WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

ANTIARTHRITIC POLYHERBAL OIL:A SYNERGISTIC BLEND OF PLANT EXTRACTS AND ITS EVALUATION.

Ms. Aarti Bhausaheb Narwade[1*], Asst. Prof. Abhijeet Rathod[2] , Ms. Yogeshwari B Pamane[3], Ms. Bhagyashri K Padul[4] , Mr. Swapnil S Parve[5]

[1] Student of Bachelor of Pharmacy, Raosaheb Patil Danve College of Pharmacy, Badnapur, Jalna.
[2] Asst. Prof. (Faculty of Pharmaceutics) Raosaheb Patil Danve College Of Pharmacy, Badnapur, Jalna.
[3] Student of Bachelor of Pharmacy, Raosaheb Patil Danve College of Pharmacy, Badnapur, Jalna.
[4] Student of Bachelor of Pharmacy, Raosaheb Patil Danve College of Pharmacy, Badnapur, Jalna.
[5] Student of Bachelor of Pharmacy, Raosaheb Patil Danve College of Pharmacy, Badnapur, Jalna
COLLEGE NAME: RAOSAHEB PATIL DANVE COLLEGE OF PHARMACY, BADNAPUR, JALNA 431202.

ABSTRACT :

Millions of people worldwide suffer from arthritis, a common chronic inflammatory joint disease that is marked by stiffness, swelling, and pain. Because they are thought to be safe and effective,

traditional herbal treatments have long been investigated for their potential in the treatment of arthritis. We created and assessed an antiarthritic polyherbal oil in this study using a synergistic combination of plant extracts known for its analgesic and anti-inflammatory qualities.

The formulation contained a carefully chosen blend of herbs, such as fenugreek, green tea, neem, coconut oil, sesame oil, camphor, eucalyptus, turmeric (Curcuma longa), and others, each of which has unique pharmacological properties related to the treatment of arthritis. Modern methods were used in the extraction procedure to guarantee the highest possible yield and potency of bioactive substances. In vitro and in vivo tests were used to evaluate the polyherbal oil's antiarthritic potential. In vivo experiments were carried out on animal models of arthritis to evaluate efficacy and safety,

whereas in vitro trials used cellular models to evaluate anti-inflammatory activities. When compared to controls, the polyherbal oil showed a substantial reduction in inflammatory markers and a reduction in arthritic symptoms, suggesting that it could be used as a therapeutic intervention for arthritis.

Additionally, acute and subacute toxicity studies were used to evaluate the polyherbal oil's safety profile, and the results showed no discernible negative effects within the studied dose range. These results highlight the developed polyherbal oil's safety and effectiveness as a potential substitute or supplemental treatment for arthritis.

Keywords: fenugreek, eucalyptus oil, turmeric, green tea, botanical extracts, anti-inflammatory, analgesic, arthritis, polyherbal oil, and therapeutic intervention.

Introduction

An inflammatory condition called rheumatoid arthritis causes inflammation of the joints, synovial growth, and articular cartilage degradation. It is an excruciating inflammatory disease that can cause severe joint deterioration and discomfort, which can result in a significant loss of mobility.
The body's reaction to damage, infection, or destruction is called inflammation, and it manifests as pain, swelling, redness, heat, and abnormal physiological processes. The body's natural defense mechanism against tissue damage brought on by trauma, harmful chemicals, or microorganisms is inflammation. It is the body's reaction to eliminate the irritant, inactivate or kill the invasive
organisms, and prepare the tissue for repair. It is brought on by migrating cells and damaged tissue releasing chemical mediators.
The following medications are frequently used to treat rheumatoid arthritis:

- Glucocorticoids, such as prednisone and cortisone
- Non-steroidal anti-inflammatory medications (NSAIDs, such as Naproxone and Ibuprofen, among others)
- Modifiers of the biological response (such as medicines that block tumor necrosis factor-alpha).
- Disease-modifying anti-rheumatic medications (DMARDSs), such as leflunomide and methotrexate (MTX)

The oldest known medical practice is herbal medicine, sometimes known as botanical medicine or herbalalism. All cultures throughout history have utilized herbs for their medical or therapeutic properties. A herb is a plant or plant part that is prized for its fragrant and therapeutic properties. Therapeutically active chemicals found in herbal plants have an effect on the body.

The efficiency of herbal medications, which are commonly used in both developed and developing nations, is limited due to their poor oral absorption. These medicines are complex chemical mixes made from plants.

