



Review Article

Pharmacological properties of *Atibala* (*Abutilon indicum linn sweet*) – A Literary review

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ABSTRACT:

Atibala is the one of from *Balachatustayam*. Etimologically *Atibala* is made of two-word *Ati*, means very and *bala*, means powerful; referring to the properties of this medicinal plant as very powerful. According to Ayurved it is *Rasayan*, *Balya*, *Bruhan*, *Vatahar*, *Hridya*, *Vishaghna*, *Varnya*, *Vajikaran*, *Grahi*, *Kasahar*, *kandughna*, *Kushtthaghna*, *Krumighna* and *Kledashoshak*. *Atibala* have numerous properties by Ayurved and many of them were supported by pharmacological studies. So here attempt is made to review on pharmacological properties of it by Ayurved and modern ways.

Summary

Atibala is the medicinal plant classically from the *Balachatuyam* and botanically by latin name it is *Abutilon indium* (L.) *Sweethaving* family *Malvaceae*.

Atibala possesses *Rasayan*, *Krimighna*, *Balya*, *Bruhan*, *Vishaghna*, *Tridoshashamak*, *Kledanashaka*, *Pramehaghna*, *Hridya*, *Vranropak* in Ayurved literature. These pharmacological actives are supported by in vivo studies like antioxidant, antimicrobial, hypoglycaemic, hepatoprotective, wound healing, anti-lipidemic activity, anti-diabetic activity and cardio protective activity.

KEY WORDS: *Atibala*, *Balachatustayam*

INTRODUCTION:

Abutilon indium (L.) *Sweet* belongs to the family *Malvaceae*. It is an important medicinal plant used in Ayurveda and is commonly called as *Atibala*. It is one of from the *Balachatustayam*. Acharya Bhavaprakash in *guduchyadivarga* quoted *Balachatustayamas* 1) *Bala* 2) *Mahabala* 3) *Atibala* 4) *Nagbala*.

“बलामूलत्वचश्चूर्णं पीतं सक्षीरशर्करामूत्रातिसारं हरति दृष्टमेतन्न
संशयः॥

हरेन्महाबला कृच्छ्रम् भवेद्वातानुलोमनी हन्यादतिबला मेहं पयसा
सितया समम्॥”⁽¹⁾

Atibala is useful in *Meha*(Diabetes mellitus) with equal quantity of *Payasa*(Cow milk) and

sita(Sugar). In Ayurvedic literature *Atibala* have properties *Rasayan*, *Balya*, *Bruhan*, *Vatahar*, *Hridya*, *Vishaghna*, *Krumighna* and *Kledashoshak*⁽²⁾ which helps to treat diabetes mellitus likewise by modern pharmacological properties antioxidant, hypoglycaemic, antimicrobial, hepatoprotective, wound healing, antilipidemic⁽³⁾. Hence here attempt is made to review these properties by Ayurvedic and modern ways in concern with diabetes mellitus.

Review of literature:

Botanical name: *Abutilon indicum Linn Sweet*

Family: *Malvaceae*

Atibala consists of root of *Abutilon indicum* Linn Sweet (Fam. Malvaceae), hairy herb or under-shrub 1.0-1.5 m high, annual or more often perennial with golden yellow flowers, flowering mostly throughout the year found abundantly throughout the hotter parts of India, as a common weed on road sides and other waste places in plains and hills, up to an elevation of 600 m.

The leaves are ovate, acuminate, toothed, and rarely sub trilobate and 1.9-2.5 cm long, the flowers are yellow in colour, peduncle jointed above the middle. The petioles 3.8- 7.5cm long; stipules 9mm long pedicels often 2.5-5mm long, axillary solitary, jointed very near the top; calyx 12.8mm long, divided in to middle, lobes ovate, apiculate and corolla 2.5 cm diameter, yellow, opening in the evening. The fruits are capsule, densely pubescent, with conspicuous and horizontally spreading beaks. The stems are stout, branched, 1-2m tall, pubescent. The seeds are 3-5 mm, reniform, tubercle or minutely stellate-hairy, black or dark brown. Tap roots, fairly long with a number of lateral branches; 1.5-2 cm in diameter, light brown, outer surface smooth with dot like lenticels⁽⁴⁾.

Synonyms:

Sanskrit: Kankatika,
Assamese: Jayavandha, Jayapateri
Bengali: Badela
English: Indian mallow
Gujrati: Kansaki, Khapat
Hindi: Kanghi
Kannada: Shrimudrigida, Mudragida, Turube
Kashmiri: Kath
Malayalam: Uram, Katuvan, Urubam, Urabam, Vankuruntott, Oorpam, Tutti
Marathi: Chakrabhendi, Petari, Mudra
Oriya: Pedipidika
Punjabi: Kangi, Kangibooti
Tamil: Tutti, Thuthi
Telugu: Tutturubenda

Constituents- Asparagin.

Properties and action:

Rasa: Madhura
Guna: Snigdha
Virya: Sheet

Vipaka: Madhura

Karma: *Balya, Vatahara, Vrushya, Grahi*

Important formulations – Bala Taila, Narayan Taila, Mahanarayan Taila

Therapeutic uses - *Raktapitta, Vatarakta, Meha*

Dose - 3-6 g of the drug in powder form⁽⁵⁾.
Root powder: 5-10 gm.⁽⁶⁾

Scientific classification:

Kingdom Plantae – Plants
Subkingdom Tracheobionta – Vascular plants
Super division Spermatophyta – Seed plants
Division Magnoliophyta – Flowering plants
Class Magnoliopsida – Dicotyledons
Subclass Dilleniidae –
Order Malvales –
Family Malvaceae – Mallow family
Genus *Abutilon* Mill. – Indian mallow
Species *Abutilon indicum* (L.) Sweet – Mon-keybush
{[http //plants.usda.gov/java/classification](http://plants.usda.gov/java/classification) servlet}

In Vedic periods, the roots of the *Bala* plants i.e., *Atibala* (*A. indicum* Linn.), *Mahabala* (*Sida arhombifolia* Linn.), *Bala* (*Sida cordifolia* Linn.) and *Bhumibala* (*Sida veronicaefolia* Lam) were used to remove poison, vata –pitta diseases, heart problems, bily blood, eye diseases, and uterine disorders. Its seeds and roots both were used infever in the form of decoction i.e., powdered plant material dissolve in water or any other solvent⁽⁴⁾

Samhita period:

Charaksamhita-

Atibala is mentioned in Brunhaniya⁽⁸⁾ Balya⁽⁹⁾, and madhuraskandha

Charak highlighted its importance in the *Rasayan chikitsa*⁽¹⁰⁾.

Susrutasamhita-

Acharya Susruta has given more medicinal utility than Charak. *Atibala* is mentioned insutrasthan chapter 39 as a *sanshaman* and *vataharghana*⁽¹¹⁾. In Mudhagarbha treatment

Atibala taila can be prepared as *Balataila*⁽¹²⁾. In *sarvopghatshamaniya* chapter *Atibala* is used as *Rasayan* like *Bala*⁽¹³⁾. *Atibala* is the ingredient in the *Baladisarpi* for *Mutrughat* treatment.⁽¹⁴⁾

Ashtanghridaya-

Acharya Vaghabhat used the *Atibala* to prepare *Pashanbhedadik watha* for *Ashamaribhedan*, also mentioned *Rasayan* like *Vruddhadaruk*.

In *AstangaHrudaya*, *Uttaratantra*, *Vagbhata* has used *Bala Dwaya* in the preparation of oil for *Vataj Galganda*⁽¹⁵⁾, *Dwibala* in the preparation of *Shatavaryadi ghruta leha* for *pittaj yoni roga*⁽¹⁶⁾ and *Balatraya* in *Gandhataila* preparation to stabilise bones.⁽¹⁷⁾

Balatrayam⁽¹⁸⁾ as *Bala*, *Atibala* and *Nagabala* is used in preparation of *Jeevantyadi taila* for *Drushtiroga*.

Nighantu period:

1. Ashangnighantu-

In *Viprakeranaprakaran* synonym given- *Vatyani*, *Bardhwaji*, *Suparnika*

2. Paryaratnamala-

Synonyms- *Vrushyaprokta*, *Atibala*, *Peetapuspa*

3. Abhidhanratnamala-

Mentioned synonyms- *Vatayani*, *Bardhwaji*, *Suparnika*

4. Dhanvantarinighantu⁽¹⁹⁾

Atibala is mentioned in *Guduchyadivarga*.

Its synonyms- *Balika*, *Atibala*, *Vatayapuspi*, *Kankatica*, *Vrushyaprokta*, *Vrushyoganotha*, *Bhooribala*.

Balatrayam stated *Bala*, *Atibala*, *Mahabala* with properties *vatapittahar*, *grahi*, *balya*, *vrushya*. *Balapanchak* is also mentioned *Bala*, *Mahabala*, *Atibala*, *nagabala* and *Rajabala*. *Balapanchak* is used as *pittavatjit*, *grahi*, *Balya*, *snigdha*, *madhur*, *vrushya*, *Daha*, *Asrugdar -nashakam*.

5. Madanpalnighantu- Abhayadivarga⁽²⁰⁾

Synonyms- *Balaka*, *Atibala*, *Bardhwaji*, *Vrukshagandhini*

6. Madanadinighantu-

Synonym- *Vrushyaprokta*, *Bardhwaji*, *Sukarnika*, *Vatyayani*, *Bhuribala*, *Balini*, *Sheetapuspika*

7. Kaidayanighantu⁽²¹⁾

Atibala synonyms- *Vrushyaprokta*, *Kankatica*, *Saha*.

In *Oshadivarga*, *Atibala* is mentioned as *Balachatusthaya* (all the four types of *Bala*), are *Ayuvardhaka* and alleviates *Vatarakta*, *Raktapitta*, *Tridosha*, *Kshata* and *Kshaya*.

8. Rajanighantu⁽²²⁾

Synonyms- *Balya*, *Balika*, *Vikakantika*, *Vatyapuspika*, *Ghanta*, *Sheeta*, *Sheetpuspa*, *Bhooribala*, *Vrushyagandhika*, *Dashadha*- 10 synonyms.

Properties- *Tikta*, *katu*, *Vatanashak*, *Krumirognashak*, *Daha*, *Trushna*, *Visha*, *Chhardi*, *Kledaprashamani*.

9. Bhavaprakshnighantu-

Atibala is mentioned in *Guduchyadivarga*.

BalaChatusthaya (*Bala*, *Mahabala*, *Atibala* and *Nagabala*) are *Madhura* in *Rasa*, *Snigdha* in *Guna*, *Sheetain* *Veerya*, *Grahi* in *Karma* alleviates *Samira*, *Arsha*, *Pittaasra* and *Kshata*.

A remedy for *prameha*- *Atibala* with *payasa* (*Godugdha*) and *sita* (*sugar*) in equal quantity destroy the *meha* (*Diabetes mellitus*) completely.⁽¹⁾

The properties of useful parts given separately as *Root*- *Vatahar*, *rasayan*, *mutrajanan*, *Beej*- *snehan*, *mruduvirechan*, *vajikaran*, *kasahar*. *Patra*-*snehan*, *vedanahar*. *Twaka*-*mutrajanan*⁽²³⁾

10. Nighantushesh-

Synonyms- *Vatapuspika*, *Vrushyaprokta*, *Vrushyagandha*, *Kankatica*, *Varshapuspika*.

Properties- *Rasa*—*Madhur*. *Vipak*- *Madhur* *Veerya*- *Sheeta* *Gun*- *snigdha* *vatanulomini*, *Atisarnashighani*

Pharmacology:

1. Antioxidant and radical scavenging activity⁽²⁴⁾

The extracts of *Atibalaroots* and aerial parts were prepared in n-hexane, chloroform, butanol, and ethyl acetate. and evaluated for their total antioxidant capacity (TAC), Trolox equivalent antioxidant capacity (TEAC), total phenolic content and total flavonoid content, employing 2,2-azinobis-3 ethylbenzotiazo-line-6-sulfonic acid (ABTS) and ferric reducing anti-oxidant power (FRAP). TEAC values ranged from 3.019 to 10.5µM for n-hexane and butanol fractions using the ABTS assay. The FRAP assay showed reducing powers of the fraction in the order of butanol>ethyl acetate>chloroform >n-hexane and butanol> chloroform>hexane >ethyl acetate. By using DPPH free radical assay T_(EC50) and EC₅₀ values were determined. The antioxidant / radical scavenging capacity of the extracts were found to be dose -dependent activity. From this report conclusion came that plant is a potent of natural antioxidant.

2. Anti-diabetic activity⁻⁽²⁵⁾

PawanKaushiket all investigated the effect of daily oral administration of CF (50 mg/kg body weight) of *Abutilon indicum* suspended in Tween 80 (5%) for 21 days on blood glucose, lipid profile, glycosylated haemoglobin, total haemoglobin and plasma insulin in normal and STZ induced diabetic rats. Chloroform fraction of *Atibala* at a dose of 50 mg/kg showed significant reduction in blood sugar level in diabetic rat when compared with diabetic control rats (p < 0.05). Significant (p < 0.05) differences were observed in serum lipid profiles, serum insulin, glycosylated hemoglobin, body weight and hemoglobin levels in diabetic animals treated with CF compared with the diabetic control. These results demonstrated that the chloroform fraction has significant antidiabetic activity and there is need to isolate the active compounds to develop them as a potential antidiabetic compound

3. Hepatoprotective activity⁻⁽²⁶⁾

The hepatoprotective activity of aqueous leaf extract was tested in carbon tetrachloride and

paracetamol induced hepatotoxicities in rats by reducing carbon tetrachloride and paracetamol induced change in bio-chemical parameters like SGPT, SGOT AND AKLP by enzymatic examination. That significant hepatoprotective action was found due to interference of leaf extract with free radical formation. Aqueous extract at dose of 100 and 200mgm/kg body wtp.o. showed hepatoprotective activity in comparison to silymarin (100mgm/kg body wt). L.D. value is more than the dose of 4kgm/kg wt in acute toxicity.

