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Research Article

Formulation and Evaluation of Herbal Cream used for Rheumatoid Arthritis

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ABSTRACT

Rheumatoid Arthritis (RA) imposes a significant global health burden, motivating the exploration of complementary therapies to complement conventional treatments. This systematic review evaluates the effectiveness of herbal medicines in managing rheumatoid arthritis (RA), specifically analyzing randomized clinical trials (RCTs) that compare herbal treatments with control groups. Specifically, the review evaluates herbal creams incorporating extracts from the Banyan tree and ginger for their potential in RA treatment. Rigorous testing of these creams reveals promising attributes, including anti-inflammatory, analgesic, and wound healing properties, suggesting their utility as adjunct therapies for RA. Further research and larger clinical trials are imperative to substantiate their efficacy and safety across diverse populations. The integration of herbal medicine with conventional treatments presents a holistic approach to RA management, emphasizing comprehensive care for this multifaceted condition.

INTRODUCTION

Over 2 million persons in the US suffer from rheumatoid arthritis (RA), a chronic condition whose exact origin is yet unknown. The synovium is the target of this inflammatory disease, which causes pain, stiffness, swelling, joint abnormalities, and impaired function. The American College of Rheumatology advises early detection and intervention with disease-modifying anti-rheumatic medications to reduce permanent joint damage given the lack of a cure or prophylactic measures. [1] Even with early

diagnosis, the efficacy of existing rheumatoid arthritis drugs is frequently restricted, and there can be substantial toxicity risks associated with these treatments. For symptom relief, complementary and alternative medicine (CAM) is a popular choice among rheumatoid arthritis sufferers. Research shows that those who are dissatisfied with traditional treatments and have chronic pain, particularly those with RA, are more prone to look into alternative therapy. For rheumatoid arthritis, among the most popular treatments are chiropractic and herbal therapy,

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with between 60% and 90% of patients opting for complementary and alternative medicine. [2]. The necessity for more extensive study on the efficacy and safety of complementary and alternative medicine (CAM) is highlighted by the growing interest in alternative medical practices. A 2000 review was constrained by the absence of studies contrasting herbal medicines with active comparators. Therefore, by analysing randomized clinical trials (RCTs) that compared herbal preparations with other control therapies, the goal of this systematic review was to assess the current clinical data on the efficacy of herbal medications in controlling rheumatoid arthritis (RA). [3] An autoimmune disease known as rheumatoid arthritis (RA) is characterized by symmetrical, ongoing joint inflammation. It usually starts in minor joints and can move to larger ones, potentially affecting the skin, eyes, heart, kidneys, and lungs, among other organs. Destroying bone and cartilage along with weakening tendons and ligaments are all part of the joint degeneration associated with RA. [4] In patients with rheumatoid arthritis (RA), severe joint deterioration commonly results in painful deformities and bone erosion. Common signs and symptoms include sore, swollen, heated joints; exhaustion; fever; weight loss; and the formation of subcutaneous rheumatoid nodules. Morning stiffness that lasts longer than thirty minutes is also common. Between the ages of 35 and 60 is when RA usually first manifests. It is marked by flare-ups and remission intervals. The condition known as juvenile RA (JRA), which is comparable to RA but does not include rheumatoid factor, can also affect children. [5-6]. In the Western world, rheumatoid arthritis (RA) is estimated to affect 1 to 2% of the population, while globally, the prevalence is approximately 1%. [7-8]. Osteoarthritis (OA) and rheumatoid arthritis (RA) differ in various ways from a clinical standpoint. Whereas OA typically affects the distal interphalangeal (DIP) joint, RA primarily targets

the proximal interphalangeal (PIP) and metacarpophalangeal (MP) joints. In contrast to RA, OA does not affect the immune system, heart, or lungs and is caused by degenerative changes as opposed to an autoimmune reaction. Furthermore, RA typically has symmetrical involvement, whereas OA frequently affects only one side of the body. In OA, morning stiffness usually goes away in 20 to 30 minutes, but in RA, it might linger for over an hour. [9-10]. The goals of RA treatment are to lessen pain and inflammation, enhance joint function, and shield joints against deterioration and deformity. A combination of prescription drugs, weight-bearing activities, patient education, and rest intervals are usually used in treatment. These tactics are customized for each patient, taking into account variables such as the degree of the disease, the joints that are afflicted, age, general health, type of work, compliance with therapy, and awareness of the condition. [11].

RHEUMATOID ARTHRITIS

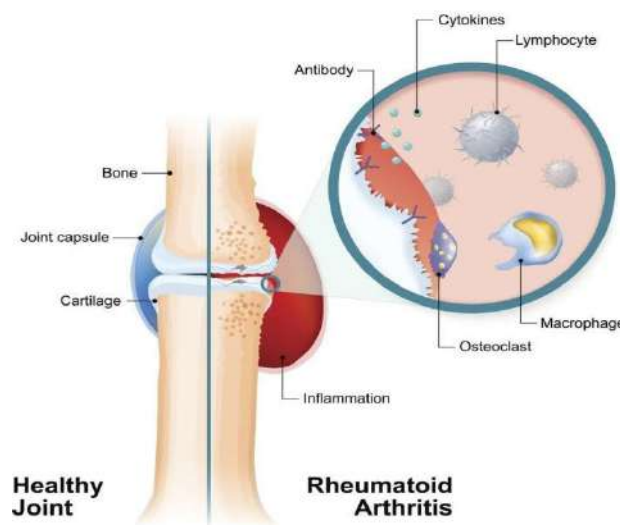


Fig No. 1

Anti-Inflammatory-

Inflammation acts as the body's built-in defense, responding to a variety of harmful factors such as pathogens, cellular damage, radiation, and toxins. It begins the body's healing process,

activating natural mechanisms to mend and rejuvenate damaged tissues.[12-13]Inflammation is commonly correlated with major diseases such as cancer, diabetes, and heart disease, among others, via numerous pathways.Many natural plant compounds have the potential to regulate these pathways and effectively reduce inflammation.[14]An important step in the healing process of wounds is inflammation, which is brought on by injuries to the skin or other soft tissues.Increased collagen production is the outcome of this inflammatory reaction, which starts cellular activity underneath the dermis. This rise in collagen levels facilitates the regeneration of epithelial tissue, which is crucial for the healing process.[15]In recent studies, researchers conducted investigations to assess the effects of bark extract and ash on burn wounds in Sprague Dawley rats.They developed several ointment formulations for topical use and discovered that those with ash and aqueous extract were especially

successful in enhancing wound healing. Formulations containing methanolic and chloroform extracts, on the other hand, were the least effective. Notably, ointments containing bark ash and aqueous extract achieved complete wound contraction within 15 days, indicating rapid wound closure and successful healing. Additionally, granulation tissue formation, cellular proliferation, and gradual re-epithelization were also seen in the treated wounds[16].

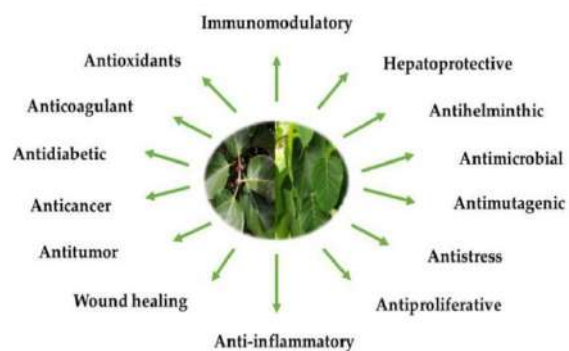

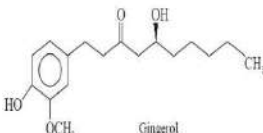
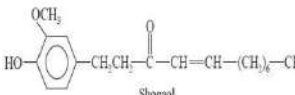

