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Research Article.....!!!

ANTI ARTHRITIC ACTIVITY OF ETHANOLIC LEAF EXTRACT***EUPHORBIA HIRTA*****DR.S. SENTHILKUMAR****Karur, Tamilnadu, India.****KEYWORDS:**

Paw volume, anti arthritic activity, *Euphorbia hirta*, Ethanol, Low dose, High dose.

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ABSTRACT

Inflammatory diseases including different types of rheumatic conditions are major and worldwide problem. Rheumatoid arthritis (RA) is a chronic, inflammatory, systemic autoimmune disease that affects about 1% of the general population in western countries and is two to three times more common in women than in men. According to Ayurveda, the first requirement for healing one self is a clear understanding of the three doshas. The concept of vata-pitta-kapha is unique to Ayurveda and it holds the potential for revolutionizing the healing systems of the west. However, the concept of the three principles and the Sanskrit words, vatta-pitta-kapha are very difficult to translate in western terms. The leaves and barks of the plant are widely used by Siddha and Ayurveda practitioners for treating several conditions.

INTRODUCTION:

Arthritis means joint inflammation, it is a chronic, progressive and disabling autoimmune disease. Arthritis can progress very rapidly causing swelling and damaging cartilage and bone around the joints. Any joint may be affected but it is commonly at the hands, feet and wrists (1). Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease predominantly affecting the joints and perarticular tissue. RA still remains a terrifying disease (2). RA is an inflammatory form of arthritis the synovial membrane (Synovial) is attacked resulting in Swelling and pain (3). The regulation of these mediators secreted by macro phages and other immune cells (4), and modulation of arachidonic acid metabolism by inhibiting enzymes like cox and lox are the potential target of chronic inflammatory conditions (5). Its prevalence depends upon age. It occurs more frequently in women than in men. It is an inflammation of synovial joint due to immune mediated response. All anti inflammatory drugs are not anti arthritic because it does not suppress T-cell and B-cell mediated response. Epidemiological studies overall show a female to male ratio of about 3:1. There are many class of anti-arthritic drugs are available like NSAIBS, monoclonal antibodies, uricosuric agents, gold compounds, anti-cytokine, immunosuppressant like glucocorticoids etc., but this all class of drugs is responsible for symptomatic relief.

MATERIALS AND METHODS:**COLLECTION OF PLANT MATERIAL:**

The leaves of *Euphorbia hirta*. were collected from paramathi near karur District in Tamilnadu.

PREPARATION OF PLANT EXTRACT:

The leaves of *Euphorbia hirta* were shade dried at room temperature. The dried material was then homogenized to obtain coarse powder and stored in air-tight bottles for further analysis. The shade, dried, powdered leaves were extracted with ethanol by hot extraction using soxhlet apparatus, collected and stored in a vial for further analysis.

PROCEDURE:

Wistar albino male rats (150-200g) were divided into 5 groups of six animals each (n=6). Group I served as control. Arthritis was induced in rats by injecting 0.1 ml of 0.1% Freund's complete adjuvant (FCA), (Sigma Aldrich USA) into the sub planter region in the right hind paw of group II-IV rats on the first day of the experiment. Group III was administered with indomethacin (10 mg kg⁻¹ day⁻¹ P.O) daily for 15 days which served as the standard reference. Group IV and V was administered with 200 mg kg⁻¹ day⁻¹ P.O and 400 mg kg⁻¹ day⁻¹ P.O of ethanolic leaf extract of *Euphorbia hirta* daily for 15 days (4).

EXPERIMENTAL DESIGN:

The plant extract treatments were administered as follows for 5 days

Group-I : Served as control

Group-II : Freund's complete adjuvant (FCA) in to the sub planter region in the right hind paw.

Group-III: Adminstrated with Indomethacin (10mg kg⁻¹ day⁻¹ P.O) daily.

Group-IV: 200mg kg⁻¹ day⁻¹ P.O of *Euphorbia Hirta*.

Group- V: 400mg kg⁻¹ day⁻¹ P.O of *Euphorbia Hirta*.

The increase in joint diameter was measured daily starting from day 1, by using verniar caliber.

Percentage protection rendered by the plant extract is calculated using the formulae

$$\frac{\text{Difference in paw volume of Induced} - \text{difference in paw volume of standard}}{\text{standard / or treated}} \times 100$$

Percentage Protection = -----

Difference in paw volume of Induced

STATISTICAL ANALYSIS:

The data presented here are means \pm SD of 6 rats in each group. The results were analysed using one-way analysis of variance (ANOVA) and the group means were compared by Dunecan's multiple range test (DMRT) using statistical program for social sciences (SPSS Version 16.0) soft ware for windows. The findings were considered statistically significant at $P < 0.05$ (5).

