

Priliminary physio-chemical and phyto-chemical characterization of powdered material of *Cassia fistula* fruit

NEETA SHRIVASTAVA¹, MANOJ DATAR¹ and R.C. SAXENA²

¹Samrat Ashok Technological Institute, Vidisha (India).

²Pest Control & Ayurvedic Drug Research Laboratory, S.S.L. Jain College, Vidisha (India).

(Received: January 05, 2010; Accepted: February 07, 2010)

ABSTRACT

Cassia fistula Linn is used extensively in various parts of the world against a wide range of ailments, the synergistic action of its metabolite production being most probably responsible for the plant's beneficial effects. Its fruitpulp is used as mild laxative, against fevers, arthritis, nervous system diseases, all kinds of bleeding, such as hematemesis or hemorrhages, as well as cardiac conditions and stomach problems such as acid reflux. It has been reported as antibacterial, antifungal, with wound healing property, hepatoprotective activity, antioxidant activity, anti-inflammatory activity, anti-tumor activity and as an bioabsorption material. An attempt has been made to highlight the medicinal fruit through the pharmacognostic studies. Primary identification of phytoconstituents was performed.

Key words: *Cassia fistula*, medicinal plant, Pharmacological studies, phytochemical studies.

INTRODUCTION

Many herbal remedies have been employed in various medical systems for the treatment and management of different diseases. Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years and have served humans well as valuable components of medicines. Today, we are witnessing a great deal of public interest in the use of herbal remedies.

Pharmacognostical analysis of medicinal herbs remains challenging issues for analytical chemists, as herbs are a complicated system of mixtures. Unlike synthetic drugs, herbal medicine is a complicated system of mixtures. Thus, the Methods of choice for identification of 'botanical drug' are mainly intended to obtain a characteristic fingerprint of a specific plant that represent the presence of a particular quality defining chemical constituents. The Golden Shower Tree is a flowering plant in the family Fabaceae, native to southern

Asia, from southern Pakistan east through India to Myanmar and south to Sri Lanka. It is the national tree of Thailand. The Golden Shower Tree is a medium-sized tree growing to 10-20 m tall with fast growth. The leaves are deciduous. The flowers are produced in pendulous racemes. The fruit is a legume, 30-60 cm long and 1.5-2.5 cm broad, with a pungent odor and containing several seeds. The seeds are poisonous. In Ayurvedic medicine, Golden Shower Tree is known as *aragvadhā* ("disease killer"). Its fruitpulp is used as mild laxative, against fevers, arthritis, *vatavyadhi* (nervous system diseases), all kinds of *rakta-pitta* (bleeding, such as hematemesis or hemorrhages), as well as cardiac conditions and stomach problems such as acid reflux. The root is considered a very strong purgative. It is widely used for its medicinal properties, its main property being that of a mild laxative suitable for children and pregnant women. It is also a purgative due to the wax aloin and a tonic (Satyavati and Sharma, 1989) and has been reported to treat many other intestinal disorders like healing ulcers (Biswas *et al.*, 1973; Kirtikar and

Basu, 1975). The plant has a high therapeutic value and it exerts an antipyretic and analgesic effect (Patel *et al.*, 1965). Besides, it has been found to exhibit anti-inflammatory and hypoglycaemic activity (Datta and Kumar, 1985). In the Indian literature, this plant has been described to be useful against skin diseases, liver troubles, tuberculous glands and its use in the treatment of haematemesis, pruritus, leucoderm and diabetes has been suggested (Alam *et al.*, 1990; Asolkar *et al.*, 1992). *C. fistula* extract is used as an anti-periodic agent and in the treatment of rheumatism (Biswas *et al.*, 1973; Kirtikar and Basu, 1975) and the leaf extract is also indicated for its anti-tussive and wound healing properties (Bhakta *et al.*, 1998a,b). It has been concluded that plant parts could be used as a therapeutic agent in the treatment of hypercholesterolaemia partially due to their fibre and mucilage content (El-Saadany *et al.*, 1991). There are reports indicating its antibacterial activity against a wide spectrum of bacteria namely *E. coli*, *Bacillus mycoides*, *Bacillus subtilis*, *Mycobacterium smegmatis*, *Klebsiella aerogenes*, *Pseudomonas aerogenes* and *Proteus vulgaris* (Perumal *et al.*, 1998). Antitumor (Gupta *et al.*, 2000), hepatoprotective (Bhakta *et al.*, 1999), antifertility (Yadav and Jain, 1999), antioxidant (Chaminda *et al.*, 2001; Siddhuraju *et al.*, 2002; Luximon-Ramma *et al.*, 2002) properties of *C. fistula* as well as its