As per WHO definition, there are three kinds of herbal medicines:

- ✓ Plant material
- ✓ Processed plant material
- ✓ Herbal products.

Herbal medicine products, which can in the form of tablets, capsules, powders, teas, extracts, and
fresh or dried plants, are nutritional supplements that people use to enhance their health. The World Health Organization (WHO) estimates that 80% of people worldwide still rely on herbs and other
traditional remedies for their basic medical needs.
A common feature in Ayurvedic, homeopathic, and naturopathic medicine, herbal medicine plays a significant role in the traditional medicine of all indigenous peoples. According to the World Health Organization, around 74% of the 119 pharmaceutical medications produced from plants are used in contemporary medicine in ways that are directly related to their traditional applications as plant medicines by indigenous societies.
The potential medical usefulness of plant materials collected from rain forests and other locations is currently the subject of intensive research by major pharmaceutical corporations.
A significant portion of the scientific medical pharmacopoeia in the 20th century came from
indigenous peoples' herbal knowledge. A large number of today's regularly used medications have botanical origins. Approximately 25% of prescription medications prescribed in the US have at least one plant-based active component. Some are created to resemble a naturally occurring plant
chemical, while others are made from plant extracts. It played a crucial role in the evolution of contemporary society.

Types of Herbal Medicine :

Traditional Chinese Herbalism which is part of Traditional oriental Medicine, Ayurvedic Herbalism which is derived from Ayurveda and western Herbalism which is originally came from Greece and Rome to Europe and then spread to North and South America. Chinese and Ayurvedic Herbalism have developed into highly sophisticated systems of diagnosis and treatment over the centuries. Western Herbalism is today primarily a system of folk medicine.

Advantages of Herbal Medicine :

- Herbal medicine have long history of use and better patient tolerance as well as acceptance
- Medicinal plants have a renewable source, which is our only hope for sustainable supplies of cheaper medicines for the world growing population.
- Availability of medicinal plants is not a problem especially in developing countries like India having rich agro-climatic, cultural and ethnic biodiversity
- The cultivation and processing of medicinal herbs and herbal products is environmental Friendly.

Disadvantage of Herbal Medicines:

- Procedures for pure and genuine herbs are not available, so sub-standard and spurious herbs are there in the market
- Identification of exact mechanism and pharmacology of all herbal medicine is not available
- Adulteration ratio is very high.
- Clinical and toxicological data was not available for all herbal medicine
- There is no much information available on the safety measures

All herbal medicine are not tested with important parameters like microbial content, heavy metals content and pyrogens etc

Herbal Formulation :-

A herbal "formula" is a carefully chosen blend of distinct herbal substances created to treat a particular disease or set of related ailments. Because they have a catalytic or activating impact on one another, herbs that are combined are more powerful and effective in the body than those that are used alone. These combinations function as potent catalysts (with synergistic effects) to activate each person's unique healing energies, also known as vital force, which are present in every cell of our body and pervade the entire organism. [2].

Standardization of Herbal Drugs :-

It is difficult to "standardize" herbal medications because a variety of factors affect their bioefficacy and repeatable therapeutic impact. The correct identification of plants, the time of year and location of collection, their extraction, the purifying process, and, in the case of polyherbal medications, the rationalization of the combination are all important steps in obtaining high-quality herbal medicines. By adding excipients or combining herbal medications or herbal medicine preparations, standardization refers to bringing the manufacture of herbal drugs into compliance with a defined content of a constituent or a collection of compounds with recognized therapeutic activity, respectively. A drug's "evaluation" includes confirming its identity, assessing its quality and purity, and identifying any adulteration.

Importance of standardization:-

When creating herbal formulations, quality control requirements are essential for guaranteeing content consistency from batch to batch. Verification of the appropriate dosage or extract amount per dosage unit. Positive control to show potential loss or deterioration throughout production.

Quality Control of Herbal Medicine :-

A drug's quality can be characterized by its identity, purity, content, and other chemical, physical, and biological characteristics, as well as by the methods used during manufacturing. The word "quality control" describes the procedures used to ensure that a manufactured product remains legitimate.

WHO Guidelines for Standardization of Herbal Formulation:

- Quality control of crude drugs materials, plant preparations and finished products.
- Stability assessment and shelf life.
- Safety assessment; documentation of safety based on experience or toxicological studies.
- Assessment of efficacy by ethno medical information and biological activity evaluations. [3].

AIM :-

To Develope and Evaluate Antiarthritic Polyherbal Oil Formulation.

