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# REVIEW ON MEDICINAL PROPERTIES OF ARAGVADHA (Cassia fistula Linn.)

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## ABSTRACT

Aragvadha (Cassia Fistula Linn) also known as Purging Cassia or Indian Laburnum is a significant medicinal plant used in Indian structure of medicine The Purging Cassia – also called Cassia fistula Linn. is a reasonable to medium sized deciduous tree which is very common in Indian landmass. The fruit pulp comprehends the anthraquinone and rhein. It is often used as a highly active moderate laxative that is safe even for children. It is suggested for the treatment of Jaundice, Gout, Fatty liver, liver disorders, Bronchitis, Skin diseases. In Ayurvedic medicine and it pacifies the three doshas of vaat, pitta and kapha. It exorcises the pitta and kapha from the body. Medicinally it has been numerous pharmacological activities like antifungal, antioxidants, antimicrobial and anti-inflammatory and hepatoprotective activity. Cassia Fistula is also working as a medicine for tumours of the abdomen, glands, liver, stomach and throat for burns, cancer, constipation, convulsions, delirium, dysuria, epilepsy, haematuria, pimples and glandular tumours.

**KEYWORDS:** Aragvadha, Cassia fistula Linn, Sampaka, Chaturangula.

## INTRODUCTION

Ayurveda, the Indian system of medicine, practiced since a long time for leading a disease-free life. It relies mainly upon the medicinal plants for the management of various disorders. There are a wide range of the medicinal plants defined in Ayurveda. Some of these plants are extinct and some are still unidentified. A few plants are still used as the richest source of medicines since the ages. Aragvadha (Cassia fistula Linn.) is one such plant drug which is being used in the medicines in Ayurveda, Unani and Siddha systems of medicine since ages. These plants are often cultured for its beautiful flowers in the gardens. Apart from the decorative value this drug proves to be one of the plants having good medicinal value. In this regard medicinal assets of Aragvadha are being explored to enumerate the pharmacological potential of the drug. Cassia fistula Linn. also known as Purging Cassia or Indian Laburnum is a significant medicinal plant used in Indian system of medicine. [1] The species is natural to the Indian subcontinent and together regions of Southeast Asia. It has varieties from southern Pakistan eastward throughout India to Myanmar and Thailand and south to Sri

Lanka. In literature, it is closely related with the Mullai (forest) region of Sangam landscape. It is the national tree of Thailand, and its flower is Thailand's national flower. It is also the state flower of Kerala in India and of massive importance amongst the Malayali population. [2] In Vedic Literature, the dried branches of Aragvadha are used for Ritual performances.[3] Cassia fistula Linn. (Family: Caesalpiniaceous) is a modest to medium sized deciduous tree increasing up to 9 meters height and having dispersion branches. Leaves are 20 – 40 cm long par pinnate. Leaflets are large oblong lanceolate, acute or acuminate tip and pubescent beneath with numerous close slender main nerves. Flowers are bright yellow in colour and are found on long slender pendulous racemes. Fruits are pendulous, cylindrical, nearly straight, dark brown or brownish black, smooth, shining, hard, indehiscent. Seeds are many, broadly ovate, smooth, and light brown to dark brown in colour. [4] Cassia fistula Linn. has revealed numerous pharmacological activities like antifungal, antimicrobial, antipyretic, larvicidal, analgesic, anti-inflammatory, hepatoprotective, antioxidant, antitumour, and hypoglycaemic. Ayurvedic medicine recognizes its use in Vibandha, Udavarta, Gulma, Shula, Udararoga, Hridroga and Prameha. [5,6]. Aragvadha is used in Ayurvedic remedies for therapeutic flatulence, inflammation, skin diseases, abdominal distension, hepato biliary disorders, constipation, intermittent fever, worm infestation and especially for black water fever.[7] Aragvadha (Cassia fistula Linn) & its gana Acharya Caraka has included Aragvadha (Cassia fistula Linn) in Kusthaghna[8] , Kandughna[9] Mahakashaya and Virechana[10] , Tiktaskandha[11] Gana while Acharya Sushrut included in Aragvadhadi [12] , Shyamadi[13], Lakshadi[14] , Tiktaskandha[15] , Adhobhagahar[16] and Kaphasamana Gana. [17] Acharya Vagbhatta included Aragvadha (Cassia fistula Linn) in Virechana [18], Aragvadhadi [19] and Shyamadi Gana [20].

**PHARMACOLOGICAL ACTIVITY OF CASSIA FISTULA:**

**ANTIMICROBIAL ACTIVITY**

The methanol extract of C. fistula seeds was investigated for potential antimicrobial activity against different medically important bacterial, yeast and fungal strains using the disk diffusion technique. The extract had great in vitro potential of antimicrobial activities against all the tested microbial strains like E. coli, P. aeruginosa, S. aureus, S. pyogenes and the fungi C. albicans and A. niger [21].

**ANTIFUNGAL ACTIVITY**

Extracts of C. fistula leaves with acetone diethyl ether and methanol shows antifungal activity against Candida albicans. Study result show that C. fistula seed extract had completely inhibited the growth of C. albicans and exhibited prolonged anti-yeast activity. Ethyl acetate extract of Cassia fistula flower shows antifungal activity against the growth of many fungi such as Trichophyton mentagrophytes, Trichophytonsimii, Trichophyton rubrum and Epidermophyton floccosum due to the presence of Rhein [21,22,23]

**ANTIVIRAL ACTIVITY**

Ethanolic extract of pod and stem bark of C. fistula were found active against Ranikhet disease virus and Vaccinia virus, Ethanol extract of fruit reported active against Foot and Mouth Diseases. In aqueous hot extract of pods and leaves of C. fistula were examine against infectious bovine

rhinotracheitis virus. Result of this study suggest that pod hot aqueous extract of C. fistula shows dose dependent anti IBR virus activity [24].

**ANTITUMOR ACTIVITY:**

The study of methanolic extract of C. fistula seeds prevents the growth of Ehrlich ascites carcinoma. Reports show the increased life span, viable tumour cell count and decreased in the tumour volume. Improvement in the haematological parameters like haemoglobin content, red blood cell count, and bone marrow cell count of the tumour bearing mice have also been observed. Cytological studies revealed a reduction in the mitotic activity, and the appearance of membrane blabbing and in protoplasmic vacuoles in the treated tumour cells [24].

**ANTIBACTERIAL ACTIVITY**

Extraction of C. fistula leaves was carried out using solvents viz. petroleum ether, chloroform, ethanol, methanol and water. Although all five extracts showed promising antibacterial activity against test bacterial species like E. coli, K. aerogenes, Porteous vulgaris, and P. aerogenes bacteria but maximum activity was observed in ethanol extract. These entire findings exhibit that the leaf extracts have broad-spectrum activity and suggest its possible use in treatment of infectious diseases [24,25,26].

**ANTI- INFLAMMATORY ACTIVITY**

The extract of leaves of C. fistula was suggested for anti-inflammatory effects. Extracts showed Dose Dependent protective effect against lipid peroxidation and free radical generation in liver and kidney homogenates which shows that C. fistula bark extracts possess significant anti-inflammatory properties [27,28].

**HEPATO- PROTECTIVE ACTIVITY**

Bhakta et al. (1999), investigated the Hepatoprotective activity of the n-heptane extract of Cassia fistula leaves was investigated by inducing hepatotoxicity with paracetamol in rats. The extract at a dose of 400 mg/kg body wt. exhibited orally, significant protective effect by lowering the serum levels of transaminases (SGOT and SGPT), bilirubin and alkaline phosphatase (ALP). The hepato protective activity of C. fistula leaves have proved protective effect analogous to that of a standard hepatoprotective agent [27,29].

**ANTIPYRETIC ACTIVITY**

Bhakta et al. (2001), examined the significant activity of methanol extract of buds of C. fistula for its anti-pyretic action on normal body temperature and yeast-induced pyrexia in rats in both the models at doses of 200 and 400 mg/kg. At a dose level of 200 mg/kg, the extract caused significant lowering of normal body temperature up to 3 hr. at 400 mg/kg dose it caused significant lowering of body temperature up to 6 hr. The results obtained are comparable to those for paracetamol, a standard antipyretic agent. The results suggest that there exists a potential benefit in utilizing C. fistula Linn. in treating conditions associated with fever.[30]

**WOUND HEALING ACTIVITY**

The methanolic extract of C. fistula leaves was examined for its wound healing property in the form of an ointment in two types of wound models in rats, excision wound model and incision wound model. The ointment of the leaf extract of two different concentrations (5 and 10% w/w ointment of leaves extract in simple ointment base) responded significantly in both models of wounds tested. The results were also comparable to standard drug, nitrofurazone,

in terms of wound contraction ability, epithelization period, tensile strength and regeneration of tissue at wound area. C. fistula treated rats showed better wound closure, improved tissue regeneration at the wound site and supporting histopathological parameters pertaining to wound healing [31,32].

**EFFECT ON CHIKUNGUNYA:**

The crude extract of C. fistula Linn. served as a potential larvicidal, ovicidal and repellent agent against chikungunya vector mosquito [33].

**ANTI-TUSSIVE ACTIVITY:**

The methanol extract of leaves of C. fistula has exhibited significant antitussive agent [34].

**EFFECT ON FISTULA IN-ANO:**

Role of Aragvadhadisutra in the management of fistula in Ano is found effective [35].

**LAXATIVE ACTIVITY:**

The pods and leaves contain anthraquinone glycans and anthraquinone glycoside which act as a laxative which has been used in traditional medicine for a long time. In-vitro effect of C. fistula infusion on isolated guineapig ileum study concluded that C. fistula pod in fusion possess significant dose dependent laxative activity [36].

**EFFECT ON SKIN DISEASES**

Based on the results of this study it may be concluded that, the C. fistula is having significant effect on skin diseases due to pitta origin and is safe drug of choice of purgation therapy [37].

**ANTIPARASITIC ACTIVITY:**

Dichloromethane extract of C. fistula fruits showed 50% effective concentration of 18.96µg/ml against promastigotes of Leishmania L. chagasi. The Cytotoxicity of this substance against peritoneal macrophages resulted in an EC50 value of 42.58µg/ml. A similar study has been done by using Hexane extract of C. fistula fruit that shows significant antileishmanial activity against the promastigote form of Leishmania L. Chagasi [38].

**ANTIFERTILITY ACTIVITY:**

This is observed that Oral administration of aqueous extracts of seed of C. fistula to mated female rates from day 1-5 pregnancy at the doses of 100 and 200 mg/kg body weight resulted in 57.14% and 71.43% prevention of pregnancy, respectively, whereas 100% pregnancy inhibition was noted at 500 mg/kg body weight. This suggests a mild estrogenic activity of the extract [39,40].

**ANTIDIABETIC ACTIVITY:**

Diabetes mellitus is the most common and serious metabolic disorder among people all over the world. Methanol extract of C. fistula stem bark reduced the blood glucose levels in Streptozotocin-induced diabetic rats. Oral administration of Catechin a natural phenol plant secondary metabolite markedly increases tissue glycogen, restored the altered Glucokinase, Glucose-6 Phosphatase, Glycogen Synthase and Glycogen Phosphorylase. Above study suggest that catechin possesses hypo-glycaemic, Glucose oxidizing and insulin mimetic activities and hence it could be used as a drug for treating diabetes [41,42,43,44,45,46,47].

## DISCUSSION

Cassia fistula has long been used in traditional medical systems such as Ayurveda. For its therapeutic properties. Different parts of the tree including the bark, flowers, and fruit, are utilized for their medicinal benefits. This drug is used as a purgative drug which removes all the toxic

elements present in the body in the form of purgative. The pulp of the fruit is known for its laxative properties and is commonly used to treat constipation. Due to Madhura rasa, Snigdha Guna and Madhura vipaka it is vatashamaka in nature and due to Madhura rasa and Sita Veerya it is Pittashamaka. Due to its Sramsamana Guna it is Pitta Kapha Samsodhaka. In Charaka Samhita in the treatment of Kushtha, Kandu, it has been Samhita ins bathing and eating. Among the ten astringents mentioned in Sushruta Samhita for the treatment of Prameha, Aragvadha has been used along with Triphala in Haridrameha. This drug is used in many different forms like churna, kwath, asava, arishta, avaleha, vati etc. It is clearly mentioned in the Ayurvedic text that it is an effective medicine to cure diseases like Jwar, Kustha, Prameha, Amavata, Updansha, Vrana etc. Additionally, the tree's bark and flowers are believed to possess anti-inflammatory, antimicrobial, and antioxidant properties, making them useful in treating various ailments.

