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This new book provides valuable insight into the role of mushrooms in the treatment of diabetes mellitus. Mushrooms are enriched with various bioactive constituents with antidiabetic efficacy such as polysaccharides, terpenes, sterols, etc. The extracts as well as bioactive constituents through different mechanisms exhibit antidiabetic action. Medicinal mushrooms such as Ganoderma lucidum, Innotus obliquus, Grifola frondosa, Phellinus species, etc. are considered in this volume for their beneficial qualities toward the mitigation of the disease. The volume considers mushroom powders, mushroom extracts, and their bioactive components for the management of diabetic syndrome. It presents various in vitro, in vivo, and clinical studies on lowering hyperglycemia and other diabetes associated with secondary abnormalities as well as provides information regarding mushroom-based antidiabetic market products. Indians are genetically more susceptible to diabetes and the W.H.O predicts the number of diabetes in India would go up to 40 million by 2010 and 74 million by 2025. Diabetes is associated with long-term complications that affect almost every part of the body. However Insulin administration is effective to some extent in increasing the life expectation of diabetic patients, but there are wide spectrum of limitations as well as draw backs for this therapy. Some Oral hypoglycemic agents are also employed in this regard, such as renal damage and neurological disturbances. There are great deals of evidences to suggest that the use of carefully chosen herbal remedies and dietary supplements to prevent and control the diabetes. The leaves of the plant Actinodaphne hookeri Meissn. (Lauraceae) have been traditionally claimed to be useful in diabetic conditions but yet no scientific reports are available in this regard. Hence the plant Actinodaphne hookeri Meissn leaves was selected for Phytochemical investigations and Anti diabetic activity. Bioactive natural products are an excellent source of novel therapeutics. The search for bioactive molecules from nature continues to play a major role in developing new generation natural products of therapeutic importance. The present critical review includes research work carried out by active researchers in natural products' chemistry, pharmacology and therapeutics, and their implications in antidiabetic medications. This compiled scientific information will be a useful resource for future research especially in

identifying promising leads and direction for the development of novel drugs including useful adjuvants for the treatment of diabetic patient. The present therapeutic approaches in the treatment of diabetes are mainly focused to lower the elevated blood glucose by reducing its absorption in gastrointestinal tract, enhancing the sensitivity of insulin, controlling or modulating hepatic glucose output, and increased utilization of the glucose by the peripheral tissues. Involvement of oxidative stress and its impact on the cellular damage in diabetes mellitus has been established and could be a useful paradigm for the development of novel antihyperglycemics along with other therapeutic strategies. The present review also highlights the effects of various herbs, phytoconstituents, phytochemicals, microbial metabolites, and products of marine origins on hyperglycemic/diabetic conditions. Furthermore, efforts were made to discuss novel molecular targets such as insulin-signaling pathways, peroxisome proliferative activating receptor- $\gamma$ , and G-protein-coupled receptors that are participating in enhancing/influencing insulin secretion, critical carbohydrate metabolism pathways, endoplasmic reticulum stress-related pathways, intracellular events associated intracellular inflammation, and chromatin-modification pathways involvement in antidiabetic activity and their significance. World Health Organisation (WHO) has defined medicinal plants as plants that contain compounds or having properties that can be used for therapeutic purposes or those that synthesize metabolites to produce useful drugs. Medicinal plants are available in almost all countries of the world but India is considered as the largest producer of medicinal plants and, therefore, is called 'Botanical garden of the world'. The increasing prevalence of diabetes mellitus world-wide is an issue of major socio-economic concern. Scientific interest in plant-derived medicine is steadily rising, yet there is often a wide disparity in the caliber of information available. A detailed compilation of scientific information from across the globe, *Traditional Medicines for Modern Times: Antidiabetic Plants* highlights the potential role of dietary and medicinal plant materials in the prevention, treatment, and control of diabetes and its complications. The book not only describes plants traditionally used to treat diabetes, but evaluates the scientific studies on these plants and describes in vitro, in vivo, and clinical methods for their investigation. It examines the theory that changes in dietary patterns from traditional plant foodstuffs containing beneficial components, to richer, more processed "junk" food is responsible for the increased prevalence of diabetes worldwide. The book begins with an introduction to the disease diabetes mellitus written by a consultant physician and an up-to-date, detailed summary table and discussion of scientifically screened antidiabetic plants compiled by authors from the Jodrell Laboratories, Royal Botanic Gardens, Kew, UK. The next chapters provide an outline of clinical, in vivo, and in vitro methods for assessing