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

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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. [1] On long term use, NSAIDs can cause gastric ulcers and other cardio vascular difficulties. [2] As a replacement therapy herbal products can be used effectively with minimum side effects and minimum cost.[3,4] 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[5] and to improve the digestion process. Bala an ingredient of the choornam is proved as an anti-inflammatory agent[6,7] and hence can be used for arthritis. In a study conducted using carrageenan – induced hind paw model, two ingredients of the formulation - Ricinus communis[8, 9] and Solanum indicum[10] is also proved to be a potent anti- inflammatory agent. Solanum xanthocarpum is a prickly herb belonging to the Solanaceae family and the juice of the plant when mixed with black pepper is suitable for rheumatism management.[11, 12] Punarnava a herb spreading on the ground is used in Ayurveda for rheumatism.[13] Anti – arthritic activity of Tribulus terrestris was estimated using Frund's complete adjuvant induced arthritis in rats.[14]

Table 1: Ingredients of balapunarnavadi choornam

Bala	***Sida cordifolia***
Punarnava	*Boerhavia diffusa*
Brihathidwayam	*Solanum indicum* and *Solanum Xanthocarpum*
Erandum	*Ricinus communis*
Gokshura	*Tribulus terestris*

MATERIAL AND METHODS

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

EXPERIMENT PROTOCOL

Evaluation of *in vitro* anti-arthritic activity.

The inhibition of protein denaturation[15, 16] 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:

TEST 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 CONTROL**:** 0.05 ml of distilled water 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.

STANDARD SOLUTION:

0.05 ml of standard diclofenac sodium of various concentration was added to 0.45 ml of bovine serum albumin to sum up the final volume to 0.5 ml.

All the samples were kept for incubation, for a period of 20 minutes at a temperature of 37^0c and later the temperature was raised to keep the samples at 57^0C for a period of 3 minutes. 2.5 ml of phosphate buffer was added to all the samples after cooling. The absorbance was measured at a wavelength of 660nm using UV- Visible spectrophotometer. The control represent 100% protein denaturation. The result obtained from the study was compared to standard value of diclofenac sodium.

The percentage inhibition was calculated by the formula:

Percentage inhibition = 100 – [{(Optical density of test solution – Optical density of product control)/ Optical density of test} × 100]

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 auto antigen production in rheumatoid arthritis is due to denaturation of protein and several studies reveal that protein denaturation is one of the reason 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.

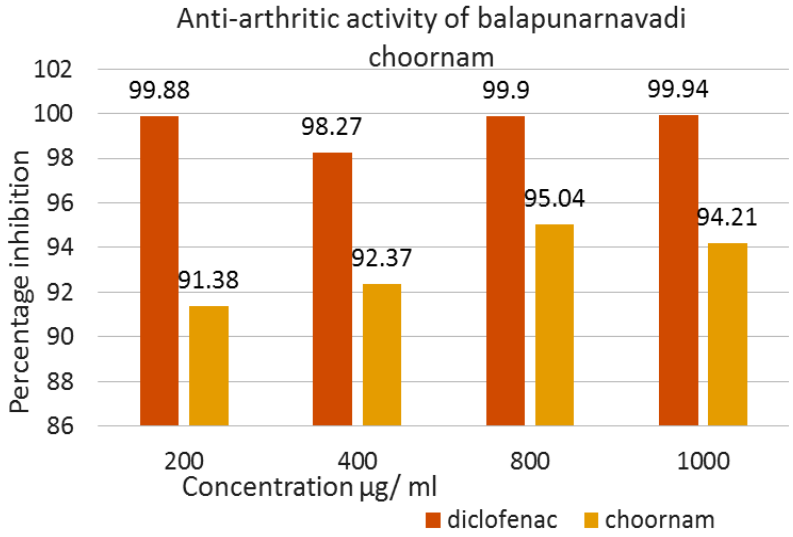
The results are tabulated and depicted in Table 2 and fig 1.

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.

S. No	Concentration µg/ml	Percentage inhibition of protein denaturation by Diclofenac	Percentage inhibition of protein denaturation by choornam
1	200	99.88	91.38
2	400	98.27	92.37
3	800	99.90	95.04
4	1000	99.94	94.21



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