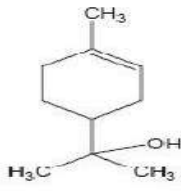
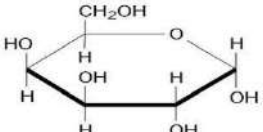


Fig No.2-Pharmacological action of banyan Tree

Table No.1- Active Ingredients their Uses

Herbal plant	Active constituents	uses
<p>Ginger (Zingiberofficinale) Family-Zingiberaceae</p>  <p>Fig No.3</p>	 <p>Gingerol</p>  <p>Shogaol</p> <p>Chemical constituents:-zingiberene, β-bisabolene, α-farnesene, β sesquiphellandrene carbohydrates(50–70%), lipids (3–8%), along with terpenes, phenolic compounds</p>	<p>Nausea, indigestion. Reducing inflammation and pain, Boosting immunity .Regulating blood sugar and cholesterol. Alleviating nausea during pregnancy. Supporting heart and respiratory health.</p>
<p>Banyan Tree (Ficus Benghalensis) Family-Moraceae</p> 	 <p>Galcactose</p>	<p>diarrhoea, dysentery, ear, nose, and dental issues, leucorrhoea, infertility, rheumatic pain, digestive troubles, piles cholesterol, fever, headaches,</p>

<p>Fig No. 4</p>	<div style="text-align: center;">  <p>Terpinoides</p> <p>Chemical Constituents - BSitosterols, glycosides, sterols, leukocyanidin, esters, querce tin, friedelin, flavonoids, inositol, leucopelar, galactose, rutin, and tannins.</p> </div>	<p>and leaves utilized in managing inflammation, among other uses</p>
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MATERIAL AND MATHOD –

Table No.2-Ingredints and their Properties

Sr. No.	Ingredients	Properties
1.	Banyan Leaf	Active Ingredient
2.	Ginger root	Active Ingredient
3.	Liquid Paraffin	Lubricant
4.	Glyceryl Monostrate	Emulsifier
5.	Sodium Benzoate	Preservative
6.	Petroleum Jelly	Smoothing Agent
7.	Glycerin	Humectant
8.	Cetyl Alcohol	Emollient
9.	Menthol	Counter irritant
10.	Beeswax	Moisture
11.	Linseed Oil	Smoothing Agent
12.	Water	Vehicle

Method -

Extraction of banyan leaves -



Fig No.5- Soxhlet Method



Fig No.6- Decoction Method



Fig No.7-Ginger extraction (Tincture)



Fig No.8- Filtrate by Decoction method

EXPERIMENTAL WORK -

1. Extraction of banyan leaves through Soxhlet apparatus and use of ethanol then heating mantle through heat. fix the temperature 75° take then assemble. take the 24 hours then collect the extract.
2. Decoction of banyan leaves - take leaves of banyan mix with ethanol and heating mantle through heat. fix the temperature of 75° then filter and collect the filtrate.
3. Ginger extraction - Tincture prepare. To soak ginger roots in ethanol for 1 day then filtrate and take ginger water.
4. After extraction of crude drug then we started the preparation of herbal cream.

Step-1(For Oil Phase):

Heating ingredients .A beaker containing Linseed oil, Liquid Paraffin,Cetyl Alcohol, Glyceryl Monostrate,Petroleum jelly,Beeswax mix together at 70-75°c until melt.

Step-2 (for Water Phase):

Heating ingredients In a beaker Banyan extract, Ginger extract, Menthol,Camphor,Glycerin, Distill Water mix together at 70-75° until melt.

Add oil phase into water phase under continuous stering until cream formulation.: stirring oil in

water with the help of Homogenizer and formulate the cream. : Self-emulsifying agent -Glyceryl Monostrate.

