WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 12, Issue 15, 653-661. Research Article ISSN 2277– 7105

VALIDATION OF THERAPEUTIC POTENTIAL OF *CASSIA TORA* LINN. THROUGH REVERSE PHARMACOLOGY

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Article Received on
06 July 2023,
Revised on 27 July 2023,
Accepted on 17 August 2023
DOI: 10.20959/wjpr202315-29422

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ABSTRACT

Cassia tora Linn. is a small annual herbs or undershrub growing commonly in Asian countries specially in south east asia. It is found as a weed through India. This plant has been used in several therapeutic formulations in Ancient texts of Ayurveda like *Charak samhita, Susruta samhita, Ashtang hridaya* and also in many *Nighantu* texts in the treatment of various skin and other diseases. Its seeds and leaves have been indicated for preparation of therapeutic formulations as well as used as single drug formulation. Leaves are cooked as vegetable C. tora is also being used for treatment purposes in various local health traditions. In pharmacological screening studies, herb has been shown to possess anti-proliferative, hypo-lipidaemic, immuno-stimulatory, anti-cancerous, anti-mutagenic and hepatoprotective activity. Present article is an attempt towards validation of pharmacological properties and therapeutic indication of *C. tora* described in ancient texts of Ayurveda by evidences gathered in different pharmacological studies published in different journals.

KEYWORDS: *Ayurveda Cassia tora,* skin disease, pharmacological properties, Reverse Pharmacology.

1. INTRODUCTION

Vedas, *Samhitas* and *Nighantus* texts are the sources of information regarding therapeutic uses of drugs of natural origin. *Chakramarda* has been used for therapeutic purposes from time period of *Samhita* texts. The botanical source of the plant is *Cassia tora* Linn., a well known medicinal plant commonly found in India and other tropical countries. Various medicinal properties have been attributed to this plant in Indian traditional system of medicine. *Chakramarda* is easily available in all regions of India especially in rainy season.

2. METHODOLOGY

A thorough literary survey of the texts starting from Vedic Literature to contemporary texts and periodical has been done to work out information regarding various aspects of the drug under Question.

3. OBSERVATIONS

3.1. Cassia *tora* Linn. in Vedic Texts:

Explained in *Parskargruhya sutra(Pa. Gru.) in Mulvidhi Chapter*.[1]

3.2. Cassia *tora* Linn. in *Samhita* Texts of Ayurveda

In ***Charak Samhita***[2] seeds of C. tora have been used as a constituent of various formulations for the treatment of skin diseases (CS.Su.3.3,12,13,15; CS.Ci.7.93,113,160). It has been classified under *Shaka Varg* (leaves cooked as vegetable) (C.Su.27.101) which has been said to be heavy to digest, Sweet (*Madhur*) in taste, cooling in effect and laxative. It should be cooked by boiling and squeezing its juice with plenty of oil. Its seeds have been classified under pulses (*Shimbi dhanya Varga*) (CS.Su.27.33) and said to aggravate *Vat-Pitta*.

In Sushrut Samhita[3], *C. tora* (*Chakramard*) fruits have been classified under the category of drugs indicated to induce emesis (SS.Su.39.3) and leaves under *Shaka Varga* (cooked as vegetable) and has been said to be *Kapha* pacifying, *Ruksha* (dry), *Laghu* (Light), *Sheet* (cooling) (SS.Su.46.262,271). Its seed have been indicated for local application as paste in wound (SS.Ci.1.98), skin diseases (*Kushtha*), *Dadru* (Ring worm) (SS.Ci 9.10,12,13)

In *Ashtanga Hridaya*[4], *Chakramarda* has been mentioned only for external use mainly to treat *kustha Roga*. Its leaves as *shaak* (vegetable) is *Madhur* (sweet in taste), *Ruksha* (dry), *Vata kapha* aggravating, *guru* (Heavy), *sheet veerya* (cooling) (AH.Su.6.94). Paste of seeds of *C. tora* is used in *kustha (*AH.Ci.19.70; AH.U.22.24). A well known formulation ***Vajra***

Tail indicated for skin diseases contains seeds of *C.tora* (AH.Ci.19.79). Paste of its seed also used for local application in *Vyanga* (Blemishes), *Nilika* (*painless, small, round blackish patch*), *Mukhdushika* (Acne vulgaris) (AH.U.22.87), *Shiro rog – Ardhavbhedak* (Hemicrania) (AH.U.24.10) and *Darunaka* (Seborrhoeic Dermatitis of Scalp) (AH.U.24.27).