antidiabetic activity of plant materials, followed by descriptions of traditional plant remedies used in Asia, the Americas, Africa, Europe, and Australia written by an international group of authors active in antidiabetic plant research. The final chapters emphasize the role of particular phytochemical groups in the treatment or prevention of diabetes. By documenting both traditional and scientifically derived knowledge, *Traditional Medicines for Modern Times: Antidiabetic Plants* brings us closer to the translation of traditional knowledge into new methods for treatment of this important disease. Diabetes mellitus is a lifestyle disorder that is rapidly becoming a major threat to populations all over the globe. Over the past 30 years, the status of diabetes has changed from being considered as a mild lifestyle disorder of the elderly to one of the major causes of morbidity and mortality, affecting people of all ages. There seems to be a renewed interest in herbal medicines across the world today and plants are a powerhouse of sources for antidiabetic drugs. The number of higher plant species on this planet estimates at 250,000. Of these, only about 6% have been screened for biologic activity and a reported 15% have been evaluated phytochemically. According to the WHO, 21,000 plants are used medicinally around the world by 65% of the world's population. The need for writing this review of antidiabetic medicinal plants came from the need to relate information about various medicinal plants with antidiabetic activity, in order to restore the ethnomedical knowledge of antidiabetic plants. This book will be of immense use to the scientific community to easily access the research data on antidiabetic plants for their therapeutic application. Volume 27, the first thematic volume in the Series, provides an overview of present knowledge with regard to the pharmacological and clinical aspects of antidiabetic drugs. It aims to stimulate further consideration of possible concepts in the development of new antidiabetic drugs. Diabetes mellitus is a complex metabolic syndrome, with wide spread derangements in the metabolism of carbohydrates, lipids and proteins and is associated with chronic hyperglycemia, the common outcome in all types of diabetes. Currently diabetes is assuming to be an epidemic and rated among the five leading causes of morbidity and mortality. Medicinal plants have long history of medicinal use and still are in use among different folks. Current study was conducted to evaluate the antidiabetic effects of traditional antidiabetic plants (*Acacia nilotica*, *Azadirachta indica* and *Euphorbia prostrata*) in diabetic rabbits. Alloxan at the dose of 150 mg/Kg body weight was administered intraperitoneally to induce diabetes. Methanolic extracts of these plants were prepared and were orally administered to diabetic rabbits once daily for 14 days at the doses of 250 mg/Kg and 500 mg/Kg body weight. Decrease in fasting blood glucose levels produced by methanolic extract of these plants was compared with standard drug (Glibenclamide, 5 mg/Kg). Serum cholesterol and triglyceride levels of diabetic rabbits were also evaluated at the end of study. Since the beginning of human civilization, medicinal plants have been used by mankind due to its therapeutic value, least toxicity and cost effective. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources. Many of these isolations were based on the uses of the agents in traditional medicine. The plant-based, traditional medicine systems continues to play an essential role in health care, with about 80% of the world's inhabitants relying mainly on traditional medicines for their primary health care. India has several traditional medical systems, such as Ayurveda and Unani, which has survived through more than 3000 years, mainly using plant-based drugs. The materia medica of these systems contains a rich heritage of indigenous herbal practices that have helped to sustain the health of most rural people of India. Therefore present work evaluation of *Blumea eriantha* for Anti diabetic activity may useful for development of a formulation from herbal sources which having least toxicity but much more efficacy and gift for poor population for management of Diabetes mellitus. -umesh pratap singh. Phytotherapy has the potential to give patients long term benefits with less or no side effects. This is the second volume of the series. This volume brings 11 chapters that cover updates on general phytotherapy, traditional Chinese medicine as well as information on anti-diabetic and antihypertensive herbs (including *Senna* spp., Curcumin, *Carum carvi*, *Premna serratifolia*, *Eugenia jambolana* and more). The monographs presented within this volume give several details necessary for pharmacopoeial data for quality assurance of pharmaceutical products derived from these specific plant sources: botanical features, distribution, identity tests, purity requirements, chemical assays, active or major chemical constituents, clinical applications, pharmacology, contraindications, warnings, precautions, potential adverse reactions, and posology. Hence academic and professional pharmacologists or clinicians will find comprehensive information on a variety of therapeutic agents along with guidelines for applying them in practical phytotherapy of diabetes and hypertension. Key features include: Details the role of plants for the treatment and management of cancer and diabetes Discusses the role of phytochemicals as ligands for cancer and diabetic targets Reviews plants and the potential of phytochemicals as antidiabetic and anticancer drugs Explores the green biosynthesis