## CONCLUSION

Several modern drugs have been isolated from the plants as plant are the natural pool of therapeutic drug free from the side effects caused by any other non-herbal product. In ancient time almost all dieses treatment managed by plant products. C. fistula is an important and potential medicinal plant. The offered literature is about the substantial evidence on the anti-bacterial activities of its pod and seed extracts C. fistula Linn. has been used since ancient time in Ayurvedic system of medicine. It is known as a rich source of tannins, flavonoids and glycosides present in C. fistula Linn. might be medicinally important and/or nutritionally valuable. It possesses therapeutic potential in diseases like kushtha (skin diseases), hridroga (cardiac problems), vatarakta (gout), Rakta pitta (blood disorders), madhumeha (diabetes mellitus), visarpa (herpes), and jvara (febrile conditions), etc. Though there are certain properties which are still to be screened out, almost all these utilities have been revalidated through relevant experimental models in recent past. Various parts of plant are found hypoglycaemic, laxative, antibacterial, antipyretic, anti-inflammatory, smooth muscle stimulant, hepatoprotective, analgesic, anticancer, abortifacient, anti-colic, anti-fertility, estrogenic, anti-inflammatory, anti-tussive, antifungal and used to check wounds healing and antibacterial properties etc. shows us diverse veracity of the plant.

## REFERENCES

1. “The Wealth of India” National Institute of Communication and Information Resources, CSIR New Delhi, 2007; 2: 223.
2. http://en.wikipedia.org/wiki/Cassia_fistula (accessed on 15/04/2015)
3. DR. J.L.N Sastry, Dravya Guna Vijnana, Vol. 2, Forward by Prof. K.C. Chunekar, Varanasi: Chaukhambha Orientalia; Year, 2005; 200.
4. Kirtikar KR, Basu BD. Indian Medicinal Plants. Vol-2, Second Edition. Dehradun; M/s Bishne Singh Mahendra Pal Singh, 1975; 856-859.
5. Theesan Bahorun, Vidushi S, Neergheen, Okezie IA. Phytochemical constituent of Cassia fistula. African journal of Biotechnology, 2005; 4: 1530-40.
6. The Ayurvedic Pharmacopoeia of India, Government of India, Ministry of health and family welfare, Department of Ayush, New Delhi.

