

A Review: Cassia Fistula .Linn (Caesalpinaceae)

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Abstract: *Cassia fistula* linn, Which is popularly known as “Indian laburnum¹” in English. It comes under the family of caesalpinaceae. It is well known as golden shower flower tree. The drug is majorly used in ayurvedic medication for various ailments. It is a deciduous tree with greyish green bark, compound leaves, leaflets are 5-12 cm long. It is a tree known for its beautiful bunches of flower, It is a monsoon plant all over the greater parts of India, ascending to 1300m in exterior Himalaya, is mostly used in traditional medicine of Indian system for its liver protective, antimycotic and wound healing. Various parts are used for medicinal purpose such as root, bark, leaves and flower. Nowadays the Research works are going on to identify, isolate and validate the various medicinal components from cassia fistula. The current work is about the pharmacognostical studies like physiochemical evaluation of the drug and anatomical studies of cassia fistula gives us eminent knowledge about the drug.

Keyword: Taxonomical classification, Traditional use, Physiochemical studies, Pharmacognostical evaluation.

I. INTRODUCTION

TAXONOMICAL CLASSIFICATION

Kingdom:	Plantae
Subkingdom:	Tracheobionta
Super Division:	Spermatophyta
Division :	Mangoliophyta
Class:	Magnoliopsida
Sub Class:	Rosidae
Order:	Fabales
Family:	Fabaceae
Genus:	Cassia
Species:	Fistula

Table 1

II. DESCRIPTION

Flowers deep yellow in terminal, drooping racemes, 30-60 cm in length; calyx is usually oblong, obtuse, pubescent; corolla with 5 subequal, obovate, small clawed petals, to 3.5 cm across; stamens 10, axial 3 with erect filaments to 0.7 cm in length and with basal fixed anthers; lower 3 curved and filaments with dorsal fixed anthers and the median 4 stamens with erect filaments, to 1 cm in length and with versatile, curved anthers⁴; pistil sessile, ovary pubescent, style to 0.5 cm in length and with an end stigma.

Cassia fistula is a medium sized tropical deciduous tree², 10 m tall with a straight trunk to 5 m, 1 m diameter and

spreading branches. Stem is grey, smooth and slender when young and dark brown and rough when old.

Leaves are alternate, usually pinnate, 30-40 cm in length, with 4-8 sets of ovate leaflets, 7.5-15 cm in length, 2-5 cm thick, entire, the petioles 2-6 mm in length.



Figure 1

Chemical constituents present in various parts of the plant

1.	Bark	<ul style="list-style-type: none"> ✓ Flavonol glycosides, ✓ Oxyanthraquinone, ✓ Dihydroxyanthraquinone
2.	Pods ¹⁸	<ul style="list-style-type: none"> ✓ Arabinopyranoside, ✓ 5-nonatetracontanone, ✓ 2-hentriacontanone
3.	Leaves	<ul style="list-style-type: none"> ✓ Quinone glycosides, ✓ sennosides A , ✓ glucoside, ✓ Barbaloin, ✓ Aloin, ✓ formic acid, ✓ butyric acid ✓ and their esters ✓ and oxalic acid ✓ Presence of pectin and tannin.
	Flowers	<ul style="list-style-type: none"> ✓ Anthraquinone glycosides, ✓ Hentriacontanoic acid, ✓ Triacontanoic acid, ✓ nonacosanoic and ✓ Heptacosanoic acids. ✓ ceryl alcohol, ✓ kaempferol, ✓ anthraquinone glycoside, ✓ Fistulin. ✓ Aurantiamide acetate, ✓ β sitosterol and ✓ β D glucoside ✓ triterpenes

	Fruit	<ul style="list-style-type: none"> ✓ Ceryl alcohol, ✓ kaempferol, ✓ rhein and ✓ bianthraquinone glycoside, ✓ fistulin, ✓ rhein, ✓ sennosides A & B, ✓ anthraquinone, ✓ tannins, ✓ oxyanthraquinone
	Pulp of the pod.	<ul style="list-style-type: none"> ✓ anthraquinone glycosides, ✓ sennosides A & B, ✓ rhein and its glucoside, ✓ barbaloin, ✓ formic acid, ✓ butyric acid and their ethyl esters and ✓ oxalic acid,
	Pulp	<ul style="list-style-type: none"> ✓ Sugar moiety, ✓ tannic substance, ✓ albuminous starch, ✓ calcium oxalate ✓ gum, ✓ astringent substance, ✓ gluten, ✓ coloring matter and ✓ water ✓ sucrose, 31.3; ✓ fructose, 26.2; ✓ glucose, 42.5% and ✓ High concentration of potassium (1809mg/100g dry basis). ✓ 20 parts pulp yielded sugar, ✓ 12; gum,; ✓ gluten; ✓ coloring matter; ✓ Water.
	Root	<ul style="list-style-type: none"> ✓ 7-methylphyscion, ✓ betulinic acid and ✓ β sitosterol,
	Root bark	<ul style="list-style-type: none"> ✓ Tannins, ✓ phlobaphenes and ✓ oxyanthraquinone^{14s}
	Seed oil	<ul style="list-style-type: none"> ✓ cyclopropenoid fatty acids, ✓ vernolicid a, ✓ malvalic acid and ✓ sterculic acids
	Fruit pulp	<ul style="list-style-type: none"> ✓ cyclopropenoid fatty acids, ✓ vernolic, ✓ malvalic and ✓ sterculic acids
	Powdered stem bark	<ul style="list-style-type: none"> ✓ tannins, ✓ lupeol, ✓ haxacosanol, ✓ B-sitosterol.