of nanoparticles and their treatment efficiency An ethno-medicinal plant *Psidium guajava* L. is commonly known as Guava belongs to myrtaceae family which has been claimed to possess several pharmacological properties including antidiabetic. The study was designed to evaluate the antidiabetic activity of aqueous extract of *Psidium guajava* leaves on streptozotocin induced type 2 diabetic model rats. Streptozotocine was induced (90mg/kg) ip to 48 hours old pups. After three months diabetes was confirmed using OGTT (fasting blood glucose >7mmol/L). Experimental rats were divided into four groups (n=7): i) Normal water control (10 ml/kg); ii) Diabetic water control (10 ml/kg); iii) Gliclazide treated (20 mg/kg) and iv) *Psidium guajava* leaves aqueous extract treated (1.25g/kg). The study materials were fed orally for 28 consecutive days. Blood samples were collected from tail tip on 0 day and from heart by cardiac puncture on 28th day. Anti-diabetic activity of the extract was evaluated by measuring glucose (Glucose Oxidase), serum insulin (ELISA), triglyceride (enzymatic colorimetric), total cholesterol, HDL-cholesterol, LDL-cholesterol (Cholesterol Oxidase/ Peroxidase), hepatic glycogen content (Anthrone reagent) method and intestinal glucose absorption by gut perfusion technique. Serum glucose level of extract treated group and gliclazide treated group decreased by 16% and 4% respectively where glucose level of water control group increased by 7%. Extract treated group significantly (p Present findings reveals that one month treatment with selected dosage of Aloe vera extract is beneficial to counteract the alterations in antioxidant enzyme system, oxidative enzymes and lipid metabolic profiles in diabetic induced wistar strain rats. The oxidative enzymes also reversed back to normal values. The changes in markers of lipid profile and oxidative stress which include triglycerides, MDA content and total cholesterol indicate efficient altered machinery of oxygen species that was operated in the renal tissue in detoxification of antioxidant system that is produced

due to diabetes. This study drawn a conclusion, stating that Aloe vera treatment to diabetic induced rats may be beneficial to improve the metabolic efficiency and thereby improve the health status. Thus Aloe vera may be useful in the formulation of herbal drugs which can be used in the treatment of diabetes. Since Aloe vera exhibited antioxidant and antidiabetic activity; it might be clinically useful in the control of human diabetes. Successive studies are mandatory to establish the precise nature of Aloe vera active constituents as well as their mechanism of action. "A Study on Inn-Virto Anti-Diabetic Activity of Bestasitostteerol" is a comprehensive research book written by G. Paneer Selvam, a renowned researcher in the field of pharmaceutical sciences. The book offers a detailed analysis of the therapeutic potential of Bestasitostteerol, a bioactive compound found in natural sources, in managing diabetes mellitus. The author presents a critical review of the existing literature on the pathophysiology of diabetes, the limitations of current treatment options, and the need for alternative approaches. He then proceeds to describe the methodology and results of his experiments, which involved testing the efficacy of Bestasitostteerol in vitro. The book provides a thorough discussion of the molecular mechanisms underlying the anti-diabetic effects of Bestasitostteerol, including its ability to enhance insulin sensitivity, suppress gluconeogenesis, and modulate glucose uptake in cells. The author also explores the potential side effects and safety considerations of using Bestasitostteerol as a therapeutic agent. Overall, "A Study on Inn-Virto Anti-Diabetic Activity of Bestasitostteerol" is a valuable resource for researchers, academics, and healthcare professionals interested in developing novel anti-diabetic drugs from natural sources. It provides a detailed understanding of the potential of Bestasitostteerol as a safe and effective alternative to conventional treatments for diabetes. Pongamia Pinnata (Stem bark) and Glycine max (fruits) were selected for evaluation of antidiabetic activity. Extracts were prepared by cold maceration method. Maximum antihyperglycaemic activity was observed in petroleum ether extract of Pongamia Pinnata (Called as PPSB-PEE). 11 compounds were isolated by column chromatography. Compound B2 was most promising antihyperglycaemic activity hence further characterized by physical and chemical properties. B2 was pure compounds namely cycloart-23-ene-3, 25 diol. B2 was further carried out for antidiabetic activity of streptozotocin-nicotinamide induced type 2 diabetic mice. The parameters were evaluated body weight, food and water intake, OGTT, serum and pancreatic insulin, HbA1c, haematology, lipid profile, renal and liver function test. Gomori staining was carried out for identification of pancreatic cells. In conclusion, PPSB-PEE possessed antihyperglycaemic activity mainly due to B2 (cycloart-23-ene-3, 25 diol). Probable mechanism of action appears to be due to stimulation of insulin release and antioxidant activity. Aqueous extract of Glycine max showed mild antihyperglycaemic activity. Discovery and Development of Antidiabetic Agents from Natural Products brings together global research on the medicinal chemistry of active agents from natural sources for the prevention and treatment of diabetes and associated disorders. From the identification of promising leads, to the extraction and synthesis of bioactive molecules, this book explores a range of important topics to support chemists in the discovery and