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Traditional Applications, Phytochemistry, and Pharmacological Effects of Cassia fistula

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Abstract

People have always favored natural medicines because of the many negative effects of modern pharmaceuticals. Traditional specialists and herbalists are increasingly being sought out for their advice on how to manage stubborn medical conditions. The use of medicinal plants is crucial to the development of novel pharmaceuticals. In the ayurvedic medical system, the plant Cassia fistula, which is part of the Caesalpiniaceae family and is more often known as Amulthus and 'Indian Laburnum' in English, is used to treat a variety of ailments. The purpose of this page is to provide readers with all the information they need to do their own research on the traditional uses, therapeutic ingredients, characteristics, and effects, and chemical constituents of Cassia fistula. This page updates previous research on its pharmacological and phytochemical qualities. Anti-leishmanial function, killing fungi, killing bacteria and other microorganisms, killing fever, reducing fever, inhibiting oxidation, killing larval pests, killing fungi, and killing other microorganisms are just some of the activities revealed by the audit, along with anti-fiery activity, activity against tumor, cough suppressant, activity of the central nervous system, impact of clastogenic, and having tetracyclic activity. Reducing anxiety, soothing, and repairing effects, Actions that are hypolipidemic, hypocholesterolemic, leukotriene suppressing, hepatoprotective, and hypoglycemic. In conclusion, the dynamic standards should be contained, and treatment for various afflictions should be sought via the tracking of clinically-effective concentrations in an effort to learn how to control the instrument of subatomic activity by mining the environment for lead particles.

Keywords: Anti-leishmaniatic; Anti-microbial; Anti-parasitic; Anti-pyretic; Anti-carcinogenic; Antitussive; Hepatoprotective; Hypocholesterolemic; Hypoglycaemic; Hypolipidemic

1. Introduction

The healing properties of the plants that nature has provided are useful to all forms of life. Some plants' basic values have been widely disseminated for quite some time, yet many remain mostly undiscovered. Therefore, pharmacognostic and pharmacological investigations are required to identify their beneficial features and examine their applications. It's likely that information on the medicinal plants was collected over the course of many centuries. There is no solid documentation of the remedies used by prehistoric man. However, the oldest book in human history, the Rig-Veda, describes how medicines were used to heal illness and revitalize the body's systems in ancient cultures as diverse as India's, China's, Greece's, and Rome's.Pakistan's Medicinal Plant Heritage

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Several years ago, scientists identified and authorized several compounds from plants for the treatment of various illnesses. Indirectly or directly, around 25% of drugs were derived from plants. Approximately 700 plant species native to the Himalayas were used for both aromatic and medicinal reasons, as reported by Shengji in 1992. Pakistan is home to a diverse flora of over 6,000 plant species. In 1999, Ahmed reported that over 80% of rural residents were still using only natural medications.

Traditional knowledge of Native American medicinal plants was just archived. One hundred plants in 'Margalla Hills National Park' were given a ranking for preservation and traditional use in 2000 by Shinwari and khan. at 2001, fifty-eight distinct medicinal plants were recorded at ANPNG, which stands for Ayubia National Park near Nathia Gali, according to Shah. Qureshi and Khan (2001) report that locals in the Kahuta area of Rawalpindi make use of roughly 25 different therapeutic plants.Amulet made from Cassia Fistula

The evaluation of the rich heritage of old-fashioned dose is vital despite the growing worldwide interest in embracing and studying ancient systems and misusing its potential in light of different human services systems. The cassia fistula plant is one example of a plant in this category due to its therapeutic characteristics. The scientific name for this family of plants is Caesalpiniaceae, and the common English name for Amulthas is "Indian Laburnum."Geographical Origin Thailand's national tree is the cassia fistula. Located in great numbers throughout southern Asia. This tree is native to Pakistan and may be found all the way from the plains to the north of the Himalayas, at an altitude of around 1200 meters. It is grown in the whole plains region of Pakistan.Cultivation

These trees may thrive in a wide range of soil conditions, from those with a lack of nutrients to those with a shallow depth of soil. It occurs in regions with annual precipitation of 500–3000 millimeters (mm), ranging from subhumid cold to subtropical moist warm tropical. Although both saplings and sapling trees are susceptible to some frost damage, the temperature range is from -5 to 45 degrees Celsius. It may be easily regrown from a seed or any other vegetative source. The seed retains its usefulness even after being stored for a long period. C. fistula, an evergreen ornamental tree, is included in the Global Compendium of Weeds (Randall, 2012) under the headings "horticultural weed," "casual aline," "cultivation escape," "environmental weed," "garden thug," and "weed."