3.5. Cassia *tora* Linn. in *Nighantu* Texts

S.N	**Nighantu Text**	**Reference**	**Indications**
1	D.Ni[5]	*Karviradi Varg 4.4*	*Vata kapha Nashak, Dadru-kandu-har* (Alleviates Ring Worm, Itiching)
2	S.Ni[6]	*Karviradi Varg*	*Kapha Swas kustha* (Asthma, Skin Diseses*) Dadru Nashak* (Destroys Ring Worm)
3	MP.Ni[7]	*Abhayadi Varg 1.42*	*Hridya* (Cardiotonic), *Kapha Swas kustha Dadru* (Ring Worm) *Krimi Nashak* (Destroys Worms)
4	K.Ni[8]	*Aushadhi Varg,p 130*	*Kapha Kustha* (Skin Diseases), *Jwar* (Fever), *Swas (*Asthma*), Kas (*Cough*), Meha (*Diabetes*) Aruchi* (Anorexia)
5	BP.Ni[9]	*Haritakyadi Varg* 1.121	*Kustha* (Skin Diseases), *Kandu* (Itching), *Dadru* (Ring Worm), *Vish* (Poison), *Anil Gulm Krimi Nashaka* (Destroys *Vat*, Tumor, Worms)
6	R.Ni[10]	*Pancharthak Varg 4/198. Shatahyaadi Varg pg102*	*Medo Vata Kaph Nashak, kandu, Kusth, dadru* (Destroys fat, *Vat*, *Kapha*, Itching, Skin Diseases and Ring Worm).
7	Pr.Ni[11]	*Shatpushapadi Varg* p106	*Kandu, Dadru Vinashanam* (destroys itching and Ring Worm).
8	Sh.Ni[12]	*Anekartha varga pratham bhag* pg 485	*Hridya* (Cardiotonic) *Kustha, Kandu, Dadru Vinashanam* (destroys skin diseases, itching and Ring Worm).
Abbreviations: D.Ni.-Dhanwatri Nighatnu, S.Ni.-Shodhal Nighantu, MP.Ni.-MadanPal Nighantu, K.Ni.- Kaiyadev Nigantu, BP.Ni.- Bhav Praksh Nighantu, R.Ni.-Raj Nighantu, Pr.Ni.- Priya Nighantu, Sh.Ni.-Shaligram Nighantu.			

4. **Synonyms[13] of *Chakramarda* and Their Etymological Derivations**– In ancient time drugs have been defined with multiple synonyms indicating various characteristics of the drugs like physical characters, properties, actions, habitat, therapeutic uses, specific natural characteristics. Therefore, synonyms have played a major role in identification of drugs in Ayurveda.

1. ***Chakramarda*-** Sanskrit word ***Chakramarda*** is made of two words, Chakra - A wheel or ring, Marda - to kill or remove. Means the drug is capable of alleviating disease which is having ring or circular in shape i.e. *Dadru (*Ringworm).
2. **Prapunnada -** It has adverse effect on virility.

3. **Meshlochan -** This indicates that the flowers are like the eyes of a sheep.
4. **Chakri -** The plant is gregarious in nat
5. **Edagaja –** Plant which is destroyed (eaten up) by goats and is smashed out by Elephant.
6. **Padmaat** - The leaves contract at sun set and blossom again at sunrise.

S.N.	Nighantus	Chakramard	Paddhaat	Chakri	Meshlochana	Aidgaja	Prapunnat
1	D.Ni.	_	+	+	Meshaakshi	+	+
2	S.Ni	+	-	-	-	+	+
3	Madanpal Nighantu	+	_	_	_	+	+
4	Kaiyadev Nighantu	+	_	Chakrika	Meshkusum	+	+
5	Bhavprakash Nighantu	+	+	+	Meshlochan	+	+
6	Raj Nighantu	+	_	+	Meshahya	+	+
7	Priya Nighantu	+	_	Chakrasya	_	_	_
Abbreviations: D.Ni= Dhanwatri Nighatnu, S.Ni = Shodhal Nighantu, MP.Ni= MadanPal Nighantu, K.Ni= Kaiyadev Nigantu, BP.Ni= Bhav Praksh Nighantu, R.Ni= Raj Nighantu, Pr.Ni= Priya Nighantu,							

5. *Ras Panchak* of *Chakrmarda* Mentioned in Different Classics

S.N.	Granth / Plant Part	Guna	Ras	Vipaka	Veerya
1	CS.(Patra Shaak)	Guru, Ruksha	***Madhura*** (sweet)	Katu (pungent)	Sheeta (cooling)
2	SS.(Patra Shaak)	Laghu, Ruksha	Katu	Katu	Sheeta
3	S.Ni, MP.Ni.(Seed)	Laghu, Ruksha	**Madhura**	Katu	Ushna
4	BP.Ni(**Phal**), D.Ni.,K.Ni. (Seed)	Laghu, Ruksha	Katu	Katu	Ushna
5	R.Ni (Seed)	***Tikshana (***Sharp***)***	Katu	Katu	Ushna
Abbreviations: CS.=Chrak Smahita, SS.=Sushruta Samhita, D.Ni= Dhanwatri Nighatnu, S.Ni = Shodhal Nighantu, MP.Ni= MadanPal Nighantu, BP.Ni= Bhav Praksh Nighantu, R.Ni= Raj Nighantu, K.Ni= Kaiyadev Nighantu					

6. Geographical Distribution[14]- It is found as a weed throughout India, ascending up to an attitude of 1550 m in Himalaya, universely distributed in wild state in Himachal Pradesh, Bihar, and Orissa, Bengal, Punjab, Rajasthan, on waste lands and along road side of, Maharashtra, Karnataka and plains of Tamilnadu.

7. **Detailed Description of *Cassia tora*[15]**

Taxonomy

Kingdom - Plant Kingdom

Division - Spermatophyta

Sub-Division - Angiosperm

Class - Dicotyledon

Sub-Class - Polypetalae

Series - Calyciflorae

Family - Leguminoceac

Sub-Family - Caesalpinioidae

Genus - *Cassia*

Species - *tora linn.*

8. Plant Description[16] –Annual herbs upto 90 cm tall. Leaflets 3 pairs, opposite. 3-5 x 1.5-2 cm, obovate-oblong with a gland between the lowest pair. Flowers bright yellow in subsessile pairs, in the leaf axils. Pods stout, obliquely septate. Flowers and Fruits: July-November. It is Found commonly in wastelands along roadsides and other places.

9. Pharamacological Activities of *Cassia tora*

Anti-inflammatory[17] **-** The methanolic extract of leaves exhibited significant anti-inflammatory activity against carageenin, histamine, serotonin and dextran induced rat hind paw oedema as a dose dependent manner.

Antifungal - The dealcoholized leaves extract of cassia tora has shown the significant antifungal activity to inhibit the growth of Candida albicans, Aspergillus niger, Sachharomyces cerevisiae and Trichophyton mentagrophytes when tested by turbidity and

spore germination methods in a concentration dependent fashion. The effects produced by the extract were compared with a standard antifungal agent Griseofulvin[5.3.2] Anthraquinones (emodin, physcion and rhein) isolated from C. tora seed show an antifungal property against phytopathogenic fungi i.e. Botrytis cinerea, Erysiphe graminis, Phytophthora infestans,In another study radical scavenging principles on 1, 1-diphenyl-2-picrylhydrazyl (DPPH) radical were isolated from the seeds. Assignments of the 1H- and 13C-NMR data showed the active components to be an anthraquinone, alaternin and two naphthopyrone glycosides, norrubrofusarin-6-β-D-glucoside (cassiaside) and rubrofusarin-6-D-gentiobioside. Alaternin showed more potent radical scavenging effect than the others.[5.3.3]

Antibacterial- Torachrysone, toralactone, aloe-emodin, rhein and emodin isolated from the seeds showed noticeable antibacterial effects on four strains of methicillin resistant Staphylococcus aureus with a minimum inhibitory concentration of 2-64 mg/ml. On the other hand, some phenolic glycosides were also isolated from seeds that did not show strong antibacterial effects on Escherichia coli and P. aeruginosa[5.3.4/5.3.5] Molecular mechanism of emodin action shows transition from laxative ingredient to an anti-tumour agent and mutagenic/genotoxic effects mainly in bacterial system. Emodin, first assigned to be a specific inhibitor of the protein tyrosine kinase p65lck, has now a number of cellular targets interacting with it. Its inhibitory effect on mammalian cell cycle modulation in specific oncogene over expressed cells formed the basis of using this compound as an anticancer agent. Some anthraquinones, phenolic glycosides including new napthopyrone glucosides as cassiaside rubrofusarin-6-O-β-D-gentiobioside and toralactone-9-O-β-D-gentiobioside were isolated from seeds have been found to show various biological or pharmacological.

Anti-helmenthic- Alcohol and aqueous seed extracts showed the anthelmintic activity against Pheretima posthuma and Ascardia galli due to the flavonoids present in its, derivatives.

Hypotensive[5.3.6/5.3.7]- The seeds of C. tora elicit hypotensive effects in anesthetized rats. Experimental results indicate that the hypotensive effect of the extract possibly involves a vagal reflex, which reciprocally alters the vasomotor tone of the centrally emanating sympathetic nervous system**.**

Hepatoprotective activity[5.3.8]- The methanolic extract of leaves in a dose of 400 mg/kg bw given orally showed hepatoprotective activity against carbon tetrachloride-induced

hepatotoxicity and paracetamol-induced hepatotoxicity in rats as evidenced by lowering of serum levels SGOT and SGPT, bilirubin and ALP.

Antioxidant Activity[5.3.9] - Uddine al. (2008) evaluated that methanolic and aqueous extract of the dried aerial part of Cassia tora, were subjected to the potential antioxidant activity. The antioxidant potential of the extract was determined on the basis of their scavenging activity of the stable 1, 1-diphenyl-2- picryl hydrazyl (DPPH) free radical. Methanolic extract of Cassia tora possess strong antioxidant activity. However the aqueous extract showed mild antioxidant activity.

10. RESULT AND DISCUSSION

There are many references about the use of the plant *chakramarda*(Cassia tora), as medicine in the *veda and as Samhita granthas of Ayurveda*. Cassia tora reported as medicine for Ring Worm Infection and has demonstrated as Antifungal activity in various pharmacological studies. Also in various pharmacological studies C.tora demonstrated as Anti bacterial, Hepatoprotective activity, Hypotensive,Anti oxidant activity.

In *Ayurveda*, different traditionally used names, known as *Paryaya* (synonyms) have been attributed to a single plant to describe morphological description habitat and pharmacological characters. There are about 25-26 synonyms attribute to *chakramarda* to describe its morphological and pharmacological characters are available in various classical texts. Many *Acharyas* of *Ayurveda* has described the Rasa of *Chakramarda as Katu*, exceptionally *Nighantu Ratnakara* has described it as *Madhura* only and *Nighantu Adarsha* described it as *Madhura and Katu*. Only *Nighantu Adarsha* has explained the vipaka of the *Chakramarda* as Katu. No other Nighantukara have explained the *Vipaka of the Chakramarda*.

11. CONCLUSION

This article gives us the traditional knowledge about *chakramarda* with its properties and formulation being used in various conditions like *kushta*, fungal infection, *vatavyadhi* etc. Many investigations on cassia tora linn. Have now established that it has an important Pharamcognostical activity smillar to *Bakuchi* so it can be used as a substitute. So it is necessary to take clinical trials according to its studies carried out and the exploit the full medicinal potential of Cassia *tora* linn.

