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

Mahendar Boddupally1*, Dr. S. Shobha Rani1, A. Thanga Thirupathī3, K.N.V. Rao3, R. Vasanthi4

1+ 2Department of Pharmacology, Nalanda College of Pharmacy, Charlapally, Nalgonda, Telangana, India.
1Department of Pharmaceutical Analysis and Quality Assurance, Jawaharlal Nehru Technological University, Kukatpally, Hyderabad, Telangana, India.
3Department of Pharmacognosy and Phytochemistry, Nalanda College of Pharmacy, Charlapally, Nalgonda, Telangana, India.
4Department of Pharmaceutical chemistry, Nalanda College of Pharmacy, Charlapally, Nalgonda, Telangana, India.

Corresponding Author: Mahendar Boddupally
Department of Pharmacology, Nalanda College of Pharmacy, Charlapally, Nalgonda, Telangana, India.
DOI: 10.20959/ejpmr20172/2565

ARTICLE HISTORY
Article Received on 05/12/2016 Article Revised on 25/12/2016 Article Accepted on 15/01/2017

ABSTRACT
The objective of present work is to study the in-vitro anti-arthritis 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-arthritis 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 diclofenec @ 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 a traditional plant of Telangana posses good Invitro anti-arthritis 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 autoimmune 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 antiarthritis 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°C for 20 minutes and then heated at 57°C 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;

\[
\text{Percentage inhibition} = \left(\frac{\text{Absorbance of Control} - \text{Absorbance of Test}}{\text{Absorbance of Control}}\right) \times 100
\]

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

<table>
<thead>
<tr>
<th>Treatment Regimen</th>
<th>Concentration (µg/ml)</th>
<th>Percentage of Inhibition(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaf extract of Cassia fistula linn (ethanolic)</td>
<td>100</td>
<td>18.3</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>29.7</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>69.2</td>
</tr>
<tr>
<td></td>
<td>800</td>
<td>81.5</td>
</tr>
<tr>
<td>Diclofenac (Reference standard)</td>
<td>1000</td>
<td>93.1</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>16.8</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>51.2</td>
</tr>
<tr>
<td></td>
<td>600</td>
<td>63.4</td>
</tr>
<tr>
<td></td>
<td>800</td>
<td>70.6</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>89.9</td>
</tr>
</tbody>
</table>
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 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 compared to the existing synthetic drugs.

REFERENCES

16. sinhala botany website