Genetics

The chromosome count for C. fistula is 2n=24, 26, 28 (Duke, 1983; IPCN Chromosome Reports, 2014).

Eppo Code

SFI (*Cassia fistula*)

Trade Name

Indian laburnum

2. Outdated/Traditional Usage

Table no. 1 shows the outdated utilization of Cassia fistula plant.

Cassia Fistulla parts	Traditional uses
Seeds	➢ Utilized for the treatment of skin diseases, abdominal pain, fever and leprosy (Perry LM.1980). ➢ Having carminative, anti-pyretic, laxative and cooling properties. ➢ Somewhat sweet and having carminative, anti-pyretic, laxative and cooling properties and assumed in cases of constipation (Markouk M et al.2000).
Flowers	➢ Utilized to cure skin illnesses, stomach torment, fever as well as leprosy (Perry LM.1980). ➢ Retain harsh, laxative, wound as well as febrifugal recuperating possessions. ➢ Decoction of the flower is specified for stomach inconveniences (Satyavati et al.1989).
Fruit	➢ Used for the treatment of skin illnesses, stomach discomfort, fever and leprosy (Perry LM.1980).

Roots	➢ Valuable in contradiction of cardiovascular disarranges, nausea, ➢ stiff condition, ➢ Ulcer, Hemorrhages, injuries plus sores, ➢ tubercular glands plus different membrane illnesses(Alam MM et al.1990),(Asolkar LV et al.1992)
Pulps	➢ Harmless laxative in lieu of kids plus prenatal ladies. ➢ Specified in disarranges of liver, as well as in biliousnes, also utilized as a tonic additionally connected in gout and stiffness (Biswas K et al.1973) (kirtikar KR et al.1975). ➢ Utilized in black water fever as well as malaria and antipyretic (Patel D et al.1965) ➢ Blood - harming, Bacillus anthracis and loose bowels, and given in leprosy and diabetes and for the expulsion of stomach impediments (Markouk M et al.2000).
Leaves	➢ Holds laxative property (Aurapa Sakulpanich et al.1999).
Ripe pod	➢ Utilized in traditional doses as a purgative drug (Khare CP.2007).

3. *Cassia fistula* Phytochemical Studies

Several of the phytochemical components of Cassia fistula are included in Table No. 2. C.fistula fruits have high levels of manganese and iron. The Mn and Fe concentrations are much higher than those of pears, apricots, oranges, apples, and peaches. Pulp contains clumps of individual amino acids including glutamic acid (13%), aspartic acid (15.3%), and lysine (7.8%). As their amino acid molecules clump

(Barthakur et al., 1995) Seeds contain 19.5% glutamic acid, 16.6% aspartic acid, and 6.6% lysine. Roots were analyzed to isolate rhamnetin 3-O-gentiobioside (Vaishnav et al., 1996). Klebsiella SP hexane fractionation showed tricontane-incompatible functionalities. From the hexane group, (Misra, et al., 1996) isolated beta-sitosterol, 5-nonatetracontanone, 16-hentriacontanone, and 2-hentracontanone. Other chemicals, such as 3-ß-hydoxy-17-norpimar-8(9)-en-15-one, diterpene, were isolated from the pods of Cassia fistula by Misra et al., 1997. Derivatives of anthraquinone, such as 3-formyl-1-hydroxy-8-methoxy-anthraquinone 1, were isolated and characterized from the C.fistula pods by Meena et al. in 1998. Lee et al., 2001 isolated and classified 27 compounds from cassia fistula aril. These compounds included 3 aromatic hydrocarbons, 8 long chain hydrocarbons, 3 sterols, 1 triterpene, 2 coumarins, 2 chromonas, and 8 anthraquinones. Twenty-seven different chemicals make up these oils and fats: palmitic acid, linoleic acid, 1-hexacosanol, oleic acid, ß-sitosterol, lupeol, heptacosyl eicosanate, stearic acid, 1-octcosanol, glycerol-1-tetrawicosanoate, stigmasterol,ch