OBJECTIVES :-

1. Develop a polyherbal oil formulation using standardized herbs known for their antiarthritic properties, ensuring consistency and reproducibility.

2. Establish standardized procedures for sourcing, processing, and preparing herbal ingredients to maintain uniformity and potency in the formulation.
3. Conduct thorough physicochemical characterization of the developed formulation to determine parameters such as viscosity, pH, density, and stability to ensure product quality and shelf-life.
4. Evaluate the antiarthritic potential of the formulated polyherbal oil through in vitro and in vivo studies, including assays for anti-inflammatory activity, analgesic effects, and inhibition of cartilage degradation.
5. Continuously optimize the formulation based on research findings and feedback, aiming for enhanced efficacy, safety, and reproducibility, while also establishing standardized protocols for manufacturing and quality control.

COMPOSITION OF POLYHERBAL OIL:

PLANT: Coconut oil FAMILY: Arecaceae (palm)
CHEMICAL CONSTITUENTS: Lauric acid, Caprylic acid

ROLE: Act as a carrier oil moisturizing and anti-inflammatory properties for joint relief

PLANT: Seasame oil FAMILY: Pedaliaceae
CHEMICAL CONSTITUENTS: Oleic acid, Linoleic acid

ROLE: Serves as a base oil for the herbal blend possesses anti-inflammatory properties.

PLANT: Eucalyptus FAMILY:Myrtaceae
CHEMICAL CONSTITUENTS: Eucalyptol

ROLE: Adds a refreshing aroma to the oil blend, promoting relaxation. Offers analgesic and anti-inflammatory effect

PLANT: Neem FAMILY Meliaceae
CHEMICAL CONSTITUENTS: Azadirachtin, Nimbin
ROLE: Acts as a natural preservative for the oil due to its antimicrobial activity

PLANT: Turmeric FAMILY: Zingiberaceae
CHEMICAL CONSTITUENTS: Curcuminoids (Curcumin)
ROLE: Imparts yellow hue to the oil blend. Contains curcumin, a powerful anti- inflammatory compound.
PLANT: Fenugreek FAMILY: Fabaceae
CHEMICAL CONSTITUENTS: Diosgenin, Galactomannan ROLE: Enhances the oil texture and consistency.
PLANT: Camphor FAMILY: Lauraceae
CHEMICAL CONSTITUENTS: Camphor
ROLE: Delivers cooling and numbing effects, Enhances blood circulation in the affected area.
PLANT: Green Tea FAMILY: Theaceae
CHEMICAL CONSTITUENTS: Catechins, Theanine
ROLE: Provides a pleasant aroma to the oil blend. Antioxidants that combat inflammation and oxidative stress in joints

Materials and methods:

The polyherbal hair oil was prepared 3-8 by collecting various plant materials like coconut oil, sesame oil, eucalyptus oil, neem, turmeric, fenugreek, camphor and green tea were procured from local market.

Sr no.	Ingredients	Quantity (50 ml)
1	Coconut oil	40 ml
2	Sesame oil	10 ml
3	Eucalyptus oil	Few drops
4	Neem	2 gm

5	Turmeric	1 gm

6	Fenugreek	1 gm
7	Camphor	0.5 gm
8	Green tea	0.5 gm

Method of Preparation:

1. First accurately measure all the ingredients.
2. Measure 40 ml of coconut oil using a graduated cylinder and pour it into a clear dry glass beaker.
3. Add 10ml of sesame oil to the coconut oil in the beaker.
4. place the beaker in water bath.
5. Carefully measure 1 ml of eucalyptus oil using a pipette and add it to the beaker.
6. Incorporate the powdered neem leaves and seeds (2 grams), turmeric powder (1 gram), crushed fenugreek seeds (1 gram), powdered camphor (0.5 gram), and powdered green tea leaves (0.5 gram) into the beaker containing the oils.
7. Mix the ingredients thoroughly using a glass stirring rod until they are well combined.
8. Heat the mixture gently using a hot plate or water bath until the coconut oil melts completely and all the herbal ingredients are infused into the oil.
9. Stir the mixture occasionally during heating to ensure uniform distribution of the herbal components. Once the mixture is heated and well blended, remove it from the heat source and allow it to cool to room temperature.
10. After cooling, strain the oil through a fine mesh strainer or cheesecloth to remove any solid particles or debris.
11. Transfer the strained polyherbal oil into a clean, dry amber glass bottle using a funnel.

