

A REVIEW ON "AROGYASHIMBI"- A GIFT OF NATURE

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ABSTRACT

Herbal drugs are an issue of national public health concern. Uses of plants in the treatment of various diseases during 300 B.C. were documented in Egypt, China, India and Middle East. Before the 700 B.C. Saraka Samritham wrote by Saraka and documented 350 plant properties while *Materia medica* written by Dioscorides with the description of 600 medicinal plant species. Traditional use of medicinal plants against number of disease in form of lotion, syrup, powder etc. *Cassia fistula* Linn.(Caesalpinaceae) is known as Pudding Pipe tree. Present article is to highlight the Phytochemical and Pharmacological properties of *Cassia fistula* Linn.

KEY WORDS: *Cassia fistula*, Sterols, Anthraquinone, flavones.

INTRODUCTION

Family Fabaceae is the third largest family of Angiosperms. Subfamily- Caesalpinaceae has 160 genera and 2000 species. *Cassia fistula* (fabales, Caesalpinaceae) one of the most important medicinal plant, used in the treatment of various disease since ancient time. It is known as "Disease killer" in Ayurvedic medicine.¹ The whole plant of *cassia fistula* is used as a traditional medicine in the treatment of many diseases like leucoderma, intestinal disorder, skin disease, leprosy, jaundice, syphilis, insect bite, facial paralysis, rheumatism, piles, ulcer, chest pain, joint pain, migraine, blood dysentery, biliousness, fever, heart disease and many type of cancers: liver cancer, stomach cancer, throat cancer etc. Antibacterial and antifungal properties are also reported in *cassia fistula*.

GEOGRAPHICAL DISTRIBUTION

It is deciduous mixed monsoon forests throughout greater parts of India, ascending to 1300 m in outer Himalaya. It is distributed in Asian countries such as India, China, Malaysia, Thailand, Hong Kong as well as Amazon, Bangladesh, Sri Lanka, South Africa, East Africa and West Indies⁴¹

REVIEW OF LITERATURE

Lee et.al (2001), isolated and identified eight long chain hydrocarbon, three aromatic compound, three sterols and eight anthraquinone, Ali et.al (2003), Sartorelli et.al (2007) isolated four compound furfural, chromone, benzyl-2-hydroxy-3,6 dimethoxy benzoate, Yadav et.al (2003), isolated flavones from defatted seeds of *Cassia fistula*, Sartorelli et.al (2007,2009), conduct an investigation on sterol, biochanin, an isoflavone (Bhatnagar Maheep 2010) from the fruit of *Cassia*, O.Tzakou et.al (2007), identified forty four compounds, Yadav R.N., Verma V. (2003) obtain flavones and glycoside from seeds of *Cassia fistula*, P.Sartorelli (2007) isolated sterol from fruit, rhein from flowers. Manisha Arora, Sandeep Rahar et.al (2016) documented 39 phytoconstituents in stem bark, leaves, root, flower of *Cassia*, Hofilena et.al (2000), Nagarajan et.al (1990) also mentioned that *Cassia fistula* is potential source of Chrysophanol, chrysophanic acid-9 anthrone, anthraquinone, rhein and aloe-emodin.

PHYTO-CHEMICAL CONSTITUENTS IN PLANT

Various chemical compounds present in Cassia, which play key role in different disease and because of these constituents, plants could be excellence source of minerals, vitamins. Anthraquinone, Oxyanthraquinone, rhein, volatile oil, glycosides, sennosides, hepatosanoic acid, triacotanoic, nonacosanoic present in leaves^{23,39} Stem and root bark are good source of Flavonol, glycosides, Phlobaphenes, oxyanthraquinone, betulinic acid, β sitosterol, 7-methylphyscion.^{23,39,40} Pulp are rich with aurantiamide acetate, β sitosterol, β -D glucosides, ceryl alcohol, kaemferol, fistulin, bianthraquinone glycoside.^{39,42} Anthraquinone glycoside, sennosides A & B, rhein, barbalion, formic acid, butyric acid, oxalic acid with higher concentration of Fe and Mn.⁴¹ sugar, tannins, albuminous starch, calacium oxalate, gum, gluten, astringent matter, sucrose, fructose, glucose, protein -arginine, leucine, lysine, phenyalanine, tryptophan, glutamic and aspartic acid^{29,31,32} documented in fruit while galactomannon, free sugar, free amino acid, seed oil contain vernolic acid, malvalic acid, steticulic acid^{21,33} were documented in stem and root bark recorded in seeds.

PHARAMCOLOGICAL ACTIVITIES

ANTIOXIDANT ACTIVITY

Kalantari H, Jalal, Saini et.al (2011), in vitro antioxidant activity of hydroalcoholic seed extract of Cassia fistula (Nayan Bhalodia, 2011), ethanol and aqueous extract of stem bark (Rohit Bargahey, 2017), studied protective effect of Cassia fistula fruit on bromobenzene induced liver injury in mice. Bhatnagar et.al (2010) evaluated the in vitro and in vivo antioxidant activity of fruit pulp of Cassia fistula.

ANTI-EPILEPTIC ACTIVITY

Ajay kumar, Satish S., Ibrahim Sayeed and Karunakara H.(2017), reported and mentioned the antiepileptic activity of methanolic extract of seeds of Cassia fistula against pentylenetetrazol treteaed mice.

ANTIDIABETIC ACTIVITY

Malpani et.al (2010), studied the “Antidiabetic activity of Cassia fistula linn bark in alloxan induced rats”, and concluded that ethyl acetate extract effectively reduce blood glucose. Silawat etal (2009), M.Ali et.al (2012), investigated the hypoglycemic activity of hydroalcoholic, alcoholic and methanolic, ethanolic extract reaction of Cassia fistula bark and leaves in alloxan induced diabetic rats with Diclofenac (10mg/kg), Metformin (150mg/kg) as a standard drugs. Result showed ethanol extract of stem bark posses same effect on alloxan induced high blood sugar level at 250 mg/kg and 500mg/kg body weight in rats. In comparison of standard drug glibenclamide, hexane extract of Cassia fistula stem bark activity against streptozotonin induced diabetes by Nirmala A et.al (2008). Result showed among three 0.15, 0.30, 0.45 g/kg body weight, 0.45 worked good as a antihyperglycemic agent. Stem bark could be a good cardioprotective because of presence of sterol, beta-sitosterol.

ANTI-INFLAMMATORY ACTIVITY

Anti inflammatory activity of Cassia fistula evaluated by (Bhatnagar et.al 2010), (Somnath 2009), (Rajeshwari et.al 2006), ethanolic extract of Cassia fistula (Gobind et.al 2010), in-vitro anti-inflammatory activity of leaves(Dinanath et.al 2012). Rajeshwari et.al studied the anti-inflammatory activity at different dose 150, 300, 450mg/kg body weight of Cassia bark with standard drug Diclofenac. They noticed that extract showed dose dependent anti inflammatory activity.

ANTIBACTERIAL, ANTIFUNGAL ACTIVITY

Subramanion et.al (2011), compared the acetone, diethyl ether and methanol extract of leaves, flower and seed of Cassia fistula against many fungi, while in vitro antimicrobial activity of leaves and root (Awal et.al 2010),

antibacterial activity of leaves and bark of Cassia with Ciprofloxacin and fluconazole drugs (Dinanath et.al 2012), antimicrobial activity of methanolic, ethyl acetate and petroleum ether extract of Cassia fistula bark, seeds and leaves was studied by Abbas et.al (2004). Dinanath et.al, concluded that among all five - aqueous, acetone, chloroform, ether and methanol extracts, methanolic extract possess highest antibacterial activity while Abbas mentioned petroleum ether and ethyl acetate extract shown highest activity as compare to methanolic extract.

ANTI TUMOR EFFECT

Antitumor activity of methanolic extract of seeds (Moh. Danish, M.Gupta et.al 2000), bark (Vasudevan 2008) and fruit pulp extract of Cassia fistula against human cancer cell lines (Irshad, Rizvi, M.Ali, Ahmed I., 2012, 2014), supported the antitumor activity of Cassia fistula by anti-lipid peroxidation and detoxification of enzyme. Their study result showed in compare of 200mg/kg, 300 mg/kg dose, 100 mg/kg body weight dose was more effective because its increase the life span of mice and decreased tumors volume.

