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PHARMACOGNOSTIC PROFILE AND OF ANTI DIABETIC ACTIVITY OF *CORCHORUS TRILOCULARIS*

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ABSTRACT

Diabetes has been recognized as a major health problem worldwide for the twenty-first century. Developing countries of Asia and Africa are the most viable areas where the disease is feared to raise 2–3 folds. A survey revealed that it is expected to increase to 366 million people by 2030 worldwide In particular, the number of people with diabetes in India is around 40.9 million by 2004 and is expected to rise to 69.9 million by 2030. India leads the world with largest number of diabetic subjects thus earning the dubious distinction of being termed the ‘‘Diabetes Capital of the World”. The disease imposes huge human and economic costs on patients, their families, local communities, health care systems, and societies. Diabetes mellitus was known to ancient Indian physicians as ‘madumeha’. Diabetes mellitus (DM) is a chronic and metabolic disease affecting glucose, fat, and protein metabolism Diabetes is defined as a state in which homeostasis of carbohydrate, protein and lipid metabolism is improperly regulated as a consequence of a relative or absolute deficiency of insulin secretion, resistance to insulin action or both at one or more points in the complex pathways of hormone action. This results primarily in elevated fasting and postprandial blood glucose levels. If this imbalanced homeostasis doesn’t return to normalcy and continuous for a protracted period of time, it leads to hyperglycemia that is due course turns into a syndrome called diabetes mellitus

KEYWORDS: Diabetes mellitus, insulin secretion, hyperglycemia, carbohydrate.

INTRODUCTION

Diabetes mellitus was known to ancient Indian physicians as ‘madumeha’ Diabetes mellitus (DM) is a chronic and metabolic disease affecting glucose, fat, and protein metabolism Diabetes is defined as a state in which homeostasis of carbohydrate, protein and lipid metabolism is improperly regulated as a consequence of a relative or absolute deficiency of insulin secretion, resistance to insulin action or both at one or more points in the complex pathways of hormone action. This results primarily in elevated fasting and postprandial blood glucose levels. If this imbalanced homeostasis doesn’t return to normalcy and continuous for a protracted period of time, it leads to hyperglycemia that is due course turns into a syndrome called diabetes mellitus DM causes complications such as nephropathy, neuropathy, retinopathy, blindness, obesity, limb amputation and failure of various organs, in particular the blood vessels and nerves and increases mortality rate.

Classification of Diabetes Mellitus

Diabetes mellitus was previously classified in two categories:

1. Type I - Insulin dependent diabetes mellitus (IDDM)
2. Type II -) Non- insulin dependent diabetes mellitus (NIDDM)

In year 1999, the classification was revised by WHO and the new classification reflects the stages of hyperglycemia as well as etiology

Type I - Insulin dependent diabetes mellitus (IDDM)

It is an autoimmune disorder caused by destruction of insulin producing β-cells when auto aggressive T lymphocytes infiltrate the pancreas. This leads to hyperinsulinemia and thus hyperglycemia. Patients with type I diabetes are prone to ketoacidosis and dependent on daily insulin injection for survival. Ketoacidosis is a serious condition that leads to diabetic coma and even death. This type of diabetes accounts for 5-10% of all cases frequently in children and adolescents.[1]

Immune Mediated
Idiopathic

Type II - Non- insulin dependent diabetes mellitus (NIDDM)
Type II diabetes or non-insulin dependent diabetes mellitus (NIDDM) accounts for 90- 95 % of all diabetic patients. It is usually associated with a combination of pancreatic β-cell dysfunction and insulin resistance in various tissues such as adipose tissue, skeletal muscle and liver. Normal β-cells can compensate for insulin resistance by increasing insulin secretion or β- cell mass, but insufficient compensation leads to the onset of glucose intolerance. Type II diabetes is highly associated with modern lifestyle and obesity that is more common in developed countries.[2]

Complications of Diabetes
As diabetes progresses and β-cell function deteriorates, the increase in insulin begins to fall below the body requirements. This all causes prolonged and severe hyperglycemia. Chronic hyperglycemia may cause toxicity to metabolic processes and to cells resulting in long term complications of diabetes. The most common complications include cardiovascular complications and micro vascular complications.

Cardiovascular Complications
Cardiovascular complications such as coronary heart disease and strokes may lead to mortality. Multiple mechanisms including hyperglycemia induced protein glycation, oxidation, glycoxidation and lipoxidation are involved in development of cardiovascular complications in diabetic patients.[3]

Diabetic Retinopathy
Diabetic retinopathy can result in severe and permanent visual loss in diabetic patients. It is due to the breakdown of the cells that regulate the circulation of blood in the retina. It may lead to cardiovascular complications and diabetic complications.[4]

Diabetic ketoacidosis
Diabetic ketoacidosis (DKA) is an acute, dangerous complication and is always a medical emergency. On presentation at hospital, the patient in DKA is typically dehydrated and breathing both fast and deeply. Abdominal pain is common and may be severe. The level of consciousness is typically normal until late in the process, when lethargy (dulled or reduced level of alertness or consciousness) may progress to coma. Ketoacidosis can become severe enough to cause hypotension and death. It is much more common in type 1 diabetes than type 2, but can still occur in patients with type 2 diabetes[5]

PLANT PROFILE
The genus Corchorus (Tillaceae family) contains an estimated 40 to 100 species of flowering plants native to tropical and subtropical regions throughout the world.[6]

The crop ‘jute’ belongs to the genus Corchorus and is the most important natural fibre crop next to cotton. Jute is a native plant of tropical Africa and Asia but also has been spread to Australia, South America and some parts of Europe. It has been grown extensively in India, Bangladesh, China, Myanmar and Nepal.[7]

Structure & Shape
Wild Jute is a branched annual herb, up to 1 mtr. tall, usually erect, sometimes found prostrate due to browsing by cattle. Young branches are purplish, sparsely hairy. Leaves are oblong to lance shaped, up to 12 × 3.5 cm, hairless or hairy, particularly on the veins. Margins are toothed with a long bristle on the 2 lowermost teeth. Flowers are borne in 1-3 flowered leaf- opposed clusters. Flowers are yellow, with sepals narrowly lance shaped, as long as the petals. Petals are 4-5, 5-7 mm long, 2-2.5 mm wide, obviate tapering to a short ciliate claw. Stamens are many. Fruit is a slender more or less erect, cylindrical, many-seeded capsule, straight or slightly curved, up to 7 cm long, 3-4-angled with a rough surface. The species name trilocularis comes from the three-chambered ovary. Young tender leaves are cooked and eaten.[8]

Distribution
Australia, tropical Africa, India, Maharashtra; Gujarat; Punjab; Rajasthan.

Chemical Constituents
Penta cyclic triterpenoids betulinic Acid and steroid β-sitosterol-D-glucoside have been isolated, on chemical examination it was concluded that, flavonoids were present in whole plant extract. cardiac glycosides strophanthidin (1) -3-ß-D-bolvinosido -ß-D-glucoside corchoroside A, components of glycoside mixture – olitoriside. Triterpenoids such as, Oxocorosin, Urosolic acid and corosolic acid have been isolated from Corchorus trilocularis.[9]

Plant seeds of Corchorus capsularis comprised of corchorin, corchortoxin helveticoside, cardiac glycosides, corchoroside A and B, olitoriside, erysimoside, strophantidol glycosides, biosides, oliogosaccaride and olitoriside; whilst leaves comprised of saponins, flavonoids, glucoside, capsularin steroids triterpenes and several various secondary metabolites. The pharmacological experiments unveiled the fact that the plant possessed anti-inflammatory, analgesic, antipyretic, cardiac, antioxidant, antimicrobial, insecticidal and several additional pharmacological properties.[10]

Traditional Uses
The leaves are tasty and sourly, cooling laxative, stimulant, tonic, and aphrodisiac; destroy "tridosha". The edible leaves of Corchorus species are reported to contain some trace minerals useful to alleviate mineral deficiencies of the human body. The seeds are used to removes tumors, pain, stomach troubles, skin diseases,

and scabies. The leaves are reported to pr event cardiovascular disorders.[11]

The leaves from Corchorus capsularis have been reported to hold demulcent, laxative, appetizer, stimulant and stomachic and its infusion is customarily used to cure constipation, dysentery, fevers, liver problems as well as dyspepsia. Additionally, decoction of the roots, as well as unripe fruits, has long been used to combat dysentery. The leaves of capsularis are actually consumed as vegetables in numerous area of the world such as Bangladesh, Africa, Middle East and Southeast Parts of Asia, which include Malaysia, for a long period [11]

Several different common names for the plant are used in various contexts. For example, the name jute applies to the fiber produced from the plant and the name mallow leaf molokhia

CONCLUSIONS

In conclusion, C. tridens L. is an understudied plant that could have applications in the health and nutrition industry owing to its abundant phytochemicals and nutritional constituents. Therefore, more research is needed to explore the pharmacological properties in relation to its underappreciated traditional usage, particularly in the treatment of STIs and inflammation, prevention of anaemia, and treatment of measles and pain-reliving properties. Our research group is currently working on the plant to pharmacologically evaluate the unexplored therapeutic activities in relation to their traditional uses to fill these identified gaps. Future research should clarify the precise mechanisms of action of C. tridens L., and its main bioactive phytochemical constituents. The development of safe and effective dosage forms from this plant requires the completion of clinical trials to assess the pharmacokinetics, safety, appropriate dosage, and efficacy of C. tridens

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