INTRODUCTION

Diabetes mellitus (DM) is a problem with your body that causes blood glucose (sugar) levels to rise higher than normal. This is also called hyperglycemia.

There are mainly two types of Diabetes mellitus

1. Type 1 DM results from the pancreas's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes".
2. Type 2 DM begins with insulin resistance, a condition in which cells fail to respond to insulin properly.

Type 2 diabetes is the most common form of diabetes. If you have type 2 diabetes your body does not use insulin properly. This is called insulin resistance. At first, your pancreas makes extra insulin to make up for it. But, over time it isn't able to keep up and can't make enough insulin to keep your blood glucose at normal levels.

The preferred methods of diagnosing diabetes are detection of fasting glucose test, random glucose test, A1C, HbA1C test etc. The standard values are

Fasting Glucose Test: Normal - Less than 100 mg/dl

- Pre-Diabetes – 100 - 125 mg/dl
- Diabetes – 126 mg/dl or higher

Random (Anytime) Glucose Test:

- Normal - Less than 140 mg/dl
- Pre-Diabetes – 140 - 199 mg/dl
- Diabetes - Greater than 200 mg/dl

A1C Test:

- Normal - Less than 5.7%
- Pre-Diabetes - 5.7 - 6.4%
- Diabetes - Greater than 6.5%

Patients with diabetes may develop retinopathy, nephropathy, neuropathy, gastropathy like severe conditions at later stages.
Diabetes mellitus is reaching potentially epidemic proportions in India. The level of morbidity and mortality due to diabetes and its potential complications are enormous, and pose significant healthcare burdens on both families and society. Worryingly, diabetes is now being shown to be associated with a spectrum of complications and to be occurring at a relatively younger age within the country.

Given the disease is now highly visible across all sections of society within India, there is now the demand for urgent research and intervention at regional and national levels to try to mitigate the potentially increase in diabetes that is predicted for the upcoming years.

**CURRENT TREATMENT PLAN:**

1. Oral hypoglycemic agents
   a. Sulphonyl ureas
      i) First generation (Tolbutamide, Chlorpropamide)
      ii) Second generation (Glibenglamide, Glipizide, Gliclazide, Glimiperide)
   b. Biguanides (Metformin)
   c. Meglitinides (Repaglinide, Nateglinide)
   d. Thiazolidine diones (Rosiglitazone, Pioglitazone)
   e. Alpha glucosidase inhibitors (Acarbose, Miglitol)
   f. Dipeptidyl peptidase-4 (DPP-4) inhibitors (Sitagliptin)
   g. Glucagon like peptide (GLP-1) analogue (Exenatide)

2. Insulin injections.

There are lots of side effects for the current treatment plan. Oral hypoglycemic agents’ results in hypoglycemia, weight gain etc. Hypoglycemia or low blood sugar is the most common side effect of insulin. Other symptoms include headache, hunger, weakness, sweating, tremors, irritability, fast heart beat, fainting, or seizures. So the current work emphasized on herbal medicine alterations which can provide a safe alternative treatment for Diabetes mellitus.

In herbal medicine, single or multiple herbs (polyherbal) are used for the treatment. The traditional literature Sarangdhar Samhita’ highlighted the concept of polyherbalism to achieve greater therapeutic efficacy. In some cases the active phytochemical constituents of individual plants are insufficient to achieve the desirable therapeutic effects. When combining the multiple herbs in a particular ratio, it will give a better therapeutic effect and
reduce the toxicity. Hence the concept of polyherbalism has a major clinical significance in the formulation of herbal preparations.

In the present study two plants have been identified and selected, i.e. *Salacia reticulate* and *Syzygium cumini*. *Salacia reticulata* (family -Celastraceae), known as *Kothala himbutu*, is a large woody climbing shrub naturally found in Sri Lanka and Southern region of India, the root of which is a herbal medicine which appears to have antidiabetic activities, namely by inhibiting carbohydrate uptake from the intestines; it appears quite effective at this, similar to Acarbose in potency. *Salacia reticulata* effectively improves insulin resistance, glucose metabolism and reduces obesity. *Syzygium cumini* (family Myrtaceae), the seed and bark of the plant found to have antidiabetic activities.

The present study is to prepare the various formulations of these two drugs, by applying the principle of polyherbalism. Churna is defined as a fine powder of drug or drugs in herbal system of medicine. Drugs are cleaned properly, dried thoroughly, pulverised and then sieved. The churna is free flowing and retains its potency for one year, if preserved in an airtight container. In recent days churna is formulated into tablets in order to fix the dose easily. Standardization of the formulated churna has to be done.

Extracts of the two herbal drugs are to be taken. One of the major problems associated with poorly soluble drugs is very low bioavailability. Formulation as nanosuspension is an attractive and promising alternative to solve these problems. Nanosuspension consists of the pure poorly water-soluble drug without any matrix material suspended in dispersion. Preparation of nanosuspension is simple and applicable to all drugs which are water insoluble. A nanosuspension not only solves the problems of poor solubility and bioavailability, but also alters the pharmacokinetics of drug and thus improves drug safety and efficacy. Nanomedicine is the medical application of nanotechnology. Nanosuspension thus formulated has to be evaluated.