EVALUATION OF POLYHERBAL FORMULATION FOR ANTIDIABETIC ACTIVITY USING WISTAR RATS

A

Thesis

Submitted for the Award of the Ph.D. degree of

PACIFIC ACADEMY OF HIGHER EDUCATION AND RESEARCH UNIVERSITY

By

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2024

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Trupti Bhagwanrao Shevante

PREFACE

Diabetes is a chronic, metabolic disease basically classified as Type 1 and Type 2. About 422 million people worldwide have diabetes, the majority living in low-and middle-income countries, and 1.5 million deaths are directly attributed to diabetes each year. In the past 3 decades the prevalence of type 2 diabetes has raised dramatically in countries of all income levels. India is a major contributor to the worldwide diabetes burden, with rapid socioeconomic development and urbanization. India has indicated a rising incidence of diabetes among both urban and rural populations, owing to the urbanization of lifestyle factors. India accounts for one in six (17%) of all diabetics worldwide. Approximately 90 to 95% of Indians diagnosed with diabetes had type 2 diabetes, compared to a lower incidence of type 1 diabetes in western nations. The reported prevalence of diabetes in adults between the ages of 20 and 79 is **India 8.31%**. Only a small percentage of the more than 400 documented traditional plant remedies for diabetes mellitus have undergone scientific and medical investigation to determine their effectiveness.

Medicinal herbs that possess anti-diabetic properties are frequently taken as dietary supplements to regulate blood sugar levels and avert chronic issues associated with diabetes. The beneficial effects of many herbal remedies in lowering blood glucose as well as the other complications of diabetes play a major part in this health concern in medicinal plants. **"Let food be your medicine and medicine be your food"** by Hippocrates is a very important sentence. Traditional medicinal plants have been used in the treatment of diabetes mellitus for more than a century, but only a few of these have proved safe and efficacious.

The aim of this study is to prove **the *Sesbania grandiflora* and *Beta Vulgaris* combination's synergistic antidiabetic activity**. Polyherbal formulation designed consists of Methanolic extract of *Sesbania grandiflora* leaves and *Beta Vulgaris* root that has proven antidiabetic potential. The polyherbal extract was found to be safe and no toxicity was exhibited in rats. Albino Wistar rats were divided into five classes, each with six animals, the study that may provide insight into a substance's overall safety is one on acute toxicity. Glibenclamide and Streptozotocin (STZ) used to induce rats. Animals had been orally treated with PHF extract at dosages of 200 and 300 mg/kg bw. Blood glucose (BG) was measured to assess the antidiabetic effect. Following STZ medication, levels of low density lipoprotein and total cholesterol were also checked. Based on body weight,

STZ-induced diabetic rats have statistically significantly affected in the range of Haematological and Biochemical parameters. The research found be concluded that the possible mechanism by which PHF exerts its Antidiabetic, Hepatoprotective, and Nephro-protective activity against STZ-induced diabetes could be due to the regeneration of pancreatic beta cells, liver cells, and kidney cells through the potential to minimize the harmful effects of free radical.

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LIST OF ABBREVIATIONS

SG	:	*Sesbania Grandiflora*
BV	:	*Beta Vulgaris*
WHO	:	World Health Organization
DM	:	Diabetes Mellitus
MODY	:	Maturity-onset diabetes of the young
(FPG)	:	Fasting plasma glucose
PHF	:	Polyherbal Formulation
T1DM	:	TYPE 1 Diabetes Mellitus
T2DM	:	TYPE 2 Diabetes Mellitus
BGL	:	blood glucose levels
HFD	:	high-fat diet
HNF	:	Hepatocyte nuclear factor
SGOT	:	Serum glutamic pyruvic transaminase
SGPT	:	Serum glutamic oxaloacetic transaminase
HPTLC	:	High-Performance Thin Layer Chromatographic
BUN	:	Blood urea nitrogen
STZ	:	Streptozotocin
ANOVA	:	Analysis Of Variance
Rf	:	Reference Factor
M.P	:	melting point
NIDDM	:	Non-Insulin Dependent Diabetes Mellitus
GD	:	Gestational Diabetes
UV-Vis	:	Ultra violet Visible
FT-IR	:	Fourier Transform Infra-Red
TLC	:	Thin Layer Chromatography
HPLC	:	High Performance Liquid Chromatography
ppm	:	parts per million