CARDIOPROTECTIVE EFFECT

Khatib N.A. et.al (2010) studied protective activity of methanolic extract of Cassia fistula bark on level of serum enzyme, histological disturbances, electrocardiogram changes and doxorubicin induced myocardial damages in rats.

HEPATOPROTECTIVE ACTIVITY

Hepatoprotective activity of Cassia fistula bark (Wasu et.al 2009), Vandal et.al (2008), aqueous extract of fruit pulp (Das et.al 2008) extract against the carbon tetra chloride induced hepatotoxicity in albino rat.

ANTIPYRETIC ACTIVITY

Antipyretic activity of Cassia fistula bark (Jana Goutam kumar et.al 2010), fruit of Cassia (Bose et.al 2007, Manjul Singh 2012) 250mg/kg, 500 mg/kg concentration was evaluated and result revealed methanolic extract were showed antipyretic effect

ANTI-PARASITIC ACTIVITY

Sartorelli et.al (2009) isolated the isoflavone from fruit of Cassia fistula, tested and reported the antiparasitic activity of dichloromethane extract of fruit.^{1,12,44}

ANTILEISHMANIAL ACTIVITY

A compound sterol isolated from fruit of Cassia fistula and evaluated their hexane extract antileishmanial activity against the promastigote form of Leishmania chagasi.^{12,30,45}

ANTI-ULCER ACTIVITY

Cassia fistula showed the antiulcer activity by lowering the level of transaminase, bilirubin and alkaline phosphate, was evaluated in N-heptane leaves extract (Adnan Jehangir et.al, 2010), ethanol extract (Patricia et.al, 2009).

ANTI-CANCER ACTIVITY

Anticancer activity of ethyl acetate, n-butanol extract of fruit pulp and seeds (Md. Irshad et.al 2014), of Cassia fistula Linn against human cervical (SiHa) and breast cancer (MCF-7) cancer cell line by the monitoring of cell growth, change in cell size like disassemble of cell fibers, cell shrinkage and nuclear morphology, analysis of apoptosis regulatory genes- Bcl-2, Bax and p 53, which control and regulate the cell rapid enlargement and growth, Caspase enzyme activity and genomic DNA fragmentation. At last they concluded Caspase enzyme activities increase as compare to normal cells. Caspase-3 activates the

deoxyribonuclease and break down the genomic DNA into Oligonucleosomal segments.

ANALGESIC ACTIVITY

Analgesic activity of methyl alcohol extract of Cassia fistula pod (Sheikh N.W., Patel R.D., Mahobia N. K., 2010), ethanol extract of stem bark at 200mg/kg, 400mg/kg body weight in comparison of std. drug diclofenac. Result showed std. drug much better pain killer in comparison of ethanol extract of stem.

ANTI-MICROBIAL ACTIVITY

Antimicrobial activity of methanolic, ethanolic, acetonic, hot and cold aqueous extract of leaves, bark, flowers of Cassia fistula against a common ear disease, Otitis externa and three commonly used ear drops Ciolox, Candid and a herbal drug bilwa tel used as positive control⁴⁷. After observation, result reveal all types of extracts of bark, flowers showed antibacterial activity against all six tested strains while the hot-cold aqueous extract of leaves, bark, flowers totally dearth this activity. Among all these extract and strains of bacteria, Acetonic extract of flowers was most effective in term of inhibiting the bacterial growth and it was overpowered the herbal drug bilwa tel.

DISCUSSION AND CONCLUSION

Plant are good source of natural nutritional antioxidant (Duthie & Duthie 2000), It possess antibacterial, antioxidant, hepatoprotective, wound healing, antipyretic, ant diabetic, antifungal activities. It's contain number of biologically active compound like flavin, rhein, glucoside, sennoside, tannin, anthraquinone, oxyanthraquinone, role and activity of polyphenols, flavones, isoflavonoids in cancer discussed by (Birt D. F., Hendrich, Wang 2003). Study on rhein isolated from plant proved and support their importance in human breast cancer, cervical cancer, liver cancer and in adenocarcinoma in a dose dependant manner (Al Fatlawi et.al 2014), while anthraquinone work as aperients, support previous studies that concentration of phenols and antioxidant activity are closely related. Above paper support that Cassia fistula is a good source of minerals, vitamins, phenols, polyphenols, flavonoids, anthraquinone and other phytoconstituents.

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