development of safer, more economical therapeutics that are desperately needed in response to this emerging global epidemic. Beginning with an overview of bioactive chemical compounds from plants with anti-diabetic properties, the book goes on to outline the identification and extraction of anti-diabetic agents and antioxidants from natural sources. It then explores anti-diabetic plants from specific regions before looking more closely at the background, isolation, and synthesis of key therapeutic compounds and their derivatives, including Mangiferin, Resveratrol, natural saponins, and alpha-glucosidase enzyme inhibitors. The book concludes with a consideration of current and potential future applications. Combining the expertise of specialists from around the world, this volume aims to support and encourage medicinal chemists investigating natural sources as starting points for the development of standardized, safe, and effective antidiabetic therapeutics. Contains chapters written by active researchers and leading global experts who are deeply engaged in the research field of natural product chemistry for drug discovery Provides comprehensive coverage of cutting-edge research advances in the design of medicinal natural products with potential as preventives and therapeutics for diabetes and related metabolic issues Presents a practical review of the identification, isolation, and extraction techniques that help support medicinal chemists in the lab Looking for natural ways to enhance antidiabetic activity? Look no further than "Enhancing Antidiabetic Activity With Natural Vitamins, Minerals, and Probiotics" by R. Gopika. In this groundbreaking study, Gopika explores the use of natural vitamins, minerals, and probiotics for managing diabetes. By examining the mechanisms by which these natural substances modulate blood glucose levels, Gopika uncovers their potential for enhancing antidiabetic activity. Whether you're a healthcare professional interested in new approaches to managing diabetes or a researcher looking to stay up-to-date on the latest advances in antidiabetic activity, "Enhancing Antidiabetic Activity With Natural Vitamins, Minerals, and Probiotics" is an essential resource. Order your copy today and discover the potential of natural vitamins, minerals, and probiotics for managing diabetes! The human system employs the use of endogenous enzymatic as well as non-enzymatic antioxidant defence systems against the onslaught of free radicals and oxidative stress. Enzymatic antioxidants and non-enzymatic antioxidants work synergistically with each other, using different mechanisms against different free radicals and stages of oxidative stress. Dietary and lifestyle modifications are seen as the mainstay of treatment and management of chronic diseases such as diabetes mellitus. The major aims of dietary and lifestyle changes are to reduce weight, improve glycaemic control and reduce the risk of coronary heart disease, which accounts for 70- 80% of deaths among those with diabetes. It is also important to note that medicinal plants have been used as medicines since ancient time, and continue to play significant role even in modern medicine in management and treatment of chronic diseases. Impressive numbers of modern therapeutic agents have been developed from plants. Phytochemicals have been isolated and characterised from fruits such as grapes and apples, vegetables such as broccoli and onion, spices such as turmeric, beverages such as green tea and red wine, as well as many other sources. The WHO estimates that approximately 80% of the worlds inhabitants rely on traditional medicine for their primary health care and many medicinal plants have ethno-medical claims of usefulness in the treatment of diabetes and other chronic diseases globally, and have been employed empirically in antidiabetic, antihyperlipidemic, antihypertensive, antiinflammatory and antiparasitic remedies. This book examines the role of antioxidant-rich natural products in management and treatment of diabetes and other chronic diseases. This book is a unique overview of insights on the genetic basis of anti-diabetic activity, chemistry, physiology, biotechnology, mode-of-action, as well as cellular mechanisms of anti-diabetic secondary metabolites from medicinal plants. The World Health Organization estimated that 80% of the populations of developing countries rely on traditional medicines, mostly plant drugs, for their primary health care needs. There is an increasing demand for medicinal plants having anti-diabetic potential in both developing and developed countries. The expanding trade in medicinal plants has serious implications on the survival of several plant species, with many under threat to become extinct. This book describes various approaches to conserve these genetic resources. It discusses the whole spectrum of biotechnological tools from micro-propagation for large-scale multiplication, cell-culture techniques to the biosynthesis and enhancement of pharmaceutical compounds in the plants. It also discusses the genetic transformation as well as short- to long-term conservation of plant genetic resources via synthetic seed production and cryopreservation, respectively. The book is enriched with expert contributions from across the globe. This reference book is useful for researchers in the pharmaceutical and biotechnological industries, medicinal chemists, biochemists, botanists, molecular biologists, academicians, students as well as diabetic patients, traditional medicine practitioners, scientists in medicinal and aromatic plants, Ayurveda, Siddha, Unani and other traditional medical practitioners. Medicinal