7. Database on "Medicinal plant "Used in Ayurveda, CCRAS, Propagation and cultivation, 02; 34.
8. Pt Kashinath Sastri, Dr Gorakh Nath Chaturvedi, Caraka Samhita, Sutra Sthana 4/13- Chaukambha Bharati Academy, Varanasi, 2009; I: 81.
9. Pt Kashinath Sastri, Dr Gorakh Nath Chaturvedi, Caraka Samhita, Sutra sthana 4/14- Chaukambha Bharati Academy, Varanasi, 2009; I: 82.
10. Pt Kashinath Sastri, Dr Gorakh Nath Chaturvedi, Caraka Samhita, Sutra sthana 4/4- Chaukambha Bharati Academy, Varanasi, 2009; I: 66.
11. Pt Kashinath Sastri, Dr Gorakha Nath Chaturvedi, Caraka Samhita, Vimana sthana 8/143- Chaukambha Bharati Academy, Varanasi, 2009; I: 791.
12. Kaviraj Ambika Dutta Shastri, Sushruta Samhita, P I, Sutra Sthana, 38/6-7, Chaukambha Sanskrit Sansthan, Varanasi, 2006; 183.
13. Kaviraj Ambika Dutta Shastri, Sushruta Samhita, P I, Sutra Sthana, 38/29-30, Chaukambha Sanskrit Sansthan, Varanasi, 2006; 185.
14. Kaviraj Ambika Dutta Shastri, Sushruta Samhita, P I, Sutra Sthana, 38/64-65 Chaukambha Sanskrit Sansthan, Varanasi, 2006; 188.
15. Kaviraj Ambika Dutta Shastri, Sushruta Samhita, P I, Sutra Sthana, 42/22, Chaukambha Sanskrit Sansthan, Varanasi, 2006; 205.
16. Kaviraj Ambika Dutta Shastri, Sushruta Samhita, P I, Sutra Sthana, 39/4, Chaukambha Sanskrit Sansthan, Varanasi, 2006; 190.
17. Kaviraj Ambikadutta Shastri, Sushruta Samhita, P I, Sutra Sthana, 39/9, Chaukambha Sanskrit Sansthan, Varanasi, 2006; 192.
18. Kaviraj Sri Atridev Gupta, Ashtanga Hrdaya, Sutra Sthana 15/2, Chaukambha Sanskrit Sansthan, 1975; 104.
19. Kaviraj Sri Atridev Gupta, Ashtanga Hrdaya, Sutra Sthana 15/17, Chaukambha Sanskrit Sansthan, 1975; 105.
20. Kaviraj Sri Atridev Gupta, Ashtanga Hrdaya, Sutra Sthana 15/45, Chaukambha Sanskrit Sansthan, 1975; 107.
21. Bhalodia, N. R., Nariya, P. B., Acharya, R. N. and Shukla V. J. 2012. In vitro antibacterial and antifungal activities of Cassia fistula Linn. Fruit pulp extracts. AYU (An international quarterly journal of research in Ayurveda), 33 (1): 123-129. doi: 10.4103/0974-8520.
22. Phongpaichit, S., Pujenjob, N., Rukachaisirikul, V. and Ongsakul, M. 2004. Antifungal activity from leaf extracts of Cassia alata, Cassia fistula and Cassia tora L. Songklanakarin. Journal Sci. Technology, 26: 741-48.
23 Duraipandi Yana, V. and Ignacimuthu, S. 2007. Antibacterial and antifungal activity of Cassia fistula Linn.: An Ethnomedicinal plant. Journal of Ethnopharmacology, 112: 590-94.
24. Shankar, S. and Mathew, L. 2012. Chemo preventive Potential of Methanol Extract of Stem Bark of Cassia Fistula Lin. Mice. IJPI'S Journal of Pharmacognosy and Herbal Formulations, 2: 8.
25. Vasudevan, D. T., Dinesh, K. R., Gopalkrishnan, S., Sreekanth, S. K. and Shekar, S. 2009. The potential of aqueous and isolated fraction from leaves of Cassia fistula Linn as antibacterial agent. Int J Chem Sci, 7: 2363-2367.
26. Panda, S. K. and Padhi, L. P. 2011. Mohanty G. Antibacterial activities and

phytochemical analysis of Cassia fistula (Linn.) leaf. J Adv Pharm Technol Res, 2: 627.

27. Bhakta, T., Mukherjee, P. K., Saha, K., Pal, M. Saha, B. P. and Mandal, S. C. 1999. Evaluation of anti-inflammatory effects of Cassia fistula (Leguminosae) Journal of Herbs, Spices & Medicinal Plants, 6(4): 67-72.

28. Ilavarasan, R., Mallika, M. and Venkataraman, S. 2005. Anti-inflammatory and antioxidant activities of Cassia fistula Linn. Bark extracts. Afr. J. Trad., 2 (1): 70 – 85.

29. Kannampalli, P., Chandrasekaran, V. R. M., Kuppannan, G. and Sivanesan, K. 2007. Effect of Cassia fistula Linn. Leaf extract on diethyl nitrosamine induced hepatic injury in rats. Journal of Chemico-Biological Interaction., 167: 12 -18.

30. Bhakta, T., Banerjee, S., Mandal, S. C., Maity, T. K., Saha, B. P. and Pal, M. 2001. Hepatoprotective activity of Cassia fistula leaf extract, Phytomedicine. 8(3): 220-224.

31. Bhakta, T., Banerjee, S., Mandal, S. C., Maity, T. K., Saha, B. P. and Pal, M. 1997. Wound healing activity of Cassia fistula Linn. (Leguminosae) leaf (methanol extract) in rats. J. Ethnopharmacol,9: 35-38.

