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ARAGVADHA (CASSIA FISTULA): A WONDER TREE FROM TREASURES OF AYURVEDA

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ABSTRACT

Aragvadha (cassia fistula) is an ancient medicinal plant and widely used in various diseases**.** *Aragvadha*, commonly known as the golden shower, Indian labrum and *Ravriksha*. *Aragvadha* known as disease killer and it pacifies the three *doshas* of *vata*, pitta and *kapha*. It has many medicinal properties having important pharmacological properties. The therapeutic uses of *Aragvadha* are Vibandha, *Udavarta, Gulma, Shoola, Udararoga, Hridroga, Prameha.* This article deals with various medicinal properties of *aragvadha*. *Cassia fistula* has many medicinal properties like are mordant, purgative, tonic, laxative, anthelmintic, emetic, antiperiodic, diuretic, carminative, anti-inflammatory, diuretic and ophthalmic. It is also to mention that Indian medicinal plants are considered as a vast source of many pharmacologically principles and compounds that are commonly used as home remedies against multiple diseases.

KEYWORDS: *Aragvadha, doshas*, medicinal properties, *Prameha, Hridroga.*

INTRODUCTION

Āragvadha (आरग्वध) is a Sanskrit word referring to "purging cassia"[1] It is an important medicinal plant used in ayurvedic preprations. It is often used as a highly effective moderate laxative that is safe even for children. *Aragvadha* (Cassia fistula) plant has therapeutic as well as curative value. Every part of aragvadha plant is recognized for its medicinal properties. A brief description about this plant is:

Latin Name: *Cassia fistula* Linn.
Family: Fabacae (caesalpiniaceae)
Synonyms:[2] Krtamala, Chaturañgula, Arevata, Dirghaphala, Rãjavrka, Vyadhighata, Sampaka, Suvarnabhusana.

In *Charaka Samhita Aragvadha* is described in *Kusthaghana* and *Kandughana Mahakashaya.* It is mentioned in *Sutra, Vimana, Chikitsa, Kalpa* and *Siddhi Sthana* for treating the disease by the name *Argvadha, Amaltaash, Chatrangul, Shampaka* etc.[3] *Acharya Sushrut* mentioned *Aragvadha* under different *Gana,Yoga, Agada* and as a *Jala shodhaka oushadha* in different *sthana.*[4] *Acharya Vagbhat* mentioned *Aragvadha* under *Aragvadhadi, Shyamadi,*[5] *and Tiktaskandhagana* and described it for kaphaj *vikara* and *jwara.*[5]

Ayurvedic Properties and Action of Aragvadha (Cassia fistula)[6]

- Rasa: Madhura, Tikta
- Guna: Guru
- Virya: Ushna
- Vipaka: Madhura
- Karma: Rechana, Pittakaphahara, gudaroga, Udara, Vrana, Kusta, Amavata, Gandamala, Krimi, Udarashoola, Prameha.

Doshaghnata[7]

Vata-pittashamaka, Kapha-pittasamshodhaka

Rogaghnata

Varna sotha, Granthishotha, Vatarakta, Amavata, Sandhivata, Mukharoga, Kustha, Kandu, Vatavyadhi, Aruchi, Vibhandha, Udavarta, Shoola, Yakrit- sotha, Hridroga, Raktapitta, Shotha, Shushka- kasa, Shwasa-krichchhra, Mootra-krichchhra, Daha, Jwara.

Botanical Discription[8] The moderate sized handsome deciduous tree, 8 to 15 m in height with greenish grey smooth bark when young and rough when old, exfoliating in hard scales. Leaves pinnately compound, leaflet 4 to 8 pairs, ovate, acute, bright green, glabrous above, paler and silvery pubescent beneath when young, main nerves numerous. Flowers bright yellow in axillary lax pendulous racemes. Pods are Cylindrical, pendulous, smooth, dark brown, black, 30 to 60 cm long. Seeds biconcave, broadly ovate, light brown, horizontally immersed in dark coloured sweetish pulp.