plants are a source of potential therapeutic compounds. Phytotherapy can give patients long term benefits with less or no side effects. This is the third volume of the series which features monographs on selected natural products used to treat diabetes and hypertension. This volume brings 7 chapters contributed by 22 researchers, that cover updates on the biochemistry of diabetes, information on anti-diabetic and antihypertensive properties of oil bearing plants, herbs, fruits and vegetables, medicinal plants from Asia, as well as the medicinal value of specific plants such as, star apple (*Chrysophyllum cainito*). In terms of therapeutic agents, two reviews in this volume focus on terpenoids and glucagon-like peptide - 1 are also included. Each review covers different plant species or medicinal agents where applicable, providing readers essential information about their role in the treatment of diabetes and hypertension. Both academic and professional pharmacologists as well as clinicians will find comprehensive information on a variety of therapeutic agents in this volume. The Wheatgrass Book is written by Ann Wigmore - the woman who introduced wheatgrass juice to America 30 years ago. Ann's book contains a wealth of information on wheatgrass - from its nutrient properties to ways of easily growing it for the home juicer. Chapters include: green power from wheatgrass, how wheatgrass chlorophyll works, super nutrition from wheatgrass, how to grow and juice wheatgrass and the many uses of wheatgrass. This is a must for the person serious about incorporating wheatgrass into his or her health regimen. In this present study,

antioxidant potential of the methanol extract of the root of *Cajanus cajan* Linn (MCC-R) was identified by using 1, 1-diphenyl-2-picrylhydrazyl (DPPH) scavenging assay, Reducing power assay, total antioxidant activity test and also by total Phenolic content test. In DPPH scavenging assay the IC-50 value of the extract was found to be 17.44 g/ml while the IC-50 value of the reference standard ascorbic acid was 15.06 g/ml. Total antioxidant capacities of MCC-R is expressed as the number of equivalent of ascorbic acid 266.7mg/g and the reducing power of MCC-R increased with concentration of the sample. The amount of total Phenolic 262.31mg/g Gallic acid. These results suggest that the MCC-R providing potent antioxidant properties and offering effective protection from free radicals. From this view point, MCC-R were tested for oral glucose tolerance test (OGTT) in normal mice. The postprandial blood glucose lowering effects of MCC-R (400mg/kg) were compared to a known type 2 diabetes drug (Acarbose-50mg/kg). The MCC-R were also tested alloxan (120 mg/kg) induced diabetic mice for 7 days. The blood glucose lowering effects MCC-R (200mg/kg). The purpose of this book is to introduce the classified chemical components of hypoglycemic compounds in natural products, summarize the recent research progress of natural products with hypoglycemic activity in the past 20 years, and provide the original analysis and development opinions of relevant scholars. Hypoglycemic compounds are to target diabetes mellitus, an important public health problem, one of four priority noncommunicable diseases (NCDs) targeted for action by world leaders. Diabetes mellitus is a common endocrine and metabolic disease, which not only causes physiological damage to patients' kidneys, cardiovascular and cerebrovascular vessels, peripheral blood vessels, nerves and eyes, but also causes mental and psychological pressure to patients. Due to the evidence that traditional medicine and natural herbal formula have advantages in treating diabetes, natural products with hypoglycemic activity have been studied extensively in recent years and have been accepted by many scholars all over the world. This book focuses on the progress on the study of the structure, hypoglycemic activities, structure-activity relationships and mechanism of a wide range of polysaccharides, flavonoids, saponins, alkaloids, terpenoids, polyphenols and other constituents. It will help students and researchers to understand current approaches and progress in the treatment of diabetes with natural products, which may also be beneficial to develop new hypoglycemic drugs.

**Abstract Title: The inhibitory effects of *Salvia triloba* and *Thymus praecox* on acetylcholinesterase activity in diabetic rats**

**Background** Diabetes mellitus (DM) is a metabolic disease characterized by long-term complications including cerebrovascular injury and cognitive disorders. Acetylcholinesterase (AChE) which is involved in numerous pathways in the central nervous system regulates the level of acetylcholine (ACh) which plays vital functions such as memory, learning, modulation of cerebral blood flow, movement control, neurotransmission as well (1). Recent studies have shown that hypoinsulinemia and insulin resistance is the reason of the decreased level of ACh and contribute the possible biochemical link between DM and cognitive disorders including Alzheimer's disease. Studies with plants have shed light on the correction of cognitive functions of diabetes mellitus with increased AChE activity. Some *Salvia* and *Thymus* species of the Lamiaceae family have antidiabetic effects (2). There is no study on antidiabetic activity of *Salvia triloba* and *Thymus praecox*.

**Aim** To investigate the effects of *Salvia triloba* and *Thymus praecox* on brain acetylcholinesterase activities in diabetes mellitus. With the help of obtained results, further studies will be carried out for ameliorating cognitive dysfunction effectively and also supporting current treatments.

**Method** The rats were divided into five groups (6 rats per group): Group-I: Normal control, Group-II: Diabetic control, Group-III: Treatment with *Salvia triloba* methanolic extract, (200 mg/kg/day, i.g.), Group-IV: Treatment with *Thymus praecox* methanolic extract, (100mg/kg/day, i.g.), Group-V: Treatment with Metformin (400 mg/kg/day, i.g.). Type 2 DM was induced experimentally in these groups of rats by the intraperitoneal administration of 55 mg/kg of STZ and 100 mg/kg nicotinamide, except control group. Treatments were carried out after induction of DM and lasted for 3 weeks except decapitation day. The AChE enzymatic assay was determined according to the method of Ellman et al. The reaction mixture (2 mL final volume) contained 100 mM K<sup>+</sup>-phosphate buffer, pH 7.5 and 1 mM 5,50-dithiobisnitrobenzoic acid (DTNB). The method is based on the formation of the yellow anion, 5, 50- dithio-bis-acid-nitrobenzoic, measured by absorbance at 412 nm during 2 min incubation at 25°C. The enzyme (40 µg of protein) was pre-incubated for 2 min. The reaction was initiated by adding 0.8 mM acetylthiocholine iodide (AcSCh). All samples were in triplicate readings and the enzyme activities were expressed in mmol AcSCh/h/mg of protein.

**Results** *Thymus praecox* and *Salvia triloba* in methanolic extract considerably decreased (p<0.0001) blood glucose levels compared to diabetic rats and performed this drop for 3 weeks. *Thymus praecox* extract reached its maximum hypoglycemic effect (141.83±17.31, p<0.0001) in 2 weeks. At the same time, *Thymus praecox* and *Salvia triloba* extract also showed strong hypoglycemic effect (164.83±113.30, p<0.0001). The diabetic group exhibited a significant increase (p<0.001) in AChE activity in prefrontal cortex compared to the control and the treatment groups. However *Salvia triloba* extract and *Thymus praecox* extract reverted this increase (p<0.001) in AChE activity induced by diabetes after 3 weeks of treatment. The metformin group decreased (47%, p<0.001) in AChE activity compared to diabetic groups. *Salvia triloba* extract (37%, p<0.001) and *Thymus praecox* extract group (41%, p<0.001) a considerably decrease in AChE activity compared to diabetic group. The metformin group did not show a significant difference in enzyme activity compared to the control group. However, *Salvia triloba* and *Thymus praecox* increased (p<0.05) in AChE activity compared to control groups.

**Discussion** Our study results showed that an increase in AChE activity in type 2 diabetic rat brains. This increase in AChE activity in the T2DM rat model can be linked to depletion in cholinergic actions leading to defective neurotransmission and cognitive dysfunction as a result of decreased levels of ACh in the synaptic cleft. We showed that the reestablishment of AChE activity by *Salvia triloba* extract and *Thymus praecox* extract which for the first time demonstrated antidiabetic activities can contribute to the maintenance of cholinergic signaling in diabetic rats. In the light of the results, these plants give a valuable direction for researchers on the future for diabetes-related cognitive disorders.

1. Jacobson AM., et al., Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Study Research Group, Long-term effect of diabetes and its treatment on cognitive function. *N Engl J Med.* 2007;356(18):1842-1852.

2. Davids D., et al., Ethnobotanical survey of medicinal plants used to manage High Blood Pressure and Type 2 Diabetes Mellitus in Bitterfontein, Western Cape Province, South Africa, *J Ethnopharmacol.* 2016 Dec 24;194:755-766. This work presents a systematic review of traditional herbal medicine and their active compounds, as well as their mechanism of action in the prevention and treatment of diabetes and obesity. The side effects and safety of herbal-derived anti-diabetic and anti-obesity phytochemicals are detailed in depth, and the text has a strong focus on current and future trends in anti-diabetic medicinal plants. This unique and comprehensive text is the only current book on the market focusing exclusively on medicinal plants used to combat obesity and diabetes. An introductory chapter focuses on diabetes and obesity and introduces the major causes and main treatments of this increasing epidemic in modern society. Readers are then introduced to medicinal plants, including details on their therapeutic aspects, plus side effects and safety. Following chapters focus on anti-diabetic and anti-obesity medicinal plants, as well as phytochemicals in the treatment of each. The text closes by focusing on present and future trends and challenges in these medicinal plants.