32. Senthil, K. M., Sripriya, R., Vijaya, R. H and Sehgal, P. K. 2006.Wound healing potential of Cassia fistula on infected albino rat model. J Surge Res, 131: 283-289.

33. Govindarajan, M. 2009. Bio efficacy of Cassia fistula Linn. (Leguminosae) leaf extract against chikungunya vector, Aedes aegypti (Diptera, Culicidae), Eur Rev Med Pharmocol Sci.13(2): 99-103.

34. Bhakta, T., Mukherjee, P., Saha, K., Pal, M. and Saha, B. P. 1998. Studies on Antitussive Activity of Cassia fistula Leaf Extract. Journal of Pharma. Bio, 36: 140-43.

35. Kumar, P. H. 2000. Role of Aragvadhadi sutra in the management of fistula -in-ano, Ancient Science of Life, 19(3): 110-112.

36. Akanmu, M. A. Iwalewa1, E. O., Elujoba, A. A. and Adelusola, K. A. 2004. Toxicity Potentials of Cassia Fistula Fruits as Laxative with Reference to Senna. African Journal of Biomedical Research,7(1): 23-26.

37. Kumar, M. and Chaudhari, V. 2013. Evaluation of purgation activity of cassia fistula in skin diseases due to vitiated pitta Dosha, Journal of Ayurveda and Holistic Medicine, 1(4):1-10.

38. Sartorelli, P., Carvalho, C. S., Reimao, J. Q., Ferreira, M. J. and Tempone, A. G.2009. Antiparasitic activity of biochanin A, an isolated isoflavone from fruits of Cassia fistula (Leguminosae). Parasitology Research,104(2): 311- 314.doi: 10.1007/s00436-008-1193

39. Vijaya Kumar, S. K., Rajesh, K.M., Mendon, M. R. and Hariharan, V., 2000. Seasonal distribution and behaviour of nutrients with reference to tidal rhythm in the Mulki estuary, Southwest Coast of India. J. Mar. Biol. Ass. India. 42: 21-31.

40. Rajesh, Y. and Jain, G. C. 2009. Effect of Petroleum ether extract of Cassia Fistula Seeds on Uterine Histoarchitecture of Ovariectomized Female Rats. International Journal of PharmTech Research, 1(3): 438-444.

41. Malpani, S. N., Manjunath, K. P., Hasan pasha, S., Savadi, R. V. Akki Kusum, S. and Darade, S. S. 2010. Antidiabetic activity of Cassia fistula Linn. Bark in alloxan induced diabetic rats. Int. Journal of Pharm. Sciences, 2: 382-85.

42. Pitchai, D. and Manikkam, R. 2012. Hypoglycaemic and insulin mimetic impact of catechin isolated from Cassia fistula: A substantiate in silico approach through

docking analysis. Med Chem Res, 21: 2238-50.
43. Agnihotri, A. and Singh, V. 2013. Effect of Tamarindus indica Linn. And Cassia fistula Linn. stem bark extracts on oxidative stress and diabetic conditions. Acta Pol Pharm, 70:1011-1209.
44. Daisy, P. and Saipriya, K. 2012. Biochemical analysis of Cassia fistula aqueous extract and phytochemically synthesized gold nanoparticles as hypoglycaemic treatment for diabetes mellitus. Int J Nanomedicine, 7:1189-1202.
45. Jarald, E. E., Joshi, S. B, Jain, D. C. and Edwin, S. 2013. Biochemical evaluation of the hypoglycaemic effects of extract and fraction of Cassia fistula Linn. in alloxan induced diabetic rats. Indian J Pharm Sci,75:427-434.
46. Einstein, J. W., Rais, M. M. and Mohd, M. A. 2013. Comparative evaluation of the antidiabetic effects of different parts of Cassia fistula Linn, a Southeast Asian Plant. J Chem,744-763.
47. Nirmala, A., Eliza, J., Rajalakshmi, M., Edel, P. and Daisy, P. 2008. Effect of Hexane Extract of Cassia fistula Barks on Blood Glucose and Lipid Profile in Streptozotocin Diabetic Rats. International Journal of Pharmacology, 4(4): 292-296.10.3923/ijp.2008.292.296

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