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Therapeutic potential of MoringaOleifera leaves in arthritis.

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ABSTRACT:-Moringaoleifera is an angiosperm plant,native of the Indian subcontinent, where its various part have been utilize throughout history as a food and medicine.Moringaoliferacommonly known as drumstick belongs to the Moringaceae family. A number of medicinal properties attributed to different parts of M. olifera.MoringaOleifera (MO), a plant from the family Moringacea. MO has been studied for its health properties, attributed to the numerous bioactive components, including vitamins, phenolic acids, flavonoids, isothiocyanates, tannins and saponins, which are present in significant amounts in various components of the plant. MoringaOleiferaleaves are the most widely studied and they have shown to be beneficial in several chronic conditions, including hypercholesterolemia, high blood pressure, diabetes, insulin resistance, non-alcoholic liver disease, cancer and overall inflammation. This research was done on leaves of MO for its antiarthritic activity.
Keywords:-Moringooleifera, antiarthritic,leaves

I. INTRODUCTION

MO is referred to as the 'drum stick tree' or the 'horse radish tree', whereas in others, it is known as the kelor, marango, mlonge, moonga, mulangay, nebeday, saijhan, sajna or Ben oil tree. Moringaoleifera (MO) is an aboriginal of Indian subcontinent and has become naturalized in the tropical and subtropical areas around the world. Nearly thirteen species of Moringa are included in the family Moringaceae. It has been reported by Bureau of plant industry that Moringa is an outstanding source nutritional components. Its leaves (weight per weight) have the calcium equivalent of four times that of milk, the vitamin C content is seven times that of oranges, while its potassium is three times that of bananas, three times the iron of spinach, four times the amount of vitamin A in carrots, and two times the protein in milk.[13,14]

Arthritis

Introduction

Arthritis, one of the most common and disabling disease of the skeletal system is a generic term for inflammation or degeneration of the joints and refers to many specific conditions of varying etiology and pathophysiology.

Types of Arthritis

I. Most common types

1. Rheumatoid arthritis

Rheumatoid arthritis (RA) is a chronic, progressive autoimmune disease. There is inflammation of synovial membranes with increased synovial exudates, leading to thickening of the synovial membranes and joint swelling. The onset of disease occurs typically between the ages of 36 and 50 years of age .

2. Osteoarthritis (OA)

Osteoarthritis (OA) is a chronic joint disorder chiefly characterised by degeneration of joint cartilage and adjacent bone followed by bony overgrowth leading to joint pain and stiffness. It is also known as degenerative arthritis. OA causes breakdown of cartilage, the smooth, gelatinous tissue that protects the ends of bones from rubbing against each other. Healthy cartilage shields bones against being worn down by friction, but in those who have OA, the cartilage is worn away, allowing bone ends to make direct contact. As the disease progresses, direct contact creates bone spurs and abnormal bone hardening and leads to inflammation and severe pain as bones continue to rub together without proper cushioning. As a result, bones may become more brittle and subject to fracture. OA further may be subdivided into following two types

a. Primary OA

This commonly develops after age 45 and affects weight bearing joints like hips, lower back, knees and feet, as well as the neck and fingers. It occurs when the joints are placed under excessive

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long-term stress from supporting too much weight or from normal weight demands placed on weak and unhealthy joints.

b. Secondary OA

It is less common subtype with more apparent direct cause like trauma, injury, previous inflammation (even from RA), congenital joint misalignment, infection, surgery or prolonged use of medication. It often appears before the age of 40.

3. Gouty Arthritis

Gout is a disorder of purine metabolism manifested by increased serum uric acid level and recurring attacks of very painful arthritis. Acute gout is caused by the interaction between the inflammatory system (particularly neutrophils) and urate crystals in the joints and cartilage .

II. Less prevalent types of Arthritis

1. Psoriatic Arthritis

Psoriatic Arthritis (PSA) occurs in about 10% of the patients who have psoriasis, a skin disease that causes red, scaly patches, most frequently on the knees, neck and elbows. This disease includes swelling in many joints of the fingers and toes.

2. Ankylosing Spondylitis

It is most common in young men, it is an inflammatory disease that bends or fuses spinal vertebrae, over time the spine stiffens.

3. Infectious Arthritis

Viruses, bacteria, and fungi can cause infectious arthritis, which most often inflames the knee joints and is characterised by fever and stiffness.

2.1.10.4. Pathophysiology of Common types of Arthritis

I. Rheumatoid Arthritis

The etiology is likely a combination of:

1. Genetic susceptibility
2. A triggering event, such as a viral infection
3. The subsequent development of autoimmunity against synovial cells.