Step-3 During the mixing process, cream was cooled to 30°C and stored in a container away from direct sunlight.[17-18]



Fig No.9- Cream 1(Homogenizer)



Fig No. 10 - Cream 2(Homogenizer)

Table No 3: Comparison b/w formulation on the basis of different Method

Sr. No	Ingredients	Method 1		Method 2	
		F1	F2	F1	F2
1	Banyan Extract	7gm	7gm	10gm	7gm
2	Ginger Extract	4gm	4gm	2gm	4gm
3	Menthol	1gm	1gm	1gm	1gm
4	Camphor	0.3gm	0.5gm	0.3gm	0.5gm
5	linseed oil	1ml	5ml	1ml	5ml
6	Glycerin	2ml	2.5ml	2ml	2.5ml
7	Liquid Paraffin	5ml	5ml	5ml	5ml
8	Cetyl alcohol	2gm	2gm	2gm	2gm
9	Glyceryl Monostrate	1gm	1.5gm	1gm	1.5gm
10	Petroleum jelly	3gm	3gm	1gm	3gm
11	Beeswax	-	0.5gm	0.5gm	0.5gm
12	Distilled Water	17ml	17ml	17ml	17ml
13	Sodium Benzoate	Q.S	Q.S	Q.S	Q.S

According to Soxhlet method F1 is not properly pass but F2 is pass the experiment and according

to Decoction method F1 not properly pass but F2 is pass the experiment.

Evaluation parameter -

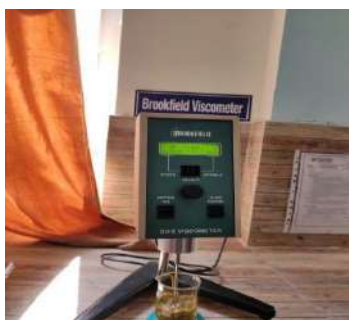


Fig No.11- Brookfield Viscometer



Fig No.12- Brookfield Viscometer

	Brookfield Viscometer (fig no 11)	Brookfield Viscometer (Fig no 12)
1.	Cp- 71900	Cp - 107700
2.	RPM-59.9% S- 63	RPM- 89% S- 63

2. Consistency-

Smooth texture.

3. Washability:

Cream was applied in skin and it was easily washable in skin.

4. Stability :

Stability in various temperature conditions to check the stability of the cream.

5. Skin Irritancy Test:

RESULT AND DISCUSSION-

Result -

Table No 3: Physio chemical parameter of Herbal formulation

Sr. No.	Parameter	Tests (Cream 1)	Test (Cream 2)
1.	PH	6	5.8
2.	Spreadability	8 gcm/sec	7gcm/sec
3.	Visual appearance	Opaque	Opaque
4.	Consistency	Smooth	Smooth
5.	Colour	Green	Light pinkish
6.	Odour	Pleasant	Aromatic

DISCUSSION -

The first Soxhlet method was given the smoothness of cream and no solid particle and non grittiness. Second Decoction method it is effective and smoothness cream found and thickness properties is good as compare to first method visual appearance and colour stability is also good.All parameter is pass in both cream but 2 is good quality.

360

when cream apply small amount in the skin of human and the effect was observed.it is a cooling effect show.

6. PH Test:

The PH of the prepared cream was measured using PH paper and found to be slightly acidic.

7. Spreadability:

It was observed that the product could be smoothly spread across the skin's surface post-application.

CONCLUSION-

Rheumatoid arthritis (RA) remains a significant global health challenge, affecting millions worldwide with its debilitating symptoms. Despite advancements in conventional treatment, a considerable number of patients seek relief through complementary and alternative medicine (CAM). Herbal therapies, particularly those derived from the Banyan tree and ginger, have shown promise for their anti-inflammatory and

analgesic properties. A herbal cream incorporating these extracts underwent comprehensive evaluation, demonstrating potential as adjunctive RA treatments owing to favorable attributes such as optimal pH and spreadability. However, further research and trials are imperative to validate their efficacy and safety across diverse patient populations. The integration of herbal extracts with conventional therapies holds promise for enhancing therapeutic outcomes in RA management. This emphasizes the significance of adopting holistic approaches to address the multifaceted nature of this autoimmune condition.

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