Ingredients used in antiarthritic polyherbal oil

Coconut oil **Neem** **Sesome oil**

Turmeric **Camphor** **Fenugreek**

Green Tea **Eucalyptus oil**

Labeling and Storage:

1. Label the bottle with the name of the polyherbal oil, ingredients used, date of preparation, and any special instructions or precautions.
2. Store the polyherbal oil in a cool, dry place at room temperature. It can be used topically as needed for joint pain relief.

Shelf Life: Much longer time

• Storage Conditions:

1. Should be stored in air tight container
2. Narrow mouthed
3. Store in cool place
4. Away from sunlight

POLYHERBAL OIL

OBSERVATION AND RESULT:

Evaluation test for antiarthritic herbal oil:

1. **PH test:**

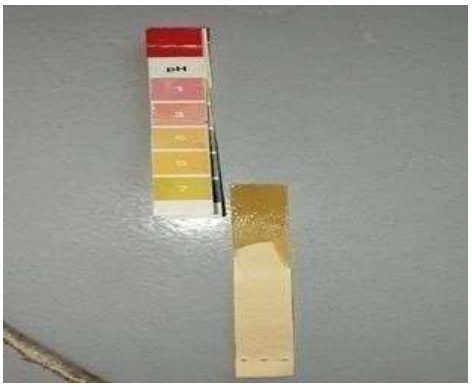
Performed a pH test on a polyherbal antiarthritic oil involves using pH strips or a pH meter. Here's a basic guide:

1. **Prepare the sample**: Shake the polyherbal antiarthritic oil well to ensure homogeneity.
2. **Collect the sample:** Take a small amount of the oil in a clean container.
3. **Dip the pH strip**: Dip a pH strip into the oil or use a dropper to apply a drop of oil onto the strip.
4. **Observe the color:** Compare the color of the strip to the provided pH scale. This will indicate the pH level of the oil.
5. **Record the result:** Note down the pH level of the oil.
6. 6 **Interpret the result:** Determine if the pH level falls within the desired range for the antiarthritic oil. Typically, pH levels slightly acidic to neutral are preferred for skin applications.

   PH of poly herbal antiarthritic formulation was found to be 7. It is neutral.

Result:- observed PH is 7 (neutral).

PH Paper

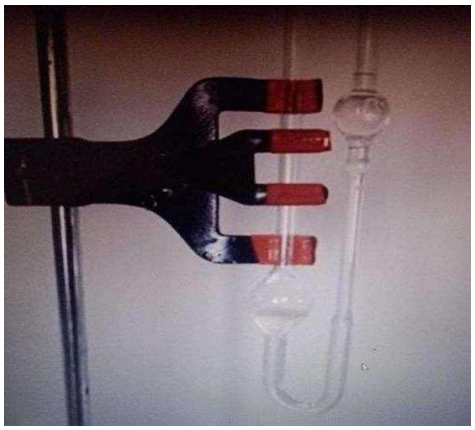


2. **Viscosity test:**

Viscosity test was perform on a polyherbal antiarthritic oil, you would typically use a viscometer, which is a device designed to measure the viscosity of fluids. Here's a general outline of the procedure

1. **Calibrate the viscometer:** Ensure that the viscometer is properly calibrated according to the manufacturer's instructions. Calibration ensures accurate measurement of viscosity.
2. **Prepare the sample:** Take a small amount of the polyherbal antiarthritic oil in a clean container. Ensure that the oil is at room temperature, as viscosity can vary with temperature.
3. **Set up the viscometer**: Depending on the type of viscometer being used (e.g., rotational, capillary), set it up according to the manufacturer's instructions. Some viscometers require filling a sample cup or capillary tube, while others may involve dipping a spindle into the sample.
4. **Measure viscosity:** Start the viscometer and allow it to stabilize. Then, immerse the spindle or fill the sample cup with the oil and take the viscosity reading from the viscometer display. Viscosity of antiarthritic oil by Ostwald viscometer was found to be 0.9240Cp.

Result:- Viscosity of polyherbal oil was found to be 0.9240cp.



0stwald viscometer

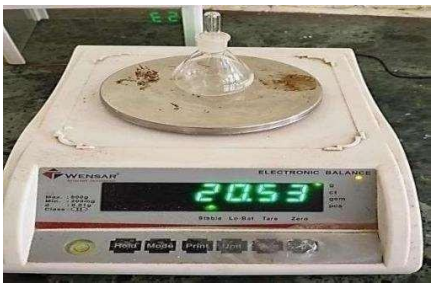
3. **Specