltman et al. 1979, Liang & Goldberg 1980); oxidative stress reduced, and strengthens the pericytes.

The current study suggest the usage of herbal formulation, a preventive remedy which lowers the blood glucose levels, combats oxidative stress, promotes healthy angiogenesis and the formulation not only imparts strength to pericytes but also helps them to proliferate in presence of elevated blood glucose levels.

The thesis is divided into 5 chapters –

Chapter 1 Introduction

It gives an elaborate account of Diabetes, regulation of blood glucose, symptoms, types, etiological factors for occurrence of Diabetes. The chapter also highlights the secondary complicated viz. Neuropathy, Nephropathy, Hypertension, Obesity, ACVD associated with Diabetes. Diabetes and eye complications are also described. Retinopathy is discussed in details. The mechanism of retinopathy Polyol pathway, AGEs, PKC pathway and Hexosamine pathways are discussed.

Oxidative stress, Antioxidants, Flavonoids and Pericytes, the smooth muscle cells of blood vessels and their role is introduced.

Chapter 2– Review of Literature
The chapter describes justification and objective of the study. Plants: a therapeutic goldmine section covers the in depth review of medicinal plants and their therapeutic bioactive ingredients.

The chapter also describes reported pharmacological and chemical evaluations and collective activity of the plant constituents. The chapter end with the formulation and gives overview of chapter 2.

Chapter 3 – Materials and Methods

The chapter is divided into two subsections 3.1 and 3.2

3.1 Nutritional analysis (Biochemical techniques)

It deals with proximate analysis (Moisture, Ash, Dietary Fiber, Protein, Fat, Starch and soluble sugar, mineral content, vitamin A and C). The chapter further puts light on extraction and estimations of secondary metabolites namely polyphenolics, proanthocynidins and flavonoids. It also takes in account the characterization and Purification of secondary metabolites by HPTLC and micro preparatory HPTLC. Antioxidant potential of these secondary metabolites by FRAP and radical scavenging ability has also been described.

3.2 Biological assays (Invitro techniques)

It is unethical for that for research sake we sacrifice the animals when alternate techniques can be handy such as cell culture or invitro assay. Chapter 3.2 deals with the methodology of Thiobarbituric acid reactive substances (TBARS) assay, Cell Viability test [MTT assay], Intestinal absorption assay, Comet assay, Angiogenesis Cam assay, Pericyte culture, Goat Corneal Opacity and Permeability (GCOP) assay. The chapter ends with Statistical analysis.

Chapter – 4 Results

Likewise chapter 3, chapter 4 is also sub-sectioned into two – 4.1 and 4.2.

4.1 Nutritional analysis (Biochemical techniques)

Discuses the results of Nutritional analysis

4.2 Biological assays (Invitro techniques)

Discuses the results of Thiobarbituric acid reactive substances (TBARS) assay, Cell Viability test [MTT assay], Intestinal absorption assay, Comet assay, Angiogenesis Cam assay, Pericyte culture, Goat Corneal Opacity and Permeability (GCOP) assay.

Chapter -5 Discussion and conclusions
The chapter deals with discussion and compares the results with the research groups actively engaged in allied research. It also adds the purpose of assay performed and correlates to finding. The results of this study will contribute toward the growing database of knowledge on ethnobiology and help advocate the safe and effective use of traditional herbal remedies. It is believed that the screening of plant derived secondary metabolites, which are eventually going to the drugs, will add to the ever increasing scientific knowledge of medicinal plants, not only in India but also globally.