**Anti-diabetes and Anti-obesity Medicinal Plants and Phytochemicals: Safety, Efficacy, and Action Mechanisms** is a much-needed and truly original work, finally presenting in one place all the necessary information on medicinal plants used in conjunction with obesity and diabetes prevention. Explore traditionally used medicinal plants for diabetes mellitus would be beneficial to find an alternative option for controlling global diabetic prevalence. Present study aims to compare and identify potential antidiabetic activity in *Tinospora cordifolia*, *Gymnema sylvestris* and *Aegle marmelos*. Fifty percent acetone and ethyl acetate extracts of each plant were studied for anti-diabetic activity using different assays (ORAC, DPPH, ABTS, TPC, α-glucosidase inhibition). Total phenolic content and anti oxidant properties were significantly different among three plants. *Tinospora cordifolia* ethyl acetate extract possessed significantly higher anti oxidant activity and total phenolic content. DPPH and ABTS results were significantly correlated with each other and with TPC assay thus phenolics could be the major contributor for the antioxidant activity. Ethyl acetate fraction of *Gymnema* possessed significantly higher α-glucosidase inhibitory effect. Overall both the ethyl acetate fraction of *Guduchi* and 50% acetone fraction of *Bael* showed considerably high anti-oxidative activity and total phenolic content while *Gymnema* showed the highest potential of α-glucosidase inhibitory effect thus all these three plants could contain potential antidiabetic activity. Further investigation should be conducted using higher sample size to confirm these observations. Anti diabetic activity of these samples could further be evaluated through animal studies. The incidence and severity of diabetes mellitus is increasing worldwide, presenting a significant burden to society both in economic terms and overall well-being. Fortunately, time-tested anti-diabetes mellitus plant foods exist that are safe and could be effective in addressing this condition when consumed judiciously with a concomitant change in lifestyle. Plants with Anti-Diabetes Mellitus

Properties presents an exhaustive compilation of the anti-diabetes mellitus activities of more than 1000 plants occurring worldwide. The author provides a brief botanical description, distribution, pharmacological properties, and phytochemicals, where appropriate. A list of traditional medicinal plants used to treat diabetes, but not tested for anti-diabetic activity, is also given. This unique reference highlights anti-diabetes mellitus plant foods along with a list of the edible parts of plants with anti-diabetes mellitus properties. Anti-diabetes mellitus nutraceuticals are described with guidelines for the development of food supplements and formulations of diets appropriate for diabetic patients. This is a valuable source of information for researchers, students, doctors, diabetic patients, and other individuals wanting to learn more about plant-based treatments for diabetes mellitus. Interest in the molecular and mechanistic aspects of cosmetic research has grown exponentially during the past decade. *Herbal Principles in Cosmetics: Properties and Mechanisms of Action* critically examines the botanical, ethnopharmacological, phytochemical, and molecular aspects of botanical active ingredients used in cosmetics. Along with dermatology, Diabetes is a chronic condition associated with metabolic disorder. Persons suffering from diabetes have shown accelerated levels of blood sugar which often harms the heart, blood vessels, eyes, kidneys, and nerves. Over the past few decades, the prevalence of diabetes has been progressively increasing. Synthetic drugs are used to treat diabetic patients to help control the disorder, but it is shown that numerous medicinal plants and herbal drugs are widely used in several traditional systems of medicine to prevent and treat diabetes. They are reported to produce beneficial effects in combating diabetes and alleviating diabetes-related complications. These plants contain phytonutrients and phytoconstituents demonstrating protective or disease preventive properties. In many developing countries, herbal drugs are recommended by traditional practitioners for diabetes treatment because the use of synthetic drugs is not affordable. **Key Features:** Provides botanical descriptions, distribution, and pharmacological investigations of notable medicinal and herbal plants used to prevent or treat diabetes. Discusses phytochemical and polyherbal formulations for the management of diabetes and other related complications. Contains reports on antidiabetic plants and their potential uses in drug discovery based on their bioactive molecules. This volume in the *Exploring Medicinal Plants* series provides an overview of natural healing treatments in selected antidiabetic plants. The book presents valuable information to scientists, researchers, and students working with medicinal plants or for those specializing in areas of ethnobotany, natural products, pharmacognosy, and other areas of allied healthcare. It is also useful to pharmaceutical companies, industrialists, and health policy makers. This book is a description of anti-diabetic activity of *Spheranthus Indicus* on streptozotocin induced diabetes on rats. *Spheranthus Indicus* which is commonly known as Gorukhmundi is a weed of Indian origin whose various activities have been proven in Charak Sahinta. The mortality rate with streptozotocin was quite low as compared to alloxan induced diabetes. The response in lowering blood sugar in fasting as well as post prandial rats along with the lipid profile like triglycerides, LDL, VLDL with *Spheranthus Indicus* is quite positive. This book can be used as good resource for designing a formulation using *Spheranthus Indicus*. People around us are like flowers, no one knows how much impact they have on the lives of us. Often, we have no clue just because of being servile. But If we really want LOVE to enter our Heart, we HAVE to show prone towards our