

A review on *Bhallatak* in Management of lifestyle disorder *Prameha* w. s. r. to Diabetes Mellitus.

Harshal Shende*¹, Sachin Sheth², Baban Rathod³

1. P.G student,
2. Assistant Professor,
3. Professor and HOD,

P.G Dept. of Rasashastra, APM's Ayurved Mahavidyalaya,
 Sion, Mumbai, Maharashtra, India.

*Corresponding Author: drharshal8393@gmail.com

Abstract:

Lifestyle diseases are diseases linked with the way people live their life. This is commonly caused by lack of physical activity, unhealthy eating, lack of organic (food-fruits-vegetables), irregular daily routine i.e. (sleep, irregular meals, toilet) etc. Alcohol intake, drug consumption and smoking are also responsible factors. Diseases that impact on our lifestyle are heart disease, stroke, obesity and type II diabetes. Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defect in insulin secretion, action, or both. Liver plays an important role in the glucose homeostasis through *glycolysis*, *glycogenesis*, and *gluconeogenesis*.

Semecarpus anacardium ('*Bhallatak*') has been used in various traditional system of medicines for various ailments since ancient times. Its nut contains a variety of biologically active compounds such as bioflavonoid, phenolic

compounds, *bhilawanols*, minerals, vitamins and amino acids, which show various medicinal properties. The fruit and nut extract shows various activities like hypoglycemic *anti-atherogenic*, *anti-inflammatory*, *antioxidant*, *antimicrobial*, *anti-reproductive*, CNS stimulant, *anti-carcinogenic* and hair growth promoter. Research study revealed, the *ethanolic* extract of SA (100 mg/kg) reduced the blood glucose of normal rats. *Bhallatak* was able to restore the altered activities of the enzymes involved in carbohydrate metabolism and energy production.

Keywords: *Bhallatak*, *semecarpus anacardium*, *Prameha*, Diabetes mellitus, lifestyle diseases, Anti hyperglycemic agents, Insulin

Introduction:

Prameha is a syndrome described in the ancient *Ayurvedic* texts that includes clinical conditions involved in obesity, pre-diabetes, diabetes mellitus, and metabolic syndrome. Even

though *Prameha* is a *Tridoshaj Vyadhi* (a disease involving all three of the psycho-physiological principles known as *Doshas* i.e. (*Vata, Pitta and Kapha*), it is basically a disease with *Kapha* predominance.

Several lifestyle factors affect the incidence of type 2 diabetes. Diabetes mellitus are increasing in epidemic proportions globally. Diabetes mellitus (DM) is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period.¹

In diabetes there is hyperglycemia, caused by varying degrees of insulin deficiency, peripheral insulin resistance, or both. The seriousness of the disease stems from its potential for long term cardiovascular, neurological, ocular, renal, etc. A number of lifestyle factors are known to be important to the development of diabetes mellitus type 2 including: obesity, physical activity, diet, stress, and urbanization.² Excess body fat underlies 64% of cases of diabetes in men and 77% of cases in women.³

Diabetes mellitus:

Diabetes mellitus (DM) is a group of metabolic disorders. In this disease carbohydrate, protein and fat metabolism is hampered due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced⁴. In this disease there is High blood sugar level which affect cardiovascular, neurological, ocular, renal, etc.

Types:

There are three main types of diabetes mellitus⁵.

American Diabetes association (ADA) and WHO has recommended following classification:

1) Type -I: Insulin dependent Diabetes Mellitus (IDDM) Beta cells destruction leads to absolute insulin deficiency.

- a) Autoimmune
- b) Idiopathic

2) Type -II: Non-Insulin Dependent Diabetes Mellitus (NIDDM).

- a) Predominantly insulin Resistance.
- b) Predominantly insulin secretory defects.

3) Other types of Diabetes Mellitus:-

- a) Genetic defect of beta cells dysfunction
e.g. Maturity onset Diabetes of the Young (MODY- 1to 6)
- b) Genetic defects in insulin action
e.g. type A insulin resistance.
- c) Diabetes of exocrine pancreas
e.g. fibro- calculus pancreatopathy
- d) Endocrinopathies
e.g. Acromegaly, Cushing's syndrome etc.
- e) Infections
e.g. congenital Rubella.
- f) Drugs or chemical induced
e.g. glucocorticoids.

4) Gestation Diabetes.

a) Type-I Diabetes Mellitus (IDDM):-

It has its onset most often in childhood and adolescence, although it may occur at any age. IDDM patients depend on insulin to be supplied from outside.

b) Type-II Diabetes Mellitus (NIDDM):-

It usually begins in the middle age or after 40 years. There is mix patho-physiological basis of impaired beta cell function with peripheral insulin resistance.

5) Other specific types of Diabetes Mellitus:

- a) Development of (type II) Diabetes Mellitus below the age of 25 years is called as maturity onset Diabetes of the young. Glucokinase deficiency is present in MODY
- b) Genetic defects in insulin action:-
- c) Insulin resistance associated with several syndromes are divided in
- d) Associated with genetic defects resulting decrease in insulin receptors numbers.
- e) Due to antibodies against insulin receptors.
- f) Diseases of Exocrine Pancreas can also lead to Diabetes Mellitus. e.g. Malnutrition Related Diabetes Mellitus.
- g) Endocrinopathies like Acromegaly, Autoimmune Hypo- Thyroidism, Addison's disease can cause co-existent Diabetes.

6) Gestational Diabetes Mellitus:

It is glucose intolerance developing during pregnancy. In postpartum period it may revert to normal, it can continue to pathogenesis or developed frank Diabetes.⁶

Why to prefer traditional medicine?

There are two main types of diabetes mellitus, referred to as type 1 and type 2 disease. Patients with type 1 diabetes mellitus have insulin deficiency, requiring therapy with subcutaneous insulin injections. Many patients with type 2 diabetes mellitus also require oral medications or subcutaneous insulin, in addition to exercise and dietary measures.

While standard allopathic modalities alone can be effective in managing diabetes mellitus, the success of such therapy is sometimes limited. Brown,⁷

Analyzing 10 years of electronic medical record data from the Kaiser Permanente Northwest diabetes registry, found that secondary failure of sulfonylurea therapy begins within one year of diagnosis and continues at a steady pace, with almost 80% of patients initially treated with sulfonyl ureas adding or switching to metformin or insulin within 10 year of diagnosis. The study also found that 5-10% of persons with type 2 diabetes mellitus avoid contact with the medical care system altogether.

First, many of the allopathic treatments have toxicities and side effects.

Metformin is frequently poorly tolerated due to its gastro-intestinal toxicities, while sulfonyl ureas and insulin can cause hypoglycemia.

Insulin and some oral medications can cause low blood sugar.⁸

Fear of insulin therapy may lead some patients to avoid the health care system. For such patients, natural remedies might be perceived as less threatening, not only to improve *glycemic* control, but also improvements in blood pressure, lipid control, and other factors associated with chronic morbidity in diabetics.

Literature review

Bhallatak is included in the group of *sthavar vanspathik visha* (vegetable poison).since ancient time it has been used as household remedy. In ancient scriptures of Ayurveda medicinal properties of *Bhallatak* have been described, but in some *nighantu's* (minor textbook of Ayurveda.), we are getting different opinions of properties of *Bhallatak*. It is commonly used all over the India.

To mark on clothes for the purpose of identification that's why it is known as marking nut also. The different of

opinions on the properties of *Bhallatak* have been studied. *Charak samhita*, *Sushrut samhita*, *Ashtang sangraha*, *Bhavprakash Nighantu*, *Raj Nighantu*, *Shaligram Nighantu*, *Kaidev Nighantu* and available commentaries are used in this study. The information of recent advance on related topic have been collected through internet.

Bhallatak is used to treat Diabetes mellitus since the Vedic era and Diabetes is described as *Madumeha* in ancient literatures e.g. *Charak Samhita*, *Sushrut Samhita*, *Ashtanga Hrudaya*, *Ashtang Sangraha Samhita* etc.

Bhallatak

The word *Semecarpus* is derived from Greek word *simeion* meaning marking or tracing and *carpus* meaning nut. *Anacardium* means like cardium; - “Heart shaped marking nut”. Maharsi Charak has categorized *Bhallatak* as *Dipaniya*- an appetizer, *Bhedaniya* – accumulation breaking herb, *mutra sangrahaniya* – anti diuretic and *kusthaghna* – anti dermatosis. *Bhallatak* is acclaimed as a drug of choice in the treatment of piles of *Vata* and *kapha* types. It has also got the potential to produce allergic manifestations through contact dermatitis

Synonyms:

Sanskrit:-*Arushkar*, *Agnik*, *Shofkrut*, *Agnimukh*, *Vatari*, *Mahatikshna*, *Spotbijak*

English: *Indian Marking Nut Tree*, *Marsh Nut*, *Oriental Cashew Nut*;

Hindi: *Bhela (Bhel)*, *Bhelwa*, *Bhilawa (Bhilv)*, *Bhilwa*;

Marathi: *Bibba*

Taxonomical classification

Kingdom: Plantae

Subkingdom: Tracheobionta

Super division: Spermatophyta

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Rosidae

Order: Sapindales

Family: Anacardiaceae

Genus: Semecarpus

Species: Anacardium

Plant description:

It is a moderate-sized deciduous tree found in the outer Himalayas and hotter parts of India up to 3500 ft. height. The plant is found in abundance in Assam, Bihar, Bengal and Orissa, Chittagong, central India.⁹

It is a medium-to-large size tree, 15–25 m in height with grey bark exfoliating in small irregular flakes, leaves simple alternate, obviate – oblong, 30–60 cm long and 12–30 cm broad, rounded at the apex. The flowers are greenish white, in panicles and appear with new leaves in May and June, easily recognized by large

leaves and the red blaze exuding resin, which blackens on exposure. The nut is about 2.5 cm long, ovoid and smooth lustrous black. The bark is grey in color and exudes an irritant secretion on incising.¹⁰

Chemical composition:-

The black corrosive juice of the pericarp contains a tarry oil consisting of 90 percent of an

Oxy-acid named anacardic acid and 10 percent of a higher, non-volatile alcohol called cardol. Naidu isolated catechol and a mono hydroxyl phenol which he

called 'anacardol', besides two acids and a fixed oil from the kernel of the nut. Pericarp also contains a vesicating oil 32p.c., soluble in ether and which blackens on exposure to the air. Fruit yields 2.14p.c.of ash.¹¹

Oil & seeds of the plant consist of Bhilawanol and anacardoside; while fruits consist of nicotinic acid, riboflavin, thiamine and essential amino acid-arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine; Nuts consist of bhilawanol (mixture of 1,2-dihydroxy-3-(pentadecenyl- 8') -benzene- and 1,2 dihydroxy-3- (pentadecadienyl-8',11')-

Ayurvedic properties:

benzene, biflavantetrahydrorobusta-flavone-and tetrahydroamentoflavone, biflavonidesA,B and C later two characterized as 3',8-binaringenin and 3',8- bilingiritigenin, nallaflavone; while semecarpus biflavone B, biflavonoid-jeediflavanone, galluf lavanone, semecarpus flavanone, anacardiac acid,aromatic amines, bhilawanol(1-pentadeca- Δ -eny1-2,3-dihydroxybenzene) and 1-pentadeca- Δ -dienyl1-2,3-dihydroxybenzene are the contents of nut shell; amentoflavone (leaves); linoleic,myristic, oleic, palmitic and steric acid(kernel oil);anacardiac acid , cardol,catechol, anacardol, fixed oil, semecarpol, bhilawanol (plant).¹²

<i>Characters</i>	<i>Bhavprakash Nighantu^{12a}</i>	<i>Raj Nighantu^{12b}</i>	<i>Shaligram Nighantu^{12c}</i>	<i>Kaidev Nighantu^{12d}</i>
Guna	Laghu,Snigdha Tikshna	-	Laghu,Snigdha Tikshna	Guru
Rasa	Madhura,Kashay	Kashay,madhura	Madhura,Kashay	Madhura
Vipaka	Madhura	-	Madhura	Madhura
Virya	Ushna	Koshna	Ushna	Sheeta
Karma	Agnideepan, Chedan, Medhya	-	Agnideepan, Chedan, Medhya	Shukral
Doshagnata	Kapha ,Vata	Kapha	Kapha ,Vata	Pitta
Rogagnata	Vran,Udar, Gulma, Arsha,Krumi	Shwas, Anaha,Vibhandha, Krimi	Vran,Udar, Gulma, Arsha,Krumi	Raktipitta

Need of Bhallatak Shodhan?

Being hot in nature, its mere skin contact may cause boils. To reduce its hot potency and toxicity, it is subjected to purification.

Procedure of Shodhan: According to Raj Nighantu, *Bhallatak* ripe seeds are taken, and put into water.

Only those which sink are used for purification and rest is discarded.

The seed is cut into two and kept immersed in dry brick powder for some time.

During this time, the dry brick powder absorbs all the strong pungent oil of *Bhallatak*, reducing its pungency and making it usable for medicinal purpose.

Various other Shodhan methods are described in rasa granthas,like *Sweden* with *Narikel jal*^[16], *Shodhan* with *Gomutra*, *Narikel jal* and *Godugdha*^[16].

Consumption of Ashodhit Bhallatak:

Skin contact with the acid juice results in irritation, inflammation, vesication, ulceration and painful blisters containing acrid serum which causes an eczematous eruption. These lesions resembles a bruise which may later ulcerate and slough.

Burning pain in the mouth with blisters formation in the mouth, tongue and throat.

Ingestion produces GI distress with blister formation in and around the mouth.

