E-ISSN:2456-3110
Review Article
Aragvadha Patra
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Journal of Ayurveda and Integrated Medical Sciences

2025 Volume 10 Number 9 September

Publisher
Maharshi Charaka Ayurveda
www.maharshicharaka.in

Aragvadha Patra (Cassia Fistula Linn.) - A Pharmacological & Phytochemical Review

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DOI:10.21760/jaims.10.9.28

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Leaves are very important for a tree as they prepare food through the process of photosynthesis. Similarly, in Ayurved, leaves are used in various forms of Kashaya (medicinal preparations) such as Swaras, Kalk, Churn, Phant and Kwath, and they have a special place in Ayurvedic treatment. Aragvadha (Cassia fistula Linn.) also known as Purging cassia or Indian laburnum is an important medicinal plant used in Indian system of medicine. It is a medium sized deciduous tree found everywhere in Indian continent. The oldest record of its medicinal use can be traced in Charak and Sushrut Samhita in the treatment of different kind of skin diseases (Kusth). The present article gives an updated information on Herbology and Pharmacology of Aragvadha Patra which is highly beneficial for different ailments, the paper reveals about different activities of the plants like Anti rheumatic, Purgative, Laxative, Febrifuge, Anti-inflammatory, Antimicrobial, Hepatoprotective and Anti allergic and various other important medicinal properties, above mentioned properties of Patra are justified due to presence of different chemical in then whiz. Sennosides, Kaempferol, quercetin, gallic acid etc. According to Shaligram Nighantu Cassia fistula Patra balances kaph and reduces Meda due to its Tikta, Kasaya Rasa, Rukhsa Guna and Ushna Veerya.

Keywords: Leaves, Aragwadha, Skin diseases, Herbology, Sennosides, Anti rheumatic

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Kumar Vikram Sahu, Post Graduate Scholar, Department of Dravyagun Vigyan, Shri NPA Government Ayurved College, Raipur, Chhattisgarh, India. Email: krvikrambs@gmail.com	Sahu KV, Markam J, Singh RK, Sahu H, Kumar Y, Patel H, Rajwade L, Aragvadha Patra (Cassia Fistula Linn.) - A Pharmacological & Phytochemical Review. J Ayu Int Med Sci. 2025;10(9):188-192. Available From https://jaims.in/jaims/article/view/4742/	

Manuscript Received	Review Round 1	Review Round 2	Review Round 3	Accepted
2025-07-17	2025-07-27	2025-08-08	2025-08-20	2025-08-26

Conflict of Interest	Funding	Ethical Approval	Plagiarism X-checker	Note
None	Nil	Not required	10.62	

Introduction

Aragvadha is a drug mentioned in Indian systems of medicines. It is commonly known as golden shower, Indian laburnum, purging cassia*, Rajvruksha*.**[1]** In *Ayurveda*, different parts of *Aragvadha* are used in several conditions. *Aacharya's* explained several methods of usage according to indications like *Lepa, Udavartana, Kwatha. Argawadha Patra* has indicated in *Vrana Shotha, Granthi, Shotha, Vatarakta, Amavata, Sandhivata, Kandu, Jwaraa, Hridrogaa, Raktapittaa, Shoolaa, Kusthaa, Gulma, Vrana,* etc. **[2]** *Aacharya's* have also classified *Aragwadha* under various groups. *Acharya Charaka* organized *Aragvadha* in the group of *Kushtaghna, Kandughna, Phalini Varga, Tikta Skanda, Virechana Dravya, etc.* **[3]** *Acharaya Susruta Aragvadadi Gana, Syamadi Gana, Adhobhagahara*, and *Acharaya Vagbhatta* have been mentioned only in *Aragvadadi Gana*.**[4]** In *Ayurveda Charaka* and *Sushruta* described *Aragvadha* in the use of the treatment of different skin diseases (*Kusth*). The phytochemicals present in the leaf of Cassia fistula possesses Anti-fungal, Antibacterial, and Antiulcer activity. *Acharya Shaligram* described the importance of leaf of *Aragvadha* for the drying of *Kapha* and *Meda*. Leave is also beneficial for the purgation of *Mala* and *Dosha.* Usually, the fruits of *Amaltas* are used primarily but medicinal properties are present in its stem, leaves and roots. Leaves are considered as a laxative and external emollient. As a poultice they are used for chilblains, insect bites, swelling, rheumatism and facial paralysis. The leaves possess antiperiodic properties and are used in jaundice, piles, rheumatism, ulcers, external skin eruptions, wounds, prurigo, pruritus and eczema. The juice of the leaves has been used as a dressing for ringworm, relieving irritation and dropsy, inflammation and in jaundice treatment. If we talk about *Panchvidh Kashaya Kalpana*, then Juice, powder, *Kalk, Kwath, Phant*, all can be prepared from the leaves but *Amaltas* leaves can be used more in the form of *Kalk* and powder. Usually in the month of March-April, new leaves start appearing in it which are very soft and reddish which matures by the middle of June. Leaves and flowers appear simultaneously in the plant. If we talk about powder preparation, then powder is prepared by drying the leaves in the shade.