Seed	<ul style="list-style-type: none"> ✓ sterculic and ✓ Malvalic acids. ✓ glycerides with ✓ oleic, ✓ linoleic, ✓ stearic and ✓ palmitic acids ✓ Major fatty acids along with traces of caprylic and myristic acids. ✓ cephalin and ✓ lecithin ✓ phospholipids and ✓ carbohydrates (11.8%).
Flower's pollen	<ul style="list-style-type: none"> ✓ amino acids ✓ Carbohydrate(11.75)
Wood	<ul style="list-style-type: none"> ✓ Fistucadin, ✓ (3, 4, 7, 8, 4'-pentahydroxyflavan).
Vegetative organs	<ul style="list-style-type: none"> ✓ Proanthocyanidins, ✓ Flavonoids
Entire plant	<ul style="list-style-type: none"> ✓ Tannin; ✓ saccharose 53-66%; ✓ invert sugar; ✓ citric acid; ✓ coloring matter; ✓ pectin; ✓ Anthraquinone¹³.
Flower oil	<ul style="list-style-type: none"> ✓ (E)-nerolidol (38%) and ✓ 2-hexadecanone (17%),
Leaf oil	<ul style="list-style-type: none"> ✓ Phytol (16.1%).
Reproductive organs: ✓ flower bud, ✓ flower, ✓ pod	
	<ul style="list-style-type: none"> ✓ Proanthocyanidins, ✓ Flavonoids

Table 2

Bengali	sondal,sonali
English	Indian laburnum, golden shower
Gujarati	Girmala
Hindi	bharva,suvarnaka Bandarlathi,
Malayalam	rajah
Sanskrit	survanaka,argwadha ,rajtaru
Tamil	konnai,tirukontai,sarakkonne, Raelachettu ³
Telugu	Kakkemara
Marathi	Bahava
Punjabi	Amaltaas, Girdnalee
Oriya	Sunaari
Urdu	Amaltaas
Arab	Khayarsambhar chaiyaphruek,khuun
Thai	chácara ,Guayaba Cimarrona Canáfistula mansa

Spanish	Bâton casse, casse espagnol
Trade name	Indian laburnum

Table 3

III. TRADITIONAL USES

✓ SEED

Used to treat skin diseases, abdominal discomfort and leprosy, possess laxative, carminative, cooling and anti-pyretic properties, used in the treatment of constipation.

✓ Flower

Used to treat skin diseases, GIT disorder and leprosy and posses astringent, laxative, febrifugal. And has high wound healing properties decoction of the flowers is given for stomach troubles.

✓ FRUIT

Used in treatment of skin diseases, fever, abdominal pain and leprosy.

✓ ROOT

Useful against cardiac disorders, biliousness, rheumatic condition, hemorrhages wounds, boils and ulcers.

✓ PULP

Safe for children and pregnant women as purgative It is given in disorders of liver, and in biliousness, and used as a tonic used in gout and rheumatic condition. [used as an antipyretic and it is remedy for malaria • Blood - poisoning, anthrax and diahorrea, and given in leprosy and diabetes and for the removal of abdominal obstructions

✓ LEAVES

Contains laxative property [17] Ripe pod • used in traditional medicines as a laxative drug Anthelmintic Activity

IV. BASED ON THE LITERATURE REVIEW THE FOLLOWING CASSIA FISTULA HAS PHARMACOLOGICAL ACTIVITIES

- ✓ Antibacterial Activity
- ✓ Antifertility activity
- ✓ Antifungal activity
- ✓ Anti-inflammatory and Antioxidant activities
- ✓ Anti-diabetic activity⁸
- ✓ Anti-itching activity
- ✓ Anti-parasitic activity
- ✓ Antiulcer activity
- ✓ Anti-leishmaniac activity
- ✓ Antimicrobial Activity
- ✓ Antiparasitic activity

