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Research Article

The Traditional Uses, Phytochemistry and Pharmacological Properties of *Cassia fistula*

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Abstract

Introduction: Due to the numerous unfavorable impact of present day drugs individuals used to incline toward herbal medications. The traditional prescriptions are progressively requested through the traditional experts and herbalists in the treatment of irresistible ailments. Medicinal plants assume a fundamental part for the improvement of new medications. Cassia fistula is a medicinal plant and belongs to a Caesalpiniaceae family which is usually recognized as Amulthus as well as 'Indian Laburnum' is an English term used for Amulthus, generally employed as a part of medicine ayurvedic system on behalf of different infirmities.

Objective: To search out traditional uses by the local population, medicinal substances, their qualities and effects as well as chemical constituents in *Cassia fistula* are the aims of article that makes available a complete detail.

Findings: *Cassis fistula* is a medium size short-lived tree with long and cylindrical fruits containing pulp and furthermore with a splendid yellow shaded flower. The tree is local to Pakistan, generally discovered east of the Indus in the fields and proceeding with north into the Himalayas to a rise of roughly 1200 meters. In Pakistan it is developed all through the field region. The present article gives a record of refreshed data on its phytochemical and pharmacological properties. The audit uncovers that wide quantities of phytochemical constituents have been separated from the plant perform activity such as destroying parasitic worms especially of the intestine, reduce fever, inhibit oxidation, killing larval pests, destroying fungi, anti-leishmaniatic function, destroying bacteria and other microbes, also anti-fiery activity, activity against tumor, as well as cough suppressant, activity of central nervous system, impact of clastogenic, having tendency to loosen or relax means producing bowel moment as well as relieving constipation, Impact against anxiety, impact of comforting, a damage mending impact, Hypolipidemic action, Hypocholesterolemic, Leukotriene restraint, Hepatoprotective as well as hypoglycemic activity.

Conclusion: The dynamic standards ought to stay confined and plan to cure distinctive distresses by trail clinically performing concentrates to grasp the instrument of sub-atomic activity, searching for lead particles from common assets.

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

1. Introduction

Nature has given plentiful plant wealth, which have therapeutic benefits for every living being. The fundamental values of a few plants have long been distributed however a substantial number of them stay unexplored up 'til now. So there is a need to investigate their utilizations and furthermore to lead pharmacognostic and pharmacological studies to determine their helpful properties. The data of the medical plants must have been gathered in the course of numerous hundreds of years. There is no reliable record of medicines utilized by the primitive man. In any case, the Rig-Veda, which is the most ancient book in the library of man, point out the utilization of medications, in the treatment of sicknesses and for energizing body frameworks in most timeworn civilization like the Indian, Egyptian, Chinese and even the Greek and Roman civilization.

1.1 History of Medicinal Flora in Pakistan

On behalf of cure of different infections, scientist have recognized as well as approved different substances from plants several years ago. Approximately, 25 percent medications were derived from plants sources either indirectly or directly. According to Shengji, 1992 approximately seven hundred species of plants in the region of Himalayan were utilized for aromatic purposes as well as restorative. About six thousand species of plants are present in Pakistan different flora. According to Ahmed, 1999 around eighty percent people fit to rural area quiet rely on natural pharmaceuticals. Recently, Native medical flora old style information was filed. According to Shinwari and khan, 2000 in ‘Margalla Hills National Park’ one hundred plants preservation rank as well as old style usage have been characterized in such manner. According to Shah, 2001 fifty eight different plants which have medicinal property were recorded from ANPNG means Ayubia National Park near Nathia Gali. According to Qureshi and Khan, 2001 around 25 herbs which have medicinal property were utilized for local information from Rawalpindi district Kahuta.

1.2 *Cassia Fistula* (Amultus)

With the rising universal interest for embracing and examining traditional system and abusing their potential in light of various human services system, the assessment of opulent legacy of old-style dose remains fundamental. Cassia fistula is an example of such plants which have medicinal properties. Such plant belong Caesalpiniaceae generally recognized as ‘Amulthus’ and the "Indian Laburnum" is a English term prevalently used for Amulthas.