actions on the central nervous systems (Mazumdar *et al.*, 1998) and inhibitory effect on leukotriene biosynthesis (Sunil Kumar and Müller, 1998) have been suggested. Besides its pharmacological uses, the plant extract is also recommended as a pest and disease control agents in India (Jaipal *et al.*, 1983; Sharma and Basandrai, 1999; Raja *et al.*, 2000). Thus *C. fistula* is well anchored in its traditional uses and has now found widespread acceptance across the world. The pods of cassia fistula are imported from the east Indies from the west Indies and from South America. Their pulp is reddish-black, with a sweetish taste. Those pods

Table 1: Result of physo-chemical parameters for fruit of *Cassia fistula*

Parameter	<i>Cassia fistula</i>
Total ash	3.15 %
Water soluble ash	2.22 %
Acid insoluble ash	1.02 %
Sulphated ash	0.0065 %
Alcohol soluble extractive	16.79%
Water soluble extractive	29.45 %
Moture content	0.095 mg/ml
Refractive index	1.625

Table 2: Result of phyto-chemical investigation for fruit of *Cassia fistula*

Test	Observation	Result
Alkaloids		Present
Mayer	+ ve (cream colour)	
Dragendroff	+ ve (red - brown colour)	
Saponins		Absent
Frothing test	+ ve (no frothing)	
Emulsion test	+ ve (no emulsion)	
Tannins		Absent
FeCl ₃ test	+ ve (green colour)	
Vanillin - HCL test	+ ve (no red colour)	
Anthraquinones with NaOH	Blood red colour appeared	Present
Flavonoids / polyphenols Fe Cl ₃	+ ve (dusky green colour)	Present
Test for reducing sugars (Glycosides)	Blue colour of Fehling's Solutions	Present
With Fehling's Solutions	Turned brick red ppt.	

yield the most pulp which are heavy and do not rattle when shaken. This paper reports the preliminary phytochemical & physiochemical investigation of powdered pod of cassia fistula.

MATERIAL AND METHODS

Herbal medicine is a triumph of popular therapeutic diversity. Almost in all the traditional medicine, the medicinal plants play a major role and constitute the backbone for the same. In order to make sure the safe use of these medicines, a necessary first step is the establishment of standards of quality, safety and efficacy. The pods of cassia fistula linn were collected from the Botanical garden. The dried pods marcerated and packaged in a plastic container. The powdered material is subjected to physio-chemical studies such as Total ash, water soluble ash, acid insoluble ash, sulphated ash, alcohol soluble extractive, water soluble extractive, ether soluble extractive, moisture content, refractive index & phyto-chemical studies such as alkaloid, flavanoid, saponin, glycosides, terpenoides, carotenoids, tannins, steroids,

anthraquinone, fixed oil, volatile oil, fatty oil, carbohydrates, protein, lipid, starch, lignin) Physiochemical Investigation is performed according to official procedure under pharmacopoeial guidelines. (Pharmacopoeial laboratory for indian medicines protocol for testing: Ayurvedic, siddha & unani medicines) & phytochemical parameters are determined as described by Trease and Evans (2002).

CONCLUSION

Standardization of herbal drugs is a topic of great concern. They are subject to variability as derived from heterogeneous sources. This variability can have both advantage and disadvantages effect. The main disadvantages are that the activity of the material may vary and that inferior material may be produced. Cassia fistula is an ayurvedic herb known for its antiarthritic, antihelminthic, hepatoprotective, antispasmodic activity and various medicinal properties. So the efforts were made to provide the scientific data to standardize the plant material for further studies.