These structures were deduced from spectral data. Benzyl 2-hydroxy-3,6- dimethoxybenzoate, 5(2-hydroxyphenoxymethyl)furfural, benzyl 2beta-O-D-

gluco-pyrannosyl-3,6- dimethoxybenzoate, and (2′S)-benzyl 2-hydroxy-3,6- dimethoxybenzoate are four new chemicals.This group of four chemicals includes the well-known substances chrysophanol, 5-hydroxymethylfurfural, chrysophanein, and (2′S)-7-hydroxy-5-hydroxymethyl-2-(2′-hydroxypropyl) chromone.Yueh- Hsiung Kuo et al., 2002 isolated and characterized 7-hydroxy-2-(2′-hydroxypropyl)- 5-methylchromone from C.fistula seeds. Their structures were determined, clarified, and synthesized using spectral data.

Yadav et al. (2003) isolated the physiologically active flavone glycoside from defatted seeds of C.fistula. The biological activity of the flavone glycoside 5,3,4- (OH)3-6-methoxy-7-O-alpha-L-rhamnopyranosyl-(1->2)-O-ß-glactopyranoside was shown using a combination of limited color responses, spectrum analysis, and chemical degradation. Sanitized and tested for efficacy against a range of photogenic bacteria were the three lectins, CSL1, CSL2, and CSL3, isolated from C.fistula seeds (Ali et al., 2003). The neutral sugar substance (S.S) value of CSL1 was determined to be 3.5, while the values for the other two were 3.1 and 2%, respectively. CSL1 and CSL2 both include glucose and galactose, but CSL3 contains mannose and galactose.

Bioguided fractionation resulted in the separation of a cholesterol and sterol, which Sartorelli et al., 2007 considered and studied using a variety of models. Chemical compositions of C,fistula flowers and leaf oil were studied by GC/MS and GC by Tzakou et al., 2007. The flowers and leaves of C.fistula were analyzed, and 40 compounds were identified as accounting for 90.7% and 92.6%, respectively. The principal components of floral oil were (E)-nerolidol (38%) and 2-hexadecanone (17%), whereas the key components of leaf oil were phytol (16.1%). Twenty-six and thirty percent carbohydrate as reported by Vasi et al., 1980.

Fruit is an essential source of both energy and nutrients, since it contains about 20% of the recommended daily allowance of fruit sugars and 19% of the recommended daily allowance of protein.

In their 2002 study on the regenerative and vegetative organs of the cassia fistula, Luximon et al. depicted the total aggregate of flavonoids, phenolic, and proanthocyanidin. The highest concentrations of flavonoids, phenolic acids, and proanthocyanidin were observed in both mature and immature leaves. Mahesh et al., 1984 discovered the presence of kaempferol, ehein, chrysophanol, and physician in the plant. Epicatechin, catechin, epiafzelechin-(4beta8)-epicatechin, and its enantiomer; flavon-3-ol(epicatechin and epiafzelechin); procyanidin B-2, and its anantiomer nearneas; were discovered by Kashiwada et al., 1990; proanthocyanidins.

Cassia fistula seeds cultivated in different climates and soil types throughout Bangladesh were found to have 3% oil of a golden hue, as reported by Sayeed et al. in 1999. Mono-, diglycerides, and triglycerides were isolated from oil by silicic acid column chromatography. The monoglyceride ranges from 0.91 to 0.98 percent, the diglyceride ranges from 2.51 to 3.32 percent, and the triglyceride ranges from 89.16 to 91.01 percent, depending on where the seeds are collected. Like proteins, lipids may be separated into three classes after being run through a silicic acid column chromatograph: neutral lipids, phospholipids, and glycolipids. The most significant fatty acids in oil were identified as follows: oleic acid (29.62%), palmitic acid (11.41%), linoleic acid (42.42%), and stearic acid (14.33%). There was also a trace quantity of caprlic acid (0.76%) and myristic acid (1.44%) present.

4. Pharmological Studies of *Cassia fistula*

Aside from being cheap and practical, the suggested procedure was also quick, selective, sensitive, precise, repeatable, and easy. Experiments demonstrating validation confirmed linearity of data throughout the specified operational range. The medications and their common excipients identified in this study did not seem to interact with one another. In addition, medical intervention for extraction was unnecessary.

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