1.3 Geogrophical Source

Cassia fistula is a Thailand national tree. Commonly found in southern Asia. It is also a local tree of Pakistan, regularly discovered east of the Indus in the plains and proceeding with north into the Himalayas to a rise of roughly 1200 meters. In Pakistan it is cultivated all through the plains area.

1.4 Cultivation

It is temperately shade tolerant trees that will develop on many soils sorts including low supplement and shallow soils. It is found in a sub-humid cool to sub-tropical moist warm tropical climate getting between 500 to 3000 mm of yearly precipitation. Its temperature go is from - 5 to 45 degree C, despite the fact that the two seedlings and trees are vulnerable to some ice harm. It is effortlessly recreated from seed and by vegetative means. The seed can be put away for a long time and hold its practicality. C. fistula is a regularly evergreen, decorative tree recorded as a 'horticultural weed', ‘casual aline’, ‘cultivation escape’, ‘environmental weed’, ‘garden thug,’ 'naturalized', and "weed" in the Global Compendium of Weeds (Randall, 2012).

1.5 Genetics

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

1.6 Eppo Code

SFI (*Cassia fistula*)

1.7 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

Table no. 2 shows certain phytochemical ingredients of Cassia fistula different portions. Manganese as well as iron found in large amount in C.fistula fruits. The amounts of Mn as well as Fe are extensively sophisticated than their concentration found in pear, apricot, orange, apple as well as in peach. Pulp contains amino acid aggregates e.g. Glutamic acid 13%, Aspartic acid 15.3% as well as lysine 7.8% separately. While the amino acid aggregates in their

seeds are 19.5 % Glutamic acid, 16.6 % Aspartic acid as well as 6.6 % lysine (Barthakur et al., 1995). Rhamnetin 3-O-gentiobioside from their roots was segregated by (Vaishnav et al., 1996). The fruits hexane division revealed functions in contradiction to tricontane, Klebsiella SP. Beta-sitoterol, 5-Nonatetracontanone, 16-hentriacontanone as well as 2 hentracontanone, all these were segregated by (Misra, et all., 1996) from hexane division. Misra, et al., 1997 segregated some other compounds such as 3-ß-hydoxy-17-norpimar-8(9)-en-15-one, diterpene from Cassia fistula pods. Meena, et al., 1998 detached and revealed derivatives of anthraquinone, and described by means of 3-formyl-1-hydroxy-8-methoxy-anthraquinone 1, from the C.fistula pods. 27 compound comprising 3 aromatic hydrocarbon, 8 long chain hydrocarbon, 3 sterol, 1 triterpene, 2 coumarins, 2 chromonas as well as 8 anthraquinones were disconnected as well as characterized by Lee et al., 2001 from *cassia fistula* aril. All these 27 compounds are palmitic acid, linoleic acid, 1-hexacosanol, oleic acid, ß-sitosterol, lupeol, heptacosyl eicosanate, stearic acid, 1-octcosanol, glycerol-1-tetrawicosanoate,stigmasterol,chrysophanol, rhein, ß-sitosteryl-3-O-D-glucopyranoside,emodinn, ziganein, isoscopoletin, physcon, citreoroseinn, scopoletin, isovanillic acid, rheinn methyl ester, 1,4,5-trihydroxyanthraquione, vanilic acid, 2,5-dimethyl-7-hydroxychromone, 2,4-dihydroxybenzylaldehyde, as well as 2,5-dimethyl-7-methoxychromone.

Spectral data were used for these structure resolved. 4 novel compounds such as benzyl 2-hydroxy-3,6-dimethoxybenzoate, 5(2-hydroxyphenoxymethyl)furfural, benzyl 2beta-O-D-gluco-pyrannosyl-3,6-dimethoxybenzoate as well as (2′S)- 7-hydroxy-5hydroxymethyl-2-(2′-hydroxypropyl) chromone, all these 4 compounds with 4 well-known compounds such as chrysophanol, 5-hydroxymethylfurfural, chrysophanein as well as (2′S)- 7-hydroxy-2-(2′-hydroxypropyl)- 5-methylchromone were identified, as well as segregated by Yueh-Hsiung Kuo et al., 2002 from C.fistula seeds. Spectral data were used for their structure determination, elucidation as well as their synthesis.

Flavone glycoside which is biologically active was detached from C.fistula defatted seeds by (Yadav et al., 2003). Through few color responses, spectral examination as well as chemical debasement, it was portrayed that 5,3,4-$(OH)_3$-6-methoxy-7-O-alpha-L-rhamnopyranosyl-(1->2)-O-ß-glactopyranoside is a flavone glycoside which is biologically active. (Ali, et al., 2003) from seeds of C.fistula separated 3 lectins that are CSL1, CSL2 as well as CSL3 were sanitized as well as check their function against various photogenic microbes. It was evaluated that 3.5 is the neutral sugar substance of CSL1 while the other has neutral S.S 3.1 as well as 2% correspondingly. Galactose is the lectine sugar opus in CSL1 and CSL2 have glucose as well as galactose while CSL3 has mannose as well as galactose.

Sartorelli *et al*., 2007 considered fractionation of bioguided brought about the separation of a cholesterol as well as sterol and in various models that was additionally examined. Tzakou et al., 2007 analyzed C,fistula leaf oil as well as flowers chemical compositions through GC/MS as well as GC. From C.fistula leaf as well as flowers distinguished 40 substances in lieu of 90.7% as well as 92.6% correspondingly. Thirty eight percent of (E)-nerolidol as well as seventeen percent of 2-hexadecanone were the flower oil primary parts whereas 16.1% of phytol predominantly found in oil of leaf. According to Vasi et al., 1980 twenty six point thirty percent carbohydrate as

well as nineteen point ninety four percent of protein concentrations are found in fruit and is considered to be a vital wellspring of energy as well as nutrients.

The total aggregate of flavonoids, phenolic as well as proanthocyanidin was portrayed in cassia fistula regenerative and vegetative organs by Luximon et al., 2002. It was found that the most astounding aggregate of flavonoids, phenolic as well as proanthocyanidin was in old as well young leaves. Kaempferol, ehein, chrysophanol as well as physician existence in plant was identified by Mahesh et al., 1984. Proanthocyanidins comprising Epicatechin, catechin, epiafzelechin-(4beta→8)-epicatechin as well as its enantiomer, flavon-3-ol(epicatechin as well as epiafzelechin), procyanidin B-2 as well as its anantiomer nearneas were revealed by Kashiwada *et al*., 1990.

In 1999 Sayeed et al., detect that Cassia fistula seeds grown under various climatic as well as soil condition of Bangladesh, confined three percent oil which have golden color. Through silicic acid column chromatography mono, di, as well as triglycerides was produced from oil. On the bases of area from which the collection of seeds take place, the monoglyceride differ from 0.91 percent – 0.98 percent, similarly diglycerides differ from 2.51 percent – 3.32 percent as well as triglycerides differ from 89.16 percent -91.01 percent. Similarly there are 3 groups of lipids as a result of lipid fractionations, these groups are known as neutral lipids, phospholipids, as well as glycolipids; all these groups were obtained through silicic acid column chromatography. About 29.62 % of oleic acid, 11.41 %of palmitic acid, 42.42 % linoleic acid as well as 14.33 % stearic acid were found to be most important fatty acids in oil. 0.76 % of caprlic acid as well as 1.44 % of myristic acid were also found in a small amount.

4. Pharmological Studies of *Cassia fistula*

The proposed method was simple, fast, selective, sensitive, specific, reproducible and not very expensive.

Validation experiments proved that results were linear over the mentioned working range. No interference was observed from the described drugs and their common excipients. Also there was no need for extraction procedure.

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