SCOPE & PLAN OF WORK
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Different methods of treatment are currently available today for treating DM. It is, however, difficult to maintain normoglycemia, prevention of diabetic complications and different pathological aspects except in the method of pancreatic transplantation. This is however, very expensive and difficult to get the required donor. There is a clear need, therefore, for alternative sources of drugs and strategies for diabetes therapy. It is believed that the best strategy will be to study plants for prevention and therapy of diabetes because many botanical products have been found to possess beneficiary effects in controlling diabetes by stimulating insulin secretion, improving insulin binding and inhibition of glucose absorption, etc.

Secondary metabolites like flavonoids, alkaloids, steroids and phenolic substances have been used to restore health and heal many diseases. Flavonoids and other phenolic compounds of plant origin are known to be scavengers of free radicals. Hence, search for natural antioxidant sources is gaining much importance. Several studies have shown that phytoconstituents like sesquiterpenes, saponins, steroids, triterpenes, phenolics and flavonoids are beneficial in the treatment of diabetes.

Hyperglycemia and hyperlipidemia, the most common features of diabetes mellitus, contribute to the development of microvascular and macrovascular complications of diabetes, leading to morbidity and mortality. Presently the agents used for diabetic treatment are synthetic drugs and insulin. These drugs, however, cause considerable side effects, such as hypoglycemia, drug-resistance and weight gain. In contrast, hundreds of traditional folk medicines have demonstrated their potential for the treatment of diabetes with less tolerability and side effects. There is an increasing need, therefore, to search for more natural antidiabetic agents from plant sources. It was proposed, therefore, to screen the indigenous medicinal plants for the treatment of diabetes and hyperlipidemia.
The following is the plan of work;

**Phase I: Collection of plant material and extraction**
- Identification, collection and authentication of the plant materials
- Preparation of extracts /fractions
- Preliminary phytochemical screening
- Determination of total phenolic and flavonoid contents

**Phase II: In vitro studies**
- $\alpha$ - Amylase inhibition
- $\alpha$ - Glucosidase inhibition
- Glucose uptake by L6 muscle cells and 3T3L1 adipocytes

**Phase III: In vivo studies**
- Streptozotocin induced diabetic rats
- HFD - fed and STZ induced diabetic rats
  - Oral glucose tolerance test (OGGT)
  - Fasting blood glucose (FBG)
  - Body weight, fluid and food intake
  - Glucose-6-phosphatase and glycogen content in liver
  - Lipid and lipoprotein levels
    - (Triglycerides (TG), total cholesterol (TC), low density lipoproteins (LDL-c), high density lipoproteins (HDL-c) and very low density lipoproteins (VLDL-c) in serum).
  - Antioxidant parameters
    - (Catalase (CAT), super oxide dismutase (SOD) and thiobarbituric acid reactive substances (TBARS) in liver and kidney)
  - Histopathology of pancreas

**Phase IV: Documentation of results**
- Evaluation of statistical significance of the results by using a Graphpad Prism 5.01 and systemic documentation.