REFERENCES

1. The Indian laburnum (*Cassia fistula* L.) fruit: an analysis of its chemical constituents *Journal Plant Foods for Human Nutrition (Formerly Qualitas Plantarum) Springer Netherlands* **47**(1): 55-62 (1995).
2. Abu Sayeed M, Abbas Ali M, Astaq Mohal Khan GRM & Rahman MS. Studies on the characterization and glyceride composition of *Cassia fistula* seed oil. **34**: 144-148 (1999).
3. Niranjana GS & Katiyar SK. Chemical analysis of some wild leguminous seeds. **56**: 722-725 (1979).
4. Sen A.B. & Shukla Y.N. Chemical examination of *Cassia fistula*. **45**: 744 (1968).
5. Barthakur NN, Arnold NP & Allii I. The Indian laburnum (*Cassia fistula* L.) fruit: an analysis of its chemical constituents. **47**: 55-62 (1995).
6. Yamauchi T, Abe F, Padilina WG, Dayrit FM. Alkaloids from leaves and bark of *Alstonia scholaris* in the Philippines. *Phytochemistry*. **29**: 3321-3325 (1990).
7. Jagetia GC and Baliga MS. The effect of seasonal variation on the antineoplastic activity of *Alstonia scholaris* R. Br. in HeLa cells. *Journal of Ethnopharmacology.*, **96**: 37-42 (2005).
8. Bahorun T, Neergheen VS & Aruoma OI. *Phytochemical constituents of Cassia fistula*. **4**(13): 1530-1540 (2005).
9. Kirtikar KR & Basu BD. Indian medicinal plants (Vol. II). Delhi, India. **2**: 481-482 (1975).
10. Satyavati GV & Sharma M. *Medicinal Plant in India*. **2**: 481-482 (1989).
11. Shukla, S.C. & Das, S.R., Cure of amoebiasis by seed powder of *Cassia fistula*. *International Journal of Crude Drug Research* **26**(3): 141-144 (1988).
12. Monif, T., Malhotra, A.K. & Kapoor, V.P., *Cassia fistula* seed galactomannan: potential binding agent for pharmaceutical formulation.

- Indian *Journal of Pharmaceutical Sciences* 54(6): 234-240 (1992).
13. R. Kirtikar and B.D. Basu, *Indian Medicinal Plants*, Vol. II, Bhushen Singh and Mahendra Pal Singh, Dehradun, 111-14 (1980).
 14. *Pharmacognosy Reviews* 1(1): *Phcog Rev.* An official Publication of Phcog. NetArulmozhi. S1*, Papiya Mitra Mazumder², Purnima Ashok¹, L. Sathiya Narayanan (2007).
 15. *The Ayurvedic Pharmacopeia of India*, Ministry of Health and Family Welfare Department and Indian System of Medicine and Homeopathy, New Delhi. Part I, 2: 137-140 (1999).
 16. *The wealth of India.*, A dictionary of Indian raw materials and industrial product, raw material, vol. 7 CSIR, New Delhi (1962).
 17. Blatter E, Caius JF, *et. al.*, *Indian Medicinal Plants*. 2: 1297-1299 (1981).
 18. *Indian Materia Medica*, (Nandkoni KM ed). Bombay Popular Prakashan, Mumbai. 892 (2002).
 19. Steinmetz EF, *Paederia foetida pharmaceutical biology* 1(4): 133-144 (1961).
 20. Khare CP, CP Khare, CCRAS. *Indian medicinal plants* 459 (2007).
 21. Kokate, C.K., *Practical Pharmacognosy*, Vallabh Prakashan, 4: 29 (1994).
 22. Kokate, C.K., Khandelwal, K.R., Pawar, A.P., Gokhale, S.B., *Practical Pharmacognosy* (1995).
 23. Trease G, Evans SM, *Pharmacognosy*. 15th Edition. Bailer Tindal, London, pp. 23-67 (2002).