- ✓ Antipyretic and analgesic¹² activity
- ✓ Antitumor activity
- ✓ Antitussive activity
- ✓ Clastogenic effect
- ✓ CNS activities
- ✓ Hepatoprotective activity
- ✓ Hypolipidemic activity
- ✓ Laxative activity¹³
- ✓ Leukotriene inhibition activity
- ✓ Wound healing activity

V. EXTRACTIVE PROCESS OF CASSIA FISTULA

The powdered material containing some of the essential component is placed inside a thimble made of thick filter paper, which is loaded inside the main chamber of the soxhlet extractor. The extraction solvent is taken into the distillation chamber and the soxhlet Extractor is placed on to this flask. The soxhlet is now equipped with a condenser. The solvent is heated to reflux. The solvent evaporates travels up into the distillation arm and overflows into the housing chamber the thimble of solid. The condenser ensures that solvent vapours are cooled, and drips down back into the housing chamber the solid material. The chamber containing the solid material is filled with hot solvent. Some of the required component will then dissolve in the hot solvent. When the chamber is almost complete, the chamber is self emptied by a siphon side arm, with the solvent going back down to the distillation flask. The thimble confirms that the rapid motion of the solvent does not transport any solid powdered material to the pot. This process may be allowed to repeat many times.

VI. PHYTOCHEMICAL STUDY

Phytochemical study is based on the extract which is collected from the soxhlet apparatus

PROCEDURE

✓ TEST OF FLAVANOIDS⁹

To the few ml of Extract and add few amount of magnesium then add conc. hcl acid

✓ TEST OF STEROIDS

Extract is first dissolved in chloroform and add few drops of acetic acid and conc. sulphuric acid

✓ TEST FOR TERPENOID

To the Extract add chloroform then add few drop of acidic acid and conc. sulphuric acid

✓ TEST FOR TANNINS

Extract is added to 3 drops of 5% ferric chloride solution.

✓ TEST FOR SAPONINS

To the Extract add 4 ml of distilled water and heated to the boiling point.

✓ TEST FOR ANTHRAQUINONES

To powdered material add 2 ml of HCL 10% and boiled for few min. Filtered and the sample is allowed to cool then filter again with equal volume of chloroform transfer the chloroform layer into test tube and shake slowly with equal volume of ammonia and then allow the layer to separate.

✓ TEST FOR GLYCOSIDES

Few gm of extract is diluted to 5 ml, with distilled water and then add 3ml of glacial acetic acid and add one drop of ferric chloride solution this was placed under flame with 2 ml of conc. sulphuric acid.

✓ TEST FOR ALKALOIDS

Few ml of extract evaporated to dryness. Residue heated on water bath with 2% HCL, filtered and then, add Mayer's reagent.

✓ TEST FOR REDUCING SUGAR

To the aqueous extract add Fehling solution then boil the test tube.

VII. RESULT AND DISCUSSION

TABLE SHOWING RESULTS OF THE TEST

Component	Name of the test	PT	CH	EA	MT	AQ
ALKALOIDS	Mayers reagent	–	–	+	+	+
	Dragandoff's reagent	–	–	–	–	–
	Hagers reagent	–	–	+	–	+
Carbohydrates	Molisch test	–	–	–	–	–
	Fehlings test	–	–	–	+	+
	Benedicts test	–	–	–	+	–
Tannins and phenol	With ferric chloride	+	+	+	+	+
Glycosides	Keller-kiliani test	–	–	+	+	–
	Legals test	–	–	–	–	–
Proteins and amino acid	Borntragers test	–	–	–	–	–
	Biurets test	–	–	+	+	+
	Ninhydrin test	–	–	+	+	+
	Xanthoprotein test	–	–	–	–	–
Gum and	Molischs test	–	–	–	–	–

mucilage						
Flavanoids	NaoH	+	+	+	+	+
	Sulphuric acid	–	+	+	+	+
	Magnesium hydrochloride	–	–	+	+	+
Saponins	Honey comb foam	–	–	–	–	–
	Foam test	–	–	+	+	+
Steroids and sterols	Salkowskis test	–	–	–	–	–
	Liebermann – bruchard test	–	–	–	–	–
Triterpenes	Thionyl chloride test	+	–	+	+	+
Oils and fats	Filter paper	–	–	–	–	–
	Alkaline KOH	–	–	–	–	–
Vitamin c	Indophenols	–	–	–	–	–
	Sodium nitroprusside	–	–	–	–	–

Table 4

PT-Pet. Ether, CH-chloroform, EA-ethyl acetate, MT-methyl alcohol, AQ-aqueous

From the literature available and physiochemical evaluation cassia fistula seems to be highly medicinal valued drug. Further studies on Pharmacological action should be performed. It may be useful for the welfare of the people. Hence cassia found to be a golden drug to researchers to explore.

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