For internal use, its new and soft leaves are used. After becoming old, they are not edible.

According to **USDA,** Taxonomic classification of *Cassia fistula* Linn.is as follows**[5]**

Kingdom	Plantae
Subkingdom	Tracheobionta - vascular plants
Super division	Spermatophyta - seed plants
Division	Magnoliophyta - flowering plants
Class	Magnoliopsida - Dicotyledons
Subclass	Rosidae
Order	Fabales
Family	Fabaceae
Sub family	Caesalpinioideae
Genus	Cassia
Species	Fistula

Aim

To study different medicinal property of *Aragvadha* leaf through *Ayurveda* and modern perspective

Materials and Methods

Physiochemical and phytochemical study of *Aragwadha Patra* reveals group of chemical presents in it. According to *Shaligram Nighantu Patra* shows action of *Kaph Med Vishoshan*, cures fever and shows property of *Rechan.***[6]**

Through this we can find different *Guna* present in the leaf.

Rasa - Tikta, Kashaya
Guna - Tikshna, Ushna, Guru
Veerya - Ushna
Vipaka - Katu
Prabhava - Virechan

Macroscopic & Microscopic Study

Cassia fistula Linn. Leaf Powder

Texture - Fine, smooth and some coarse particles
Colour - Light Green to Yellowish green
Odour - Characteristic
Taste - Bitter, Astringent

Macroscopic Study of the Cassia fistula Leaf: Macroscopic features of Cassia fistula leaves aid in their identification and study.

These are Alternate, petiolate, pinnate compounds have 4-8 pairs of leaflets, pulvinus base, stalked, ovate, wavy, acute, are bright green on the upper surface and slightly light green on the lower, and have smooth margins and a prominent central vein.

Microscopic study of Cassia fistula Linn. Leaf:- The powdered sample of cassia fistula leaf is light green with characteristic distinct odour or taste. Diagnostic characters of powder include unicellular covering trichomes, anomocytic and paracytic stomata, xylem vessels with reticulate thickening and prism shaped calcium oxalate crystals. Various leaf constants were established which can be important in detecting adulteration and mishandling of the crude drug.

Physiochemical study of leaf

Loss on Drying	0.5%
Total Ash	9%
Acid Insoluble Ash	1%
Water Soluble Extractive	12.8%
Alcohal Soluble Extractive	9.4%
pH (10% Aqueous solution)	6

Phytochemical Study of leaf

Test for Steroids	Salkowskis test	Present
Test for Saponins	Froth test	Absent
Test for Phenolic compounds	-	Absent
Test for Flavonoids	NaOH test	Present
Test for Terpenoids	Salkowskis test	Present
Test for Glycosides	Keller-killani test	Absent
Test for Tannin	Ferric chloride test	Present

Chemical compound present in leaf of *Cassia fistula* Linn.as per IMPPAT Database.[7]

Chrysophanol	Hexadecane	beta-bisabolene	triacontanoic acid
Tannic acid	Elemicin	2- tridecanone	heptacosane
octadecane	rhein	methyl salicylate	Hentriacontanoic acid
citric acid	eugenol	kaempferol	methyl linolenate
quercetin	ellagic acid	nonacosanoic acid	heptacosanoic acid
1-docosene	beta-lonone	methyleugenol	1- octadecane
eicosane	methyl palmitate	benzyl salicylate	Anthraquinone
palmitic acid	2-heptadecanone	heptadecane	nonadecane
docasane	pentacosane	pentadecane	tridecane
nonacosane	tricosane	Isoelemin	farnesylacetone
1-eicosene	Hexadecan-2-one	tetradecane	procyanidin B2
cis-beta-farnesene	6,10,14-trimethylpentadecan-2-one	3,4-Dihydroxybenzoic acid	(-)-Epiafzelechin
physcion	1-Hexadecane	1- Tetradecane	alpha-Terpineol
Sennoside-B	nerol	phytol	sennoside A
cianidanol	beta-D-glucose	nerolidol	cabreuva oxide B.

Discussion

Effect of leaf on various diseases

Anti- Arthritic Effect[8]

Invitro Anti- Arthritic Effect of the ethanolic extract of leaves by bovine serum protein denaturation method.

Cough Suppressant Activity[9]

Cassia fistula Linn leaves were tested for antitussive activity by developing induced cough model in mice. Findings showed that methanolic extracts of leaves manifested excellent activity and results were equivalent to other commercially available cough suppressant drugs.

Anti Hepatotoxic Activity[10]

Leaves of Cassia fistula were found to be effective in treatment of liver damage. In order to investigate hepatoprotective activity, in vivo model consisting of Albino rats was developed. Liver toxicity in these rats was induced using diethyl nitrosamine.

To these rats ethanolic extracts of Cassia fistula Linn leaves were administered orally for 30 days. Results proved that Cassia fistula leaves are indeed beneficial to cure liver damage and liver injuries.

Antifungal activity[11]

Cassia fistula Linn found to possess promising antifungal properties as well. Leaves of Cassia fistula has been tested against various fungal species including Candida albicans. *Cassia fistula* Linn leaves extracts were prepared by using solvents of different polarity namely methanol, acetone and diethyl ether. Among all these extracts methanolic extract of *Cassia fistula* Linn leaves manifested excellent antifungal activity and its effect was similar to that of commercially available antifungal agents.

Anti-inflammatory Activity[12,13]

Cassia fistula leaves also demonstrate outstanding effects to alleviate inflammation such as gout which have negative impact on patient quality of life. In vivo model of albino rats were used to evaluate anti-inflammatory activity of leaves extracts. Oedema was induced in these rats using carrageenan and dextran. *Cassia fistula* Linn leaves extract showed significant.

Antiulcer activity[14]

The ethanolic leaf extract of Cassia fistula Linn was evaluated for antiulcer activity against pylorus ligation- induced gastric ulcer.

Larvicidal and Ovicidal Activity[15]

Leaves of *Cassia fistula* Linn also found to possess pesticidal activity. When leave extract of varying concentrations applied topically, they not only inhibit hatching of eggs but also makes them nonfunctional to produce any diseases. In another study larvicidal activity of Cassia fistula Linn leaves methanolic extract was tested against Culex quinquefasciatus and Anopheles stephensi.

The methanolic leaf extract show more activity against A. stephensi at larvae stage. Less larvicidal activity was reported against C. quinquefasciatus. Thus, it was proved that Cassia fistula Linn does possess good larvicidal activity

Wound Alleviating Activity[16]

Wound healing potential of *Cassia fistula* Linn was explored by using its methanolic leaves extract in different in vivo wound models in rats. Leaves extract in 5 and 10% w/w concentration was incorporated in ointment base.

In these concentrations the ointment was found to be effective in treating both types of wounds. The wound healing effect was equivalent to standard control drug nitrofurazone in every aspect. Wound healing activity of *Cassia fistula* Linn was demonstrated in another study using albino rat model. Ointment base formulation of alcohol leaves extract was prepared and wound healing effect was analyzed on wounds infected with Staphylococcus aureus and Pseudomonas aeruginosa. It was observed that wounds treated with Cassia fistula Linn ointment showed faster healing, better tissue reanimation and rapid wound reduction rate. These findings provided a scientific proof of traditional use of *Cassia fistula* Linn in wound management.

Anti-oxidant Activity[17]

Alcoholic extracts of *Cassia fistula* Linn pulp, leaves, flowers and stem bark also exhibit good antioxidant activity. Significant antioxidant activity was reported in stem bark followed by leaves and flowers while pulp showed minor activity as level of phenolic constituents was found low in pulp.

Conclusion

It is quite obvious that the plant is widely used in *Ayurvedic* medicinal system of India and has been reported to possess Anti-Arthritic, hepatoprotective, anti-inflammatory, antitussive, antifungal and also used to check wounds healing and antibacterial properties. It is known as a rich source of tannins, flavanoids, terpenoids and steroids present in *Cassia fistula* leaves might be medicinally important or nutritionally valuable. The present review summarizes some important pharmacological studies on *Cassia fistula* leaves and phytochemical investigations and isolated principles from them, which can be investigated further for formulations to achieve lead molecules in the search of novel drugs.

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