Severe poisoning results in vomiting, abdominal pain, diarrhea, hypotension, tachycardia, delirium and coma.

Fatal Dose:- Uncertain but considered to be 5-10 gms, Seeds- 6-8 and Oil- 9-10ml¹⁷

Fatal period:- 12-24 hours¹⁸.

Contra-indication of Bhallatak:-

Since *Bhallatak* is extremely hot and sharp in its attributes, it should be used with caution. Individuals showing allergic reactions to it should stop and avoid the usage of *Bhallatak*.

It should not be used in small children, very old persons, pregnant women and individuals

of predominant *pitta* constitution.

The use of the same should be restricted in summer season.

Allergic reactions like rash, itching and swelling may develop.

Antidote

The antidotes used externally are coconut oil, Rala ointment, ghee, coriander leaves pulp or butter mixed with *musta* (*Cyperusrotundus*). The oily

part of the nut is toxic and its degree of removal is proportional to its safety margin.

Some Research proving Anti hyperglycemic effect of *Bhallatak*:

1. *Semecarpus anacardium* (*Bhallatak*) Alters the Glucose Metabolism and Energy Production in diabetic Rats

Jaya Aseervatham¹, Shanthi Palanivelu² and Sachdanandam Panchanadham¹
Hindawi Publishing Corporation

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SA is able to favorably modulate the activities of the enzymes involved carbohydrate metabolism. It was also able to restore the altered activities of the TCA cycle enzymes and normalize the alteration in energy production and increase the expression of PI3K and AKT in the skeletal muscles leading to increase in the uptake of glucose by the cells

The results of the study revealed that *Semecarpus anacardium* was able to restore the altered activities of the enzymes involved in carbohydrate metabolism and energy production.

2. Hypoglycemic and Anti hyperglycemic Effect of *Semecarpus anacardium* Linn in Normal and Alloxan-Induced Diabetic Rats

R. Kothai (Assistant Professor) ,B.

Arul (Professor) ,K. Suresh

Kumar (Assistant Professor) &A. J. M.

Christina (Professor)

Pages 49-56 | Published online: 20 Aug 2009

The ethanolic extract of *S. anacardium* (100 mg/kg) reduced the blood glucose of normal rat from 84 ± 1.4 to 67 ± 1.7 mg/dl, 3 hours after oral administration of the extract ($P < 0.05$). It also significantly lowered blood glucose level in alloxan induced diabetic rat from 325 ± 2.2 to 144 ± 1.4 mg/dl, 3 hours after oral administration of the extract ($P < 0.05$).

3. Antihyperlipidemic and anti-inflammatory effect of Bhallatak nuts in ameliorating the alterations in lipid metabolism and inflammation in diabetes-induced cardiac damage in rats.

Suganthi Subramaniam,

Haseena Banu Hedayathullah Khan,

Shanthi Palanivelu,

Sachdanandam Panchanatham

September 2014, Volume 23, Issue 5, pp
1593–1601

The drug established its cardioprotective effect by decreasing the lipid levels and ameliorating the alterations in the activities of lipid-metabolizing enzymes and also by its anti-inflammatory activity. The present study establishes the remarkable hypolipidemic and anti-inflammatory activity of the drug in preventing and treating the diabetes-induced cardiovascular damage.

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Studied the effect of ethanolic extract of dried nuts of SA on blood glucose and investigated in both normal (hypoglycemic) and streptozotocin-induced diabetic (ant hyperglycemic) rats. The ethanolic extract of SA (100 mg/kg) reduced the blood glucose of normal rats. The blood glucose levels were measured at 0, 1, 2 and 3 h after the treatment and ant hyperglycemic activity of SA was compared with tolbutamide, a sulfonyl urea derivative used in diabetes mellitus.

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Discussion:

Diabetes mellitus (DM) is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period. This occurs due to defect in insulin secretion, action, or both.

In diabetes there is hyperglycemia, caused by varying degrees of insulin deficiency, peripheral insulin resistance, or both. *Bhallatak* is found to be much effective to treat hyperglycemia with the oxidative stress occurring all over body. Research study revealed, the ethanolic extract of SA (100 mg/kg) reduced the blood glucose of normal rats. *Bhallatak* was able to restore the altered activities of the enzymes involved in carbohydrate metabolism and energy production.

Conclusion:

Diabetes Mellitus is a metabolic disease with raised blood sugar level and many metabolic cellular changes which lead to multi system complications. *Bhallatak* is found to be much effective to treat hyperglycemia with the oxidative stress

occurring all over body. Being Herbal medicines it is found easily and it shows anti diabetic effect which should be used to treat Diabetes. It also reduces the economic burden of the patient.

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