Table – 1. Antiarthrititis activity of Ethanolic leaf extract of *Euphorbia hirta*

Paw volumes (mm)					
Days	Control	Induced	Standard	Low dose	High dose
0.	3.28 \pm 0.16	3.15 \pm 0.12	3.40 \pm 0.08	3.20 \pm 0.05	3.24 \pm 0.08
1.	3.28 \pm 0.16	6.96 \pm 0.24	6.60 \pm 0.21	7.14 \pm 0.26	7.08 \pm 0.21
2.	3.28 \pm 0.16	7.45 \pm 0.23	7.27 \pm 0.14	7.34 \pm 0.23	7.26 \pm 0.22
3.	3.28 \pm 0.16	7.95 \pm 0.02	7.83 \pm 0.06	7.60 \pm 0.24	7.46 \pm 0.21
4.	3.28 \pm 0.16	8.60 \pm 0.09	8.38 \pm 0.09	7.76 \pm 0.25	7.41 \pm 0.20
5.	3.28 \pm 0.16	9.32 \pm 0.05	8.16 \pm 0.04	7.97 \pm 0.24	7.30 \pm 0.19
6.	3.28 \pm 0.16	9.92 \pm 0.04	7.89 \pm 0.05	7.89 \pm 0.27	7.16 \pm 0.16
7.	3.28 \pm 0.16	10.25 \pm 0.09	7.73 \pm 0.11	7.69 \pm 0.30	7.03 \pm 0.11
8.	3.28 \pm 0.16	10.77 \pm 0.04	7.23 \pm 0.06	7.49 \pm 0.28	6.88 \pm 0.12
9.	3.28 \pm 0.16	11.44 \pm 0.08	6.89 \pm 0.10	7.29 \pm 0.26	6.65 \pm 0.12
10.	3.28 \pm 0.16	11.85 \pm 0.06	6.52 \pm 0.12	7.09 \pm 0.24	6.45 \pm 0.11
11.	3.28 \pm 0.16	11.23 \pm 0.07	6.15 \pm 0.05	6.90 \pm 0.27	6.25 \pm 0.07
12.	3.28 \pm 0.16	10.73 \pm 0.06	5.73 \pm 0.06	6.67 \pm 0.28	6.08 \pm 0.10
13.	3.28 \pm 0.16	10.22 \pm 0.04	5.43 \pm 0.06	6.45 \pm 0.29	5.88 \pm 0.09
14.	3.28 \pm 0.16	9.85 \pm 0.08	5.25 \pm 0.08	6.24 \pm 0.28	5.66 \pm 0.09
15.	3.28 \pm 0.16	9.31 \pm 0.08	5.11 \pm 0.04	6.15 \pm 0.34	5.42 \pm 0.11

Values are expressed as mean \pm SD (n=6)

Table-2. Percentage protection of *Euphorbia hirta* against FCA induced arthritis

Groups	Initial paw volume (mm)	Final paw volume (mm)	Difference(mm)	Percentage Protection (%)
Control	3.28 ± 0.16	3.28 ± 0.16	-----	-----
Induced	3.15 ± 0.12	9.28 ± 0.08	6.15 ± 0.19	-----
Standard	3.40 ± 0.08	5.11 ± 0.09	1.71 ± 0.09	72.20
Low dose	3.20 ± 0.05	6.16 ± 0.37	2.96 ± 0.37	51.96
High dose	3.24 ± 0.08	5.42 ± 0.07	2.19 ± 0.07	64.45

Values are expressed as mean ± SD (n=6)

RESULTS AND DISCUSSION:

This autoimmune disorder is characterized by pain, synovial membrane inflammation and confined joint development because of tissue harms. In RA, bone disfigurements and inability of joint capacity occurs due to dynamic disintegration of articular ligament in synovial joint via generation and incision of auto-antibodies in it (8). The main pathological changes of RA incorporate hyperplasia of synovial membrane, penetration of fiery cell and neovascularization, which eventually prompt ligament disintegration and articular destruction.

Degradation of cartilage is a more mind-boggling occasion including the local arrival of proinflammatory substance, for example prostaglandins, leukotriens, elastase, and proteases including metalioproteases and iysosomal compounds that intervene aggravation in joints and in the synovial liquid in RA (9). Women are three times more prone to get RA than men. The fundamental classes of medications used to treat rheumatoid antirheumatic drugs (DMARDS), non steroidal anti-inflammatory drugs (NSAIDS), corticosteroids and immunosuppressive drugs. (Table-1,2).

In any case, these medications deliver some undesirable symptoms, for example gastrointestinal ulcerogenicity and renal morbidity. Thus, these days restorative herb in the treatment and counteractive action of illnesses is drawing attention by researchers around the world (10).

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