loving ones in their every bad condition. Because sharing a helping hand towards them by providing right kind of herbal product really aids to resolve their health problems and find them relieve. *Medicinal Foods as Potential Therapies for Type-2 Diabetes and Associated Diseases: The Chemical and Pharmacological Basis of their Action* focuses on active pharmacological principles that modulate diabetes, associated risk factors, complications and the mechanism of action of widely used anti-diabetic herbal plants—rather than just the nutritional composition of certain foods. The book provides up-to-date information on acclaimed antidiabetic super fruits, spices and other food ingredients. Sections cover diabetes and obesity at the global level, the physiological control of carbohydrate and lipid metabolism, the pathophysiology of type-2 diabetes, the chemistry and pharmacology of a variety of spices, and much more. This book will be invaluable for research scientists and students in the medical and pharmaceutical sciences, medicinal chemistry, herbal medicine, drug discovery/development, nutrition science, and for herbal practitioners and those from the nutraceutical and pharm industries. Provides background knowledge on type-2 diabetes and its pathophysiology and therapeutic targets down to the molecular level Explores, in detail, the chemistry or secondary metabolites of the indicated foods that potentially modify diabetes and/or associated diseases Examines the pharmacological findings on medicinal foods, including available clinical trials Apart from diet and exercise, the strategic use of different classes of prescribed or non-prescribed xenobiotic compounds for the restoration of euglycemic levels in the body is well known. The ongoing rivalry between the recommended usage of allopathic medicines versus ayurvedic remedies has encouraged many researchers to focus their studies on thoroughly isolating and characterizing the extracts from different parts of plants and then evaluating their relative activities via in vitro, in vivo and in some cases clinical studies. *Alternative Medicines for Diabetes Management: Advances in Pharmacognosy and Medicinal Chemistry* provides a holistic view of all oral therapies for diabetes mellitus that are available to the public by removing the silos and stigmas that are associated with both allopathic and ayurvedic medicines. **Additional Features Include:** Highlights the potential role of dietary and medicinal plant materials in the prevention, treatment, and control of diabetes and its complications. Educates readers on the benefits and shortcomings of the various present and potential oral therapies for diabetes mellitus. Allows quick identification and retrieval of material by researchers learning the efficacy, associated dosage and toxicity of each of the classes of compounds. Presents the history, nomenclature, mechanisms of action and shortcomings for each of the various subclasses of allopathic therapeutants for diabetes mellitus and then introduces ayurvedic medicines. Section C discusses various metallopharmaceuticals and provides a holistic view of all available and potential therapies for the disease. Here is an informative overview of diabetes mellitus in conjunction with plant-based treatments. It discusses available methods for studying the antidiabetic activities of scientifically developed plant products, mechanisms of action, their therapeutic superiority, and current genome editing research perspectives and biotechnological approaches. The book begins with an introduction to diabetes, giving a brief overview of the history, diagnosis, classification, pathophysiology, and risk factors. It goes on to review traditional uses of plants for diabetes along with ethnobotanical information. The results of scientific studies on the various modes of action of antidiabetic plants are discussed, such as the molecular aspects of active plantbased antidiabetic drug molecules. A section featuring recent biotechnological advancements of antidiabetic plants and plant-based antidiabetic drugs covers advances in molecular breeding and application of molecular markers, biotechnologically engineered transgenic medicinal plants, and advances in genomic editing tools and techniques. The new edition of this successful reference offers both cutting-edge and classic pharmacological methods. Thoroughly revised and expanded to two volumes, it offers an updated selection of the most frequently used assays for reliably detecting the pharmacological effects of potential drugs. Every chapter has been updated, and numerous assays have been added. Each of the more than 1,000 assays comprises a detailed protocol outlining purpose and rationale, and a critical assessment of the results and their pharmacological and clinical relevance. Diabetes mellitus is a disease which is characterized by an increase in the blood glucose level resulting from insulin deficiency or insulin resistance or both. As a result it can lead to glycation of tissues which proceeds with acute metabolic disturbances which ends with organ damage with severe health deteriorations. Such a condition results in increased blood glucose levels which in turn damage many organ systems like nervous system, blood vascular system etc. Diabetes may occur due to autoimmune destruction of pancreatic  $\beta$  cells with consequent insulin deficiency or due to abnormalities that results in insulin resistance. Due to insulin resistance on target tissues, abnormalities in carbohydrate, protein and fat metabolism occurs in diabetes. Symptoms of diabetes are polyuria, polydipsia, weight loss, and polyphagia. Uncontrolled diabetes may lead to acute life threatening consequences like ketoacidosis or non ketonic hyperosmolar syndrome. Featuring more than 4100 references, *Drug-Induced Liver Disease* will be an invaluable reference for gastroenterologists, hepatologists, family physicians, internists, pathologists, pharmacists, pharmacologists, and clinical toxicologists, and graduate and medical school students in these disciplines.