**In vitro Anti-Arthritic Activity of the Polyherbal Formulation – Balapunarnavadi Choornam**

Amoolya Sree, Shibina K. A, Jahanara Hameed*

Department of Pharmacology, Amrita School of Pharmacy, Amrita Vishwa Vidyapeetham University, Amrita University, Kochi, India.

**Abstract**

**Objective:** Arthritis have emerged to be a very common disorder affecting statistically one third of the population. The present study aims to investigate the effectiveness of Balapunarnavadi choornam, a polyherbal formulation in treating the disorder arthritis. The formulation is typically used in the treatment of anorexia and for improving digestion.

**Methodology:** The anti-arthritic activity was investigated in-vitro by protein denaturation method. The aqueous extract of the choornam at different concentration was incubated with bovine serum albumin for complete denaturation and the result was assessed spectrophotometrically at 660nm against the standard diclofenac sodium.

**Result:** The result revealed that the formulation possessed significant anti-arthritic activity and protein denaturation was inhibited by the extract at 200µg/ml - 1000µg/ml in comparison with diclofenac sodium, the standard drug used.

**Conclusion:** The study concluded that the formulation is an effective inhibitor of protein denaturation and showed potent anti-arthritic activity.

**Key Words**- Arthritis, Balapunarnavadi choornam, protein denaturation method

---

**INTRODUCTION**

Arthritis has emerged to be a disorder affecting people around the globe. It literally means inflammation at joints. Since only symptomatic relief can be provided for the disease, NSAIDs and other analgesics are mostly used in arthritic management. On long term use, NSAIDs can cause gastric ulcers and other cardio vascular difficulties. As a replacement therapy herbal products can be used effectively with minimum side effects and minimum cost.

Balapunarnavadi choornam is a polyherbal combination of herbs like Bala, punarnava, erandum, gokshura and Brihathidwayam. The key ingredients and their scientific names are tabulated in table 1. The choornam is used traditionally for the treatment of anorexia and to improve the digestion process. Bala an ingredient of the choornam is proved as an anti-inflammatory agent and hence can be used for arthritis. In a study conducted using carrageenan – induced hind paw model, two ingredients of the formulation - Ricinus communis and Solanum indicum is also proved to be a potent anti-inflammatory agent.

RESULT

The inhibition of protein denaturation was the adapted methodology for in-vitro anti-arthritic activity.

**Evaluation of in vitro anti-arthritic activity.**

The inhibition of protein denaturation was the adapted methodology for in-vitro anti-arthritic activity.

Concentrations chosen for study: 1000 – 200µg/ ml

Standard: Diclofenac sodium

Chemicals: Phosphate Buffer Saline pH 6.3

0.5% Bovine serum albumin (BSA) – (5% w/v of aq solution)

Instruments required: Incubator, pectrophotometer - 660 nm

The following 4 solutions were prepared for the test:

**STANDARD SOLUTION:** 0.05 ml of test solution of various concentration was added to 0.45 ml of bovine serum albumin making the final volume of 0.5 ml.

**TEST SOLUTION:** 0.05 ml of test solution was added to 0.45 ml of bovine serum albumin to sum up the final volume to 0.5 ml

**PRODUCT CONTROL:** 0.05 ml of test solution was added to 0.45 ml of distilled water to sum up the final volume to 0.5 ml.

**EXPERIMENT PROTOCOL**

**MATERIAL AND METHODS**

The choornam was purchased from Everest pharma, Thrissur, Kerala and was extracted with water.

<table>
<thead>
<tr>
<th>Bala</th>
<th>Sida cordifolia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Punarnava</td>
<td>Boerhavia diffusa</td>
</tr>
<tr>
<td>Brihathidwayam</td>
<td>Solanum indicum and Solanum Xanthocarpum</td>
</tr>
<tr>
<td>Erandum</td>
<td>Ricinus communis</td>
</tr>
<tr>
<td>Gokshura</td>
<td>Tribulus terrestris</td>
</tr>
</tbody>
</table>

The choornam was purchased from Everest pharma, Thrissur, Kerala and was extracted with water.
RESULT AND DISCUSSION

The choornam extract exhibited significant anti-arthritic activity at 200-1000 µg/ml by protein denaturation inhibition. The effect of choornam extract was studied by comparing with the standard diclofenac sodium. The autoantigen production in rheumatoid arthritis is due to denaturation of protein and several studies reveal that protein denaturation is one of the reasons for rheumatoid arthritis. The maximum activity is exhibited by the choornam at a concentration of 800µg/ml. From the study conducted it can be concluded that Balapunarnavadi choornam can be used in the management of arthritis. The results are tabulated and depicted in Table 2 and fig 1.

CONCLUSION

The in vitro anti-arthritic study conducted on the polyherbal formulation balapunarnavadi choornam concluded that the choornam exhibited significant anti-inflammatory activity and hence can be used effectively in the management of arthritis. The constituent responsible for the action need to be identified.

Table 2: In Vitro anti-arthritic activity exhibited by balapunarnavadi choornam on comparison with standard.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Concentration µg/ml</th>
<th>Percentage inhibition of protein denaturation by Diclofenac</th>
<th>Percentage inhibition of protein denaturation by choornam</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200</td>
<td>99.88</td>
<td>91.38</td>
</tr>
<tr>
<td>2</td>
<td>400</td>
<td>98.27</td>
<td>92.37</td>
</tr>
<tr>
<td>3</td>
<td>800</td>
<td>99.90</td>
<td>95.04</td>
</tr>
<tr>
<td>4</td>
<td>1000</td>
<td>99.94</td>
<td>94.21</td>
</tr>
</tbody>
</table>

REFERENCE