4. Hypoglycaemic activity⁻⁽²⁷⁾

The hypoglycaemic activity of *Abutilon indicum* Linn leaves alcohol in alcohol and water extract form showed significant effect at dose of 400mg/kg p.o. in normal rats 4hrs after administration (23.10% & 26.95 % respectively). When results were compared to standard drug Tolbutamide, alcohol and water extract showed weak activity while petroleum ether and chloroform extract did not show significant hypoglycaemic activity.

5. Wound healing activity –⁽²⁸⁾

The wound healing activity of *Abutilon indicum* Linn was evaluated and it was found significant increase in wound closure rate. All the extract were obtained and subjected to phytochemical studies. The progressive changes in the wound area were monitored by tracing the wound margin every day. The conclusion in drawn that the petroleum ether extract of *Abutilon indicum* Linn had greater wound healing activity as compare to ethanolic extract.

6. Immunomodulatory activity⁻⁽²⁸⁾

On the basis of haemagglutination antibody (HA) titre, delayed type hypersensitivity (DTH), neutrophil adhesion test and carbon clearance test, the Immunomodulatory activity of ethanolic and aqueous extracts of *Abutilon indicum* leaves was studied in dose of 200mg/kg and 400 mg/kg. It also showed significantly potentiated DTH reaction and increase in percentage adhesion test. The results of the study reported that both the extracts were found to have significant immunostimulatory activity.

7. Lipid lowering activity⁽²⁹⁾

Triton and diet induced hyperlipidemic models of wistar albino rats and it was used to evaluate the lipid lowering effect of the successive extract of the leaf of *Abutilon indicum*. The ethanolic and water extract at 400mg/kg dose levels inhibited the elevation in serum cholesterol and triglyceride levels on Triton WR 1339 administration rats. The extract at the same dose level significantly attenuated the elevated serum total cholesterol and triglycerides with an increase in HDL in high fat diet induced hyperlipidaemic rats.

8. Cardio protective activity⁽²⁹⁾

The ethanolic extract of the *Abutilon indicum* roots was evaluated for protection against Isoproterenol (150 mg/kg body wt, s.c) induced myocardial infarction in male Wistar rats. Isoproterenol induced rats showed significant elevation in the levels of serum marker enzymes such as Creatinine Kinase- MB, Lactate dehydrogenase (LDH), Aspartate transaminase (AST) and Alanine transaminase (ALT) with significantly increased lipid peroxides and significant decrease in antioxidant parameters

viz., Super oxide dismutase (SOD), Catalase (CAT) and Glutathione peroxidase (GPx) in heart homogenate and also increased serum uric acid level. Oral pre-treatment with ethanolic root extract of *A. indicum* (100 mg/kg body wt) daily for a period of 28 days, reduced significantly the elevated serum marker enzymes and lipid peroxidation and elevated the levels of SOD, CAT and GPx in the heart homogenate and decreased serum uric acid level. Histopathological observation also revealed a marked protection by the extract in myocardial necrotic damage. Our results show that treatment with ethanolic root extract of *A. indicum* (100 mg/kg body wt) was safe and highly effective in preventing cardiovascular dysfunction in rats, possibly due to antioxidant property as revealed by the amelioration of histopathological changes and biochemical markers of cardiac tissue damage. However, ethanolic root extract of *A. indicum* (500 mg/kg body wt) was found to produce myocardial injury on its own and failed to reverse the Isoproterenol induced myocardial injury.

These properties can be compared as follows-

Table No. 1: Ayurvedic and Morden Properties of *Atibala*

Sr. No.	Ayurvedic properties	Modern properties
1	Rasayan	Antioxidant
2	Pramehaghna	anti-diabetic activity, hypoglycaemic
3	Krimighna	Antimicrobial
4	Hridya	cardio protective activity
5	Vranropak	wound healing

DISCUSSION:

The Ayurvedic references shows that the *Atibala* possesses *Rasayan*, *Krimighna*, *Balya*, *Bruhan*, *Vishaghna*, *Tridoshashamak*, *Kledanashaka*, *Pramehaghna*, *Hridya*, *Vranropak*. Modern pharmacology proves the antioxidant, hypoglycaemic, antimicrobial, hepatoprotective, wound healing, anti-lipidemic activity, and anti-diabetic activity and cardio protective activity in vivo studies.

CONCLUSION:

The literary study of *Atibala* from Ayurvedic classical texts and modern researches in vivo studies concludes that *Atibala* (*Abutilon indicum* (L.) Sweet) has following properties according to Ayurveda, *Rasayan*, *Krimighna*, *Balya*,

Bruhan, *Vishaghna*, *Tridoshashamak*, *Kledanashaka*, *Pramehaghna*, *Hridya*, *Vranropak*, and according to modern the antioxidant, antimicrobial, hypoglycaemic, hepatoprotective, wound healing, anti-lipidemic activity, anti-diabetic activity and cardio protective activity.

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