REFERENCE

1. Prof. P.V. Sharma; Dravyaguna Vijana(Vedic Plant And History Of Dravyaguna); Reprint, 2003; Mulvidhi Prakaran, 64.
2. Shastri Kashi Nath, GangaSahaya Pandeya(Ed.) Charak Samhita Vidyotini Hindi Commentary. Chaukhambha Sanskrit Sansthan Varanasi, 6th ed., 2000.
3. Kaviraj Shastri Ambikadutta,Susruta Samhita Vidyotini Hindi Commentary, Chaukhambha Sanskrit Sansthan Varanasi 6th ed**.,** 1993**.**
4. Kaviraj Gupta Atrideva, Upadhyaya Yadunandan Vaidya(Ed.) Astang Hridyam Vidyotini Hindi Commentary**,** Chaukhambha Sanskrit Sansthan Varanasi 12th ed., 1997.
5. OjhaJharkhande, Dhanvantri Nighantu, Kashi Hindu Vishvavidayala, Varanasi Ist Edi., 1985; karviryadi varg, 4th chapter, 181.
6. E- Nighntu (Collection of Ayurvedic Lexicons) National Institute of Medical Heritage(NIIHM)Hyderabad, Karviradi Varg, 2012.
7. Vaidya Ramprasad, Madanpal Nighantu, *Abhayadi Varg*,Khemraj Shre Krishna Das Prakashan, Bombay, 1990; 2.
8. Sharma P.V, Kaiyadev Nighantu, *Aushadhi Varg,Chaukhmbha Orientalia, Varanasi 1st Edi., 1979; 130.*
9. Chunekar K.C, *BhavPrakash Nighantu Haritakyadi Varg*, Chaukhambha Bharti Academy Varanasi, Reprint, 2018; 121.
10. Tripathi Indradev, Raj Nighantu *Shatahyaadi Varg,* Krishna Das Academy, Varanasi, 1st Edi., *1982; 102.*
11. Sharma P.V, Priya Nighantu, *Shatpushapadi Varg*, Chaukhmbha Subharati Prakashan, Varanasi, 2nd Edi., 1995; 106.
12. Vaishya Shaligram, Shaligram Nighantu *Ashta varg*, khemraj Prakashan, Shri Krishna Das Laxmi Steem Press, Mumbai Ist edi., 1983; *163.*
13. Sharma Priya Vrat, *Namarupajanam, Chaukhmbha* VishvaBharti, Varanasi, Reprint, 2015; 78.
14. P. C. Sharma, M. B. Yelne and T. J. Dennis Edited Database On Medicinal Plants Used In Ayurveda, II: 148.
15. www.easyayurvedacassiatora.com
16. Dr Singh K.K, Flora of Dudhwa Nationl Park, Bishen Singh Mahendra Pal Singh, Dehradoon., 1996; 179.

17. Maity TK, Mandal SC, Mukharjee PK, Saha K, Das J, Pal M and Saha BP, Studies on Anti inflammatory effect of Cassia tora leaf extract (Fam. Leguminosae), Phytother Res., 1998; 12(3): 221-223.
18. Maity TK, Mandal SC, Mukharjee PK, Saha K, Das J, Pal M and Saha BP, Evaluation of hepatoprotective potential of Cassia tora leaf extract, Nat Prod Sci., 1997; 3(2): 122-126.
19. Park TH, Kim DH, Kim CH, Jung HA, Choi JS, Lee JW and Chung HY, Peroxynitrite scavenging mode of alaternin isolated from Cassia tora, J Pharm Pharmacol, 2004; 56(10): 1315-1321.
20. Yen GC and Chung DY, Antioxidant effects of extracts from Cassia tora L. prepared under different degrees of roasting on the oxidative damage to biomolecules, J Agric Food Chem., 1999; 47(4): 1326-1332.
21. Patel RP and Patel KC, Antibacterial activity of Cassia tora and Cassia obovata, Indian J Pharm., 1957; 19: 70-75.
22. Chidume FC, Kwanashie HO, Adekeye JO, Wambebe C and Gamaniel KS, Antinociceptive and smooth muscle contracting activities of the methanolic extract of Cassia tora leaf, J Ethnopharmacol, 2002; 81(2): 205-209.
23. Chan SH, Koo A and Li KM, The involvement of medullary reticular formation in the hypotensive effect of extracts from seeds of Cassia tora, Am J Chin Med., 1976; 4(4): 383-38.
24. Maity, T.K., Mandal, S.C. Pal, M. and Saha, B.P. Antihepatotoxic activity of Cassia tora leaf extract Nat Prod Sci., 1998b; 4: 226-229.
25. S.N. Uddin, E.A. Mohd, Y. Nazma. American Journal of Plant Physiology, 2008; 3(2): 96-100.