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INVITRO ANTI-ARTHRITIC EFFECT OF THE LEAVES OF *CASSIA FISTULA* LINN.

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ABSTRACT

The objective of present work is to study the in-vitro anti-arthritic activity of Cassia fistula linn leaf, a traditional plant of Telangana, India. The ethanolic extract of Cassia fistula linn leaf (EECFL) was studied for In-Vitro anti-arthritic activity by bovine serum protein denaturation method. The activity of ethanolic extract of CFL was compared with standard anti-inflammatory drug Diclofenec. It showed 18.3%, 29.7%,44.4%,69.2%,81.5%,93.1% inhibition of denaturation @ 100,200,400,600,800,1000mcg/ml of bovin serum whereas, standard diclofenac @ 100, 200, 400,600,800,1000 mcg/ml showed 16.8%,27.4%,51.2%, 63.4%,70.6%,89.9% inhibition of denaturation of bovin serum. It was found that ethanolic extract of Cassis fistula linn leaves was more potent in inhibition of egg albumin denaturation than diclofenac. Finally, from results it can be concluded that Cassia fistula linn a traditional plant of Telangana posses good Invitro anti-arthritic activity. By further extensive research, we can explore the medicinal value of Cassia fistula linn leaf.

KEYWORDS: Cassia fistula linn, Arthritis, Protein denaturation, *Diclofenac sodium, Bovine serum albumin.*

INTRODUCTION

Arthritis can be clearly say as an informal way of referring to joint pain and is most common among women, which occur frequently as people get older.Arthritis condition can also be defined as an auto immune disorder which is associated with pain and swelling.[1] Generally arthritis is an inflammation of synovial joint due to immune mediated response. But the usage of anti-inflammatory drugs in treating arthritis is not advisable all the times, because it does not suppress T-cell and B-cell mediated response.[2]. Even though there are many modern drugs to treat such disorder, their prolonged usage may cause severe side effects. Hence there is a strong desire to develop new therapeutic agents with minimum side effects.*Cassia fistula linn* from Fabacea family is a flowering plant used in telangana Batukamma festival and can also be considered as an herbal medicine for the treatment of various diseases. The plant is commonly found in the greater part of India like; Bengal, Bihar, Orissa, Tamilnadu, Karnataka, Andrapradesh and Kerala.[3] The flower blooms in late spring.Flowering with trees being covered with Yellow flowers,many times with almost no leaf being seen.it will grow well in dry climates. The leaves are deciduous, 15–60 cm (5.9–23.6 in) long, and pinnate with three to eight pairs of leaflets, each leaflet 7–21 cm (2.8–8.3 in) long and 4–9 cm (1.6–3.5 in) broad.*Cassia fistula linn* is known as Golden shower has therapeutic importance in healthcare since ancient times. In Ayurvedic medicine the golden shower tree is known as Aragvadha meaning "disease killer"But there are not much scientific data regarding the usage of the plant. Ayurveda and other traditional system of medicine support the use of the plant as an antioxidant, analgesic,anti-inflammatory,and also in treating rheumatoid arthritis.[4,5] Hence by considering the above facts, the leaves of *Cassia fistula linn* were selected for the screening of *invitro* antiarthritic activity. Most of the medicinal value of *Fistula* species is due to the presence of various secondary metabolites like saponins, coumarins and anthraquinones.[6] The fruits and roots are well known remedies for the treatment of osteoporosis, tissue and wound healing.[6] They have free radical scavenging activities which may be responsible for the therapeutic action against the tissue damage.[7] The fruit has a high content of antioxidants like Vitamin C, total phenolics, flavonoids, tannins and anthocyanins.[8] The antioxidant activity of *Cassia fistula linn* can be explained on the basis of total phenolic contents, flavonoids and anthocyanins.[9] It is also established that antioxidant activity of lots of fruits are based on their flavonoid content.[10] The plant is also reported as antimicrobial.[11],

anticancer.[12], Radio protective agent.[13], Hepatoprotectant[14] and Antiviral activity.[15]. Since the plant is also reported with anti-inflammatory activity.[16] an attempt has been carried out to screen the aqueous and alcoholic (ethanolic) extract of the fruits for its *invitro* antiarthritic activity.

MATERIALS AND METHODS

Plant Material

The matured fruits of *Cassia fistula linn* were collected from the forest areas of Penpahad, Nalgonda district of Telangana state. It was then shade dried and powdered after confirming the botanical identity.

Fig 1: Plant showing the matured leaves of *Cassia fistula linn*

Preparation of the Leaf Extracts

The powdered leaves were subjected to extraction by using ethanol. The ethanolic extract was screened for the presence of various phytoconstituents.[17]

EVALUATION OF ANTI-ARTHRITIC ACTIVITY

Denaturation Of Proteins By Bovine Albumin

The reaction mixture was consisting of ethanolic extract of the leaves of *Cassia fistula linn* at different concentrations and 1% of aqueous solution of bovine albumin. The samples were incubated at 37^0C for 20 minutes and then heated at 57^0C for 20 minutes after cooling the samples. Absorbance of turbidity was measured at 660nm.[19]

Statistical Analysis

The percentage of inhibition of protein denaturation was calculated by using the following formula;

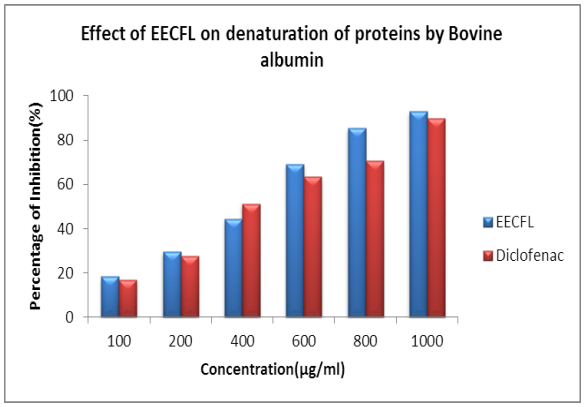
$$\text{Percentageinhibition} = \frac{\text{Absorbance of Control} - \text{Absorbance of Test}}{\text{Absorbance of Control}} \times 100$$

3. RESULTS

In the present study, the alcoholic (ethanolic) extracts of the leaves of *Cassia fistula linn* and Diclofenac (reference drug) were investigated for antiarthritic activity by denaturation of Proteins by Bovine albumin method. The maximum antiarthritic activity was observed in the concentration 1000 µg/ml, while the minimum activity was observed in the concentration 100 µg/ml. The *invitro* antiarthritic activity of the leaves of *Cassia fistula linn* by denaturation of Proteins by Bovine albumin method is shown in table 1, where, the percentage of arthritic protection was found to be, 93.1 (alcoholic/ethanolic) in 1000ml concentration and 89.1 for Diclofenac.From the findings it is very clear that alcoholic (ethanolic) extracts of the leaves of *Cassia fistula linn* exhibited a dose dependent response and also it can be assumed that the alcoholic (ethanolic) leaf extract possess prominent and significant antiarthritic activity when compared with the Diclofenac which was used as a reference standard during the evaluation.

Table 1: Percentage inhibition of protein denaturation of the fruits of *Cassia fistula linn* using bovine albumin

Treatment Regimen	Concentration (µg/ml)	Percentage of Inhibition(%)
Leaf extract of Cassia fistula linn (ethanolic)	100	18.3
	200	29.7
	400	44.4
	600	69.2
	800	81.5
Diclofenac (Reference standard))	1000	93.1
	100	16.8
	200	27.4
	400	51.2
	600	63.4
	800	70.6
	1000	89.9



DISCUSSION

The antiarthritic activity exhibited by the leaf extract could be due to the presence of flavonoids, phenolic compounds. Denaturation of tissue protein is one of the Denaturation of tissue protein is one of the well documented cause of inflammatory and arthritic disease. Production of auto antigens in certain arthritic diseases may be due to invivo protein denaturation.Hence the drugs which can prevent the protein of denaturation would be worth for establishing the anti arthritic drug development.The mechanisms of denaturation probably involves alteration in electrostatic hydrogen,hydrophobic and disulfide bonding.Most of the medicinal values of Fistula species is due to presence of various secondary metabolites like saponins,phenolic compounds, flavonoids, coumarin and anthraquinones.

CONCLUSION

From the results of the present study, it can be stated that the leaf extract of Cassia fistula linn is capable of controlling invivo denaturation of proteins in rheumatic diseases.Further isolation of lead molecules responsible for antiarthritic activity has to be carried out which may be beneficial to the development of natural antiarthritic drug with less adverse effects comapared to the existing synthetic drugs.

REFERENCES

1. Tripathi KD. Essentials of medical pharmacology.6th edition. New Delhi:Jaypee brother's Medical Publisher(P), Ltd; 2008.
2. Mohan H. Text book of pathology. New Delhi:Jaypee brother's Medical Publisher(P),Ltd; 2000. pp. 1648. .
3. Pandey S. Various techniques for the evaluation of anti-arthritic activity in animal models. 2010. Journal of Advavces on Pharmaceutical Technologyand Research, 1(2): 164-170.
4. Ma J, Luo XD, Protiva P, Yang H, Ma C, Basile MJ, Weinstein IB, and Kennelly EJ. 2003. Bioactive novel polyphenols from fruit of Malinkara zapota(sapodilla). Journal of Natural Products. 66: 983-986.
5. Mukherjee PK. Quality control of herbal drugs, Syndicate binders.New Delhi: 2002; pp: 13.
6. Agrawal SS, and Paridhavi M. Herbal drug technology. University press Pvt. Ltd. Hyderabad, 2007. pp. 2.
7. Singh AP. Distribution of steroid like compound in plant flora, Phcog. Mag.2(6): 2006.p.no87-89
8. Kiritikar KR, and Basu BD. A text book of Indian medicinal plant, Lalit Mohan Basu, Allahabad, 1998; pp. 1486-1487.
9. Deshpande V, Jadhav VM and Kadam VJ. In-vitro anti-arthritic activity of Abutilon indicum(Linn.) Sweet. Journal of Pharm.Res. 2009; 2(4): 644-645.
10. Ferrero-Miliani L, Nielsen OH, Andersen PS, Girardin SE; Nielsen; Andersen; Girardin. "Chronic inflammation: importance of NOD2 and NALP3 in interleukin-1beta generation". Clin. Exp. Immunol. **147** (2): (February 2007).061127015327006—. doi:10.1111/j.1365-2249.2006.03261.x. PMC 1810472. PMID 17223962.
11. *Abbas A.B.; Lichtman A.H.*"Ch.2 Innate Immunity". In Saunders (Elsevier). Basic Immunology. Functions and disorders of the immune system (3rd ed.). ISBN 978-1-4160-4688-2.2009.
12. Williams & Wilkins Stedman's Medical *Dictionary (Twenty-fifth ed.)* 1990.
13. *Cotran; Kumar, Collins.*Robbins Pathologic Basis of Disease. Philadelphia: W.B Saunders Company. ISBN 0-7216-7335-X.*1998.*
14. Wiedermann U, et al. (1996). "Vitamin A deficiency increases inflammatory responses". Scand J Immunol. **44**(6): 578–584. doi:10.1046/j.1365-3083.1996.d01-351.x. PMID 8972739.
15. The Plant List: A Working List of All Plant Species". Retrieved June 19: 2014.
16. sinhala botany website
17. "Cassia Fistula (aburnum, Purging Fistula, Golden Shower, Amaltas)", Ayurveda - Herbs (4 to 40), retrieved 2011-01-20
18. Pole, Sebastian (2012). Ayurvedic Medicine: The Principles of Traditional Practice. Singing Dragon. p. 129. ISBN 1848191138. Retrieved November 10, 2012.
19. Bhagwan Dash, Vaidya (2002). Materia Medica Of Ayurveda. India: B. Jain. pp. 41–42. Retrieved November 10, 2012.
20. "Cassia fistula". Natural Resources Conservation Service PLANTS Database. USDA. Retrieved 11 January 2016.
21. Ma J, Luo XD, Protiva P, Yang H, Ma C, Basile MJ, Weinstein IB, and Kennelly EJ. 2003. Bioactive novel polyphenols from fruit of Malinkara zapota(sapodilla), J. Nat. Prod. 66: 983-986.
22. Kiritikar KR, and Basu BD. A text book of Indian medicinal plant, Lalit Mohan Basu, Allahabad, 1998; pp. 1486-1487.