Distribution
Throughout the greater part of India, ascending upto and altitude of 1220 m in the Sub-Himalayan tract and outer Himalaya, in Kumaon, abundant in forest through out upper Gangetic plain of Bengal, Central India and deciduous forest of South Iindia.

Part Used
Root bark, leaf, flower, fruit pulp.

Chemical Constituents[9]
Sugar, mucilage, pectin[10] Anthraquinones, tannins, sterols. The pulp of the pod contains glycosides, sennosides A and B, rhein and its glucoside, barbaloin, Rheinglucoside, Emodin, Chrysophanic Acid, Phlobaphenes, Fistuacacidin, Lupeol, and Sterols like Beta-Sitosterol, and Hexacosanol.

Pharmacological Activity[11]
Hepatoprotective[12]
Cassia fistula leaves are tested for hepatoprotective activity. It is found that nheptane extract of Cassia fistula leaves has hepatoprotective activity4. The extract (dose of 400 mg/kg body weight) exhibited protective effect signifcantly by lowering the serum level of transaminase (serine glutamic-oxaloacetate transaminase [aspartate aminotransferase] and serine glutamicpyruvic transaminase [alanine aminotransferase]), alkaline phosphatase, and bilirubin. The protective effect of cassia fistula leaves is comparable to that of a standard hepatoprotective agent.

Anti- Pyretic Effect[13,14]
The pods extracts exhibited antipyretic effect by reducing yeast induced fever. The extract showed activity in both the models at doses of 200 and 400 mg/kg. At 200 mg/kg dose, the extract caused a camparatively better hypothermal activity against yeast-induced pyrexia. In the yeast-provoked elevation of body temperature model, the extract showed dose dependent lowering upto 4 h at both the dosage levels.

Leukotriene Inhibitory Activity
The Cassia fistula fruit's methanol extract inhibits the leukotriene, 5- lipoxygenase catayzed product, in bovine polymorphonuclear leukocytes (IC50: 38 micro g/ml). It also inhibits (IC50 of 40 micro g/ml) lipid peroxidation in bovine brain. A linear correlation was observed between the effects of the extract in two assays confirming a redox based mechanism for the inhibition of the 5-lipoxygenase enzyme.

Anti-Tussive Activity: The methanol extract was investigated in mice to check its effect on a cough model induced by sulphur dioxide gas. The extract showed significant, dose dependent antitussive effect as compared to the control. The antitussive activity was also comparable with codeine phosphate, a prototypes antitussive agent. The extract (400 and 600 mg/kg, p.o.) supressed the coughing by 44.44 and 51.85%, respectively, as compared to the control group.

Anti Oxidant Activity
The antioxidant properties was showed by of 90% ethanol extracts of leaves, and 90 stem bark, flowers and pulp from Cassia fistula. The order of antioxidant power in decreasing order is as follows: stem bark, leaves, flowers and pulp. It was in correlation with the total polyphenolic amount of the methanolic extracts. , Hence stem bark had more antioxidant activity in terms of reducing power, inhibition of DPPH radical scavenging ability, and peroxidation.

Anti-Inflammatory Activity
Wistar albino rats model was used to study the anti-inflammatory and antioxidant effects of the aqueous and methanolic extracts of the Cassia fistula bark. The extracts were found to have significant anti-inflammatory effect in both chronic and acute models. The bark extracts showed prominant radical scavenging by inhibiting lipid peroxidation initiated by FeSO4 and CCl4 in rat kidney ad liver homogenates. Both extracts showed prominent antioxidant activity in nitric oxide ,DPPH, and Hydroxyl radical induced in-vitro assay methods. Both extracts showed Dose-Dependent protective effect against free radical generation and lipid peroxidation in kidney and liver homogenate.

Wound Healing Activity
Infection is the major dificulty to treat the wound. The antibiotic resistance by the pathogenic microorganism makes drug ineffective. The alcohol extract of leaves was tested for antibacterial effect against Pseudomonas aeruginosa and Staphylococcus aureus. The extact treated rats showed, comparatively better wound closure, improved tissue regeneration, and supporting histopathological parameters pertaining to wound healing.

Hypolipidimic Activity
The 50% ethanolic extract of legume affetcs serum lipid metabolism in cholesterol fed rats with the dose; oral feeding of cholesterol (dose 500 mg/kg b.wt./day) dissolved in coconut oil (dose 0.5 ml/rat/day) for 90 days. Administration of legume extract (at the doses 100, 250 and 500 mg/kg b.wt./day along with cholesterol) prominantly prevented the rise in the serum total and

LDL-cholesterol, phospholipids and triglycerides in a dose dependent manner.

Anti-Cancer Activity: Experiment was performed to observed that methanolic extract of seed on the on the life span of tumour bearing mice and growth of Ehrlich ascites carcinoma (EAC).13 The treatment showed the decrease in the tumour volume, and increase of life span in the EAC tumour hosts .

Anti-Diabetic Activity

The hypoglycemic effects of the hexane extract of stem bark in the streptozotocin induced and normal diabetic rats was observed. Hexane extract of at the doses of 0.15, 0.30, 0.45 g/kg body weight for 30 day decreased the elevated blood glucose levels 20. The aqueous extract of flowers (ACF) was tested for its antioxidant effect in alloxan induced diabetic rats while seeds extract was investigated for hypoglycemic activity. They showed marked hypoglycemic activity on normal members of albino rats in 21 & 22 days.

Anti-Leishmanish Activity

The hexane extract from the fruits showed antileishmanial activity against the promastigote form of Leishmania L. chagasi.16 The bioguided method of fractionation resulted in the isolation of clerosterol, which was further tested in different models. Promastigotes presented an IC50 of 10.03 micro g/mL. The intracellular amastigotes showed high susceptibility, with IC50 value 18.10 micro g/mL. The mammalian cytotoxicity was and it was tested and it showed that clerosterol was comparatively 3.6 times lesser toxic than the standard drug i.e. pentamidine.

CNS Activity

The methanol extract of the seeds of cassia fistula was evaluated for different pharmacological effect in mice. A depressant activities of extract was also found from the behavioral studies on mice.17 The extract significantly increase the sedative effect of diazepam, sodium pentobarbitone, chlorpromazine, and meprobamate. It also increased the analgesia induced by pethidine and morphine in a dose-dependent manner.

Antiparasitic Activity

The dichloromethane extract of fruits led to the isolation of the active isoflavoane iochain A, which was characterized by spectroscopic methods. 19 Isoflavoane iochain A compound showed 50% effective concentration (EC50) value - 18.96 micro g/mL against the promastigotes of Leishmania (L.) chagasi. The cytotoxicity of isoflavoane iochain A against peritoneal macrophages resulted in an EC50 value of 42.58 micro g/mL.IN addition to this, biochanin A showed an antitrypanosoma-cruzi activity, resulting in an EC50 value 18.32 micro g/mL and a 2.4 times more effectiveness than benznidazole.

Anti-Itching Activity

Vicharchika is a chronic skin disease which has no permanent cure in modern medicine. The common immunological marker of eczema is the raised serum IgE level. This study showed the prominant efficacy of aragvadha on patients of eczema.

Anti- Ulcer Activity: The ethanol leaf extract (ELE) was tested for antiulcer activity against the pylorus ligation-induced gastric ulcer. Drug ranitidine (dose 30 mg/kg b.w.) and ELE (doses of 250, 500, and 750 mg/kg b.w.) were given orally in different groups of rats (n = 6), for 1 h prior to the pyloric ligation. After four hours of pyloric ligation, the gastric juice was collected for testing of various parameters.

Protease Inhibitory Activity

The seed PI is homologous to the family of plant -defensins (gama-thionin) which have four disulfide linkages at highly conserved locations .The cassia fistula seed PI supress trypsin and it is the first known example of plant defensing with protease inhibitory activity. It suggests a possible additional functions for some members of this class of plantdefensive protein.

Anti-Fertility Activity

The petroleum ether extract of seeds of was evaluated for the antifertility activity in proven fertile female albino rats with the doses of 100, 200 and 500 mg/kg b.wt./day. The oral administration of the extract to mated female rats on days 1-5 of pregnancy resulted in a decline in the numbers of uterine implants, fertility index, and live foetuses in a dose dependent manner and was confirmed by laparotomy on day 15 of pregnancy. The seed extract (100 mg/kg b.wt.) showed weak estrogenic activity when given alone and tested in immature bilaterally ovariectomized female albino rats, but exhibited slight antiestrogenic activity when administration along with estradiol valerate (0.1 mg/kg b.wt.). Blood sugar and haematological parameters were within normal range. Thus, the results of the present study indicate that the petroleum ether extract of Cassia fistula seeds possesses pregnancy terminating effect by virtue of antiimplantation activity.

Larvicidal and Ovicidal Activity

It is reported that the ovicidal effect of leaf extracts of C. fistula (at 0.5, 1.0 and 2.0%, topically applied) was evaluated on the viability and hatching of eggs (0, 1 and 3 days old) of D. koenigii. Application of leaf extracts of the plant inhibited hatching of the eggs, and increasing concentration of the extract resulted in increased non-viability of 3-day-old eggs. 25The methanolic leaf extract of Cassia fistula was tested for larvicidal and ovicidal activity against Culex quinquefasciatus and Anopheles stephensi. The extract was found to be more lethal to the larvae of A. stephensi than C. quinquefasciatus with LC50 values of 17.97 and 20.57 mg/l, respectively Mean percent hatchability of the ovicidal activity was observed 120 h after treatment. The

percent hatchability was inversely proportional to the concentration of extract and directly proportional to the eggs. The egg raft of C. quinquefasciatus was found to be more hatchable than A. stephensi. The results show that the leaf extract of C. fistula is promising as a larvicidal and ovicidal agent against C. quinquefasciatus and A. stephensi.

Laxative Activity

The in-vitro effect of Cassia fistula infusion on isolated guinea-pig ileum. The acute and sub-chronic toxicity of the infusion of C. fistula and Cassia acutifolia sp. Del. Pod- (Senokot tablet) as the reference drug were also determined. The results obtained for C. fistula infusion when compared with senokot tablet showed that the infusion of Cassia fistula pods possessed very low levels of toxicity, having the LD50 of 6600 mg/kg and also without any pathological effects on the organs examined microscopically. It is therefore concluded from the study that C. fistula pod infusion could be safely utilized as laxative drugs and as a substitute for the official Senna.

Anti-Epileptic Activity/ Anti- Convulsant Activity

To evaluate anticonvulsant activity of methanolic extract of seeds of Cassia Fistula against pentylenetetrazol (PTZ) induced convulsions in mice. Here the animals were divided into four groups of six mice each and were injected PTZ (60mg/kg intraperitonially) Group I was served as toxic control, Group II was pretreated with Gabapentin (200mg/kg P.O.). Group III was pretreated with methanolic extract of seeds of Cassia Fistula (100 mg/kg P.O.) for 7 days. Group IV was pretreated with methanolic extract of seeds of Cassia Fistula (200mg/kg P.O.) for 7 days.The result shows that methanolic extract of seeds of Cassia Fistula significantly reduced duration of clonic convulsions and also delayed the onset of convulsions induced by pentylenetetrazol. The result was expressed as mean ± SEM and were statistically analyzed by one way ANOVA. It is concluded that methanolic extract of seeds of Cassia Fistula can show anticonvulsant activity against pentylenetetrazol induced convulsions in mice.

Doses[15]

Fruit Pulp - 5-10 gm (Purgation Dose 10 to 20 gm)
Root bark decoction – 50 to 100 ml
Flowers – 5 to 6 gm.

Formulation and Preprations[16]

Mahamarichyaadi Taila, Mahamanjishthadyarishta, Rasnadi KwathaYoga, Aragvadhadi Kwatha, Aragvadhadi Taila, Aragvadhai leha.

CONCLUSION

This review summarizes on pharmacological activities, phytochemical and many more that can be considered further to achieve lead molecules in the search of novel herbal drugs. It is clear by this review that in traditional medicinal system of India plant possesses hepatoprotective, anti-inflammatory, antitussive, larvicidal and ovicidal, anti-epileptic, antifungal, laxative**,**wound healer and antibacterial properties.

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