Disease begins with inflammation of the synovial membrane leading to swelling and congestion. This eventually leads to thickening of the synovium. Infiltration of CD4+ T cells, plasma cell and macrophages trigger inflammatory reaction. As the amount of granulation tissue (Pannus) resulting from inflammation increases, it interferes with the normal nutrition of the articular cartilage and cartilage becomes necrotic. Demineralisation of exposed bone along with erosion of joint margin leads to total derangement of the affected joint resulting in joint deformities, subluxation and even dislocation.[3,4,5,6]

II. MATERIALS AND METHOD

Preparation of extract

Powdered material of MO was charged into Soxhlet apparatus and extraction was carried out using diethyl ether.

Route of administration

Oral route using oral feeding needle no 18.

Animals

Wistar albino rats of both sex (120-150 gm)

Acute toxicity test

Oral toxicity study as per guidelines (AOT 425) suggested by the Organization for Economical Co-operation and Development (OECD) was performed.

Methods for Anti-Arthritic Activity.

Complete Freund's adjuvant (CFA) induced arthritis in rats.

Table 1.1: Treatment schedule for Anti-arthritic activity.

Group No.	Treatment	Dose
I.	Control (Vehicle)	1 ml/kg p.o.
II.	Moringaoleifera	100mg/kg p.o.
III.	Moringaoleifera	200mg/kg p.o.
IV	Moringaoleifera	400mg/kg p.o.
V.	Methotrexate (M)	0.75 mg/kg p.o.

Rats (Males) were randomly divided into 05 groups, each containing 06. They were made arthritic by single intra-dermal injection of 0.1 ml of complete Freund's adjuvant (CFA) containing 1.0 mg dry heat-killed Mycobacterium tuberculosis per milliliter sterile paraffin oil into a foot pad of the left hind paw of rats on the 1st day. Respective drug treatment as mentioned in table was started from day one, 30 minutes before adjuvant injection and continued till next 14 days and following parameters were evaluated.[7,8,9]

1. Paw volumeevalution by using Plethysmometer (in ml)
2. Radiographic analysis.
3. Observation of secondary lesions.

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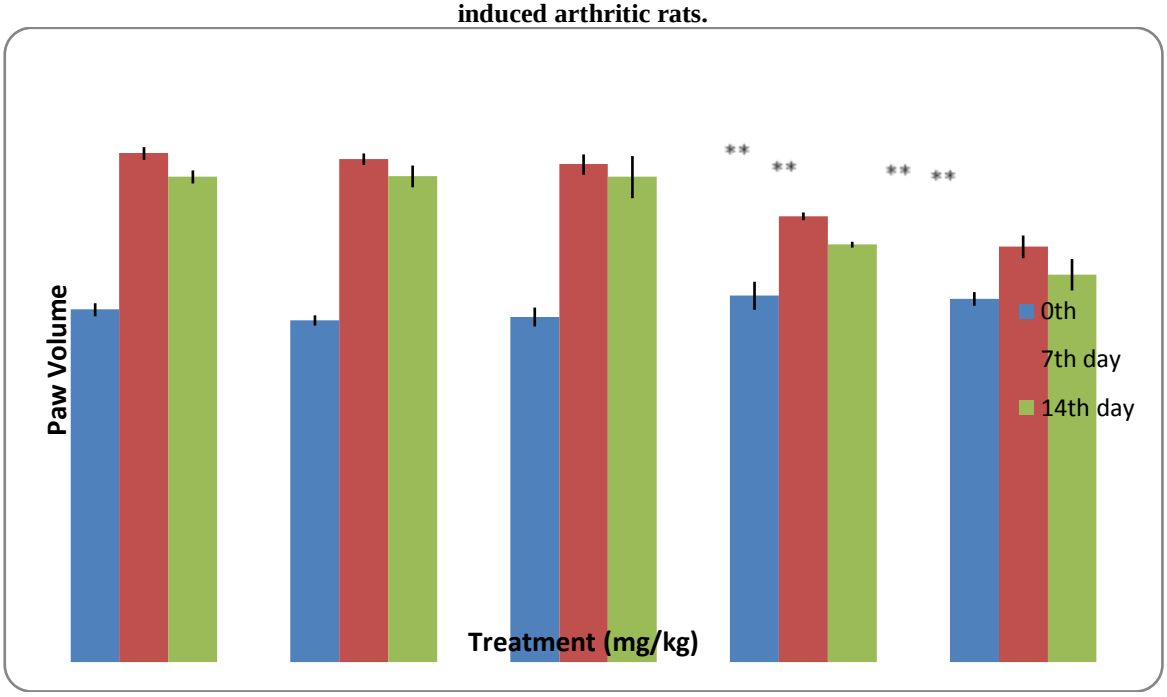
Anti-Arthritic Activity

The paw volume displacements of rats pretreated with MO extract 100, 200 and 400 mg/kg methotrexate (0.75mg/kg) and control rats on the 0th, 7th and 14thday are summarised in Figure. On 7th day, control rats and MO extract 100 mg/kg and 200 mg/kg treated rats exhibited significant inflammation where as the MO extract 400 mg/kg and Methotrexate treated rats showed significant reduction in inflammation. Furthermore, MO 400 mg/kg and Methotrexate were equipotent (P<0.01). Similar results were also observed on 14th day evaluation. Secondary lesions measured on the 14th day was found to be improved with MO 400 mg/Kg

Figure 1.1: Effect of MO extract and Methotrexate on paw volume in Complete Freund's adjuvant induced arthritic rats.



Results are expressed as mean ± SEM. (n = 6) Data was analysed by one way analysis of variance (ANOVA) followed by Dunnett's 't' test. *P<0.05, **P<0.01.

Table 1.1:Effectof MO extract on secondary lesions on 14th day.

No.	Treatment (mg/kg)	Secondary lesions
1	Control	+++
2	MO100	+++
3	MO 200	++
4	MO 400	+
5	Methotrexate	-

- Nil; + Mild; ++ Moderate; +++ Severe.

- **Note:** Secondary lesions on the 14th day were collectively observed in the ear, fore-paws, hind-paws and tail of rats.
- **Radiographic analysis**

MO 400 mg/kg pretreatment showed remarkable reduction in soft tissue swelling as well as destruction of the knee joints. Moreover the joint space is more even as compared to the vehicle treated control rats. Similar but more potent results were seen in rats pretreated with Methotrexate.

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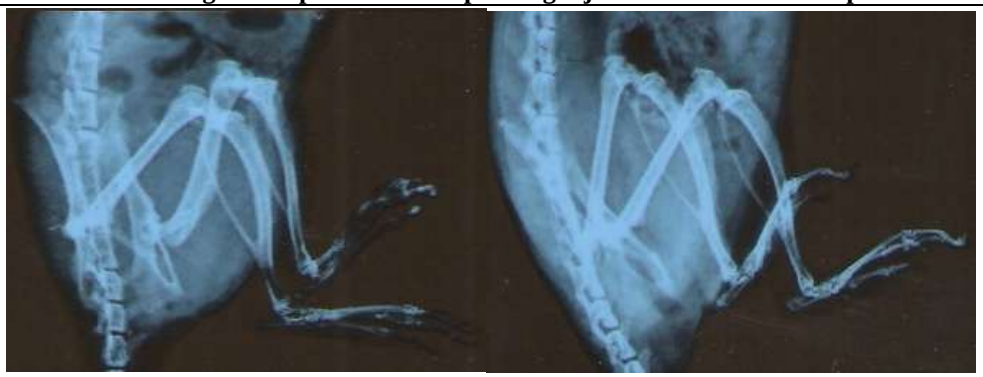
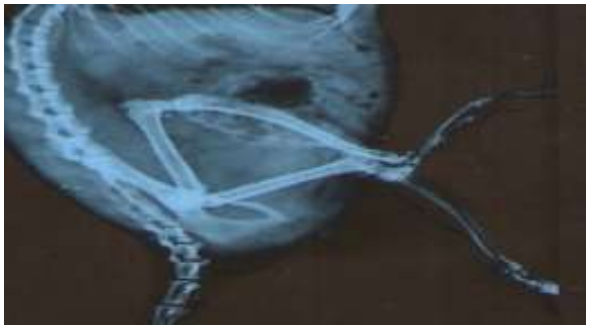
Figure 1.2: Effects of test drug on the proximal interphalangal joints of control and experimental rats



- Control MO 400



- Methotrexate (0.75 mg/kg)

III. RESULT AND DISCUSSION:-

The present investigation reported that the 400 mg/kg dose of the extract showed significant improvement in arthritic condition by reducing hind paw inflammation and secondary lesions. The improvement in secondary lesionsis the hallmark of anti-rheumatoid activity of the extract. These results postulated possible dual role of extract as a symptomatic therapy and preventive remedy which can be considered as a value added outcome as compared to modern therapy.

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