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A SHORT REVIEW ON DIABETES AND VILVAM [*Aegle marmelos*]

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ABSTRACT

Diabetes mellitus (DM) is a metabolic disorder due to altered carbohydrate, protein and fat metabolism. It is also well known as endocrine disorder because to insufficiency of the hormone, insulin which is secreted by the beta cells of pancreas. Diabetes is characterized by polyuria [frequent urination], polydipsia [increased thirst], polyphagia [increased hunger] and loss of weight, in later peripheral neuritis on palm and sole. Depending upon the etiology Diabetes is divided into 2 Types. That is 1. Insulin dependent and 2. Non-Insulin Dependent (IDDM and NIIDDM). In the two types of DM (Type I and II), Type II is the most common one all among the world. *Aegle marmelos* (Vilvam) is a popular medicinal plant in Siddha systems of medicine used to treat diabetes, diarrhea, Peptic ulcer, Spermatorrhoea etc. The plant Vilvam is the ‘Thalavriksham’ in all Lord Shiva temples. *Aegle marmelos* is used for its anti-Diabetic activity all over the India by the practitioners of Indian system of medicine.

KEYWORDS

Bael, *Aegle marmelos*, Madhumegam, Siddha herbs and hypoglycemic activity.

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INTRODUCTION

Diabetes mellitus (DM) is syndrome, initially characterized by a loss of glucose homeostasis resulting from defects in insulin secretion, insulin action both resulting impaired metabolism of glucose and other energy-yielding fuels such as lipids and protein¹. Diabetes mellitus is a major global health concerning with a projected rise in prevalence from 171 million in 2000 to 366 million in 2030². Diabetes mellitus is considered as one of the five leading causes of death in the world³. And it is a systemic metabolic disease characterized by

hyperglycemia, hyperlipidemia, hyperaminoacidemia, hypoinsulinaemia which leads to decrease in both insulin secretion and insulin action⁴. Diabetes has emerged as a major healthcare problem in India. According to Diabetes Atlas published by the International Diabetes Federation [IDF], there were an estimated 40 million persons with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025. The countries with the largest number of diabetic people will be India, China and USA by 2030. The oral hypoglycemic agents [OHAs] like Metformin used for NIDDM all around world widely. In present days world's focus turns to the herbal medicine because of the side effect of modern drugs⁵. Much of the heart disease and stroke in these estimates was linked to diabetes. WHO estimates that diabetes, heart disease and stroke together will cost about \$ 333.6 billion over the next 10 years in India alone⁶. In India number of plants is mentioned in ancient literature (Siddha) for the cure of diabetic condition and to prevent complications. Some of the Medicinal plants have been experimentally evaluated and the active principles were isolated⁷. DM is congruent with Madhumegam (Madhu-sweet, Megam-urination) in Siddha system of medicine. There are 20 types of Madhumegam explained in Siddha text and literatures according to Vali, Azhal, and Iyyam. Siddha medicine has better remedies for treatment and management of diabetes. Many of the Siddha medicinal plants possess the anti-diabetic property. Plants are always an exemplary source of drugs; in fact many of the currently available drugs were derived directly or indirectly from them. According to world ethnobotanical information reports, almost 800 plants may possess antidiabetic potential⁸. In the past decade, research has been focused on scientific evaluation of traditional drugs of plant origin and screening of more effective and safe hypoglycemic agents has continued to be an important area. In developing countries 80% of populations are using traditional medicine in primary medical problems⁹. Moreover, undesirable effect such as hypoglycemic, anorexia, brain atrophy and fatty liver appear during

the uptake of oral hypoglycemic synthetic drugs. Therefore there is need safer and more effective antidiabetic and ameliorative drugs¹⁰. In Siddha medicine the herb, *Aegle marmelos* [Vilvam] is used to treat Peptic ulcer, diarrhea, dysentery, Spermatorrhea, diabetes, Ulcerative colitis, etc¹¹.

VILVAM *Aegle marmelos*

Aegle marmelos (AM) is a medium sized, armed deciduous tree found wild, especially in dry forests and is also cultivated throughout Indian subcontinent for its fruit. Leaves, fruits, stem and roots of this plant have been used in ethno medicines for several medicinal properties: astringent, antidiarrheal, antidysentric, demulcent, antipyretic, antiscourbutic, aphordisiac and as an antidote to snake venom¹². Daily intake of *Aegle marmelos* juice with fresh bitter-gourd juice will stimulate the pancreas and enable it to secrete insulin.

IN PRECLINICAL STUDY¹³

It was evaluated for the hypoglycemic activity of the *Aegle marmelos* (AM) leaf aqueous extract in streptozotocin induced diabetic mice. After the administration of the leaf extract, the weight of the animal recovered to almost to the normal level. There was significant reduction in the fasting blood glucose level. And marked reduction was seen in the TC, LDL, VLDL, TGL and it is significant ($P < 0.05$). There was significant reduction in liver glucose-6-phosphatase activity in the treated group compared to the untreated group. Treatment with AM extract led to a 41 and 40% increase respectively in hepatic and muscle glycogen content in diabetic group ($p < 0.05$) as compared to diabetic control group. Data showed that 300 mg/kg b.wt of extract was most effective in reverting the diabetic mice to normal condition. Different biochemical parameters like glucose tolerance test, lipid profile, glycogen biosynthesis, glucose uptake, differential regulation of glucose homeostatic enzymes like glucose-6-phosphatase, hexokinase and insulin release *in vitro*, clearly demonstrated the hypoglycemic effect in treated

animals. The data showed that this plant's (AM) leaf extract has remarkable hypoglycemic and hypolipidemic effects¹³.

IN CLINICAL STUDY¹⁴

The leaves of *Aegle marmelos* in diabetic patients, hypoglycemic effects were accompanied by significant changes in the postprandial blood glucose level (PPBGL). The fall in PPBGL was more marked in group IV where patients were receiving the test drug along with oral hypoglycemic therapy when compared with group I (test drug alone) and II (control group). The study suggested that the Bael leaves produce hypoglycemic effect probably by enhancing the peripheral utilization of glucose, correcting the impaired hepatic glycolysis and limiting its gluconeogenic formation similar to Insulin¹⁴.

CONCLUSION

Siddha system is one of the ancient system of medicine with full of pride which has more number of medicinal plants used for many specific diseases. As per past decades, scientific research held on Vilvam [*Aegle marmelos*] shows safer antidiabetic activity. And it is assured that Siddha system of medicine along with its traditional life style and food habits can challenge to prevent, treat and to control Diabetes on this scientific and modern world. AM can be combined in high dose with oral hypoglycemic agents to bring the blood glucose to normal levels in patients whose diabetes is not controlled with these agents or in those patients in whom these drugs produce adverse effects on dose increments. This article supports the inclusion of herb for traditional antidiabetic preparation and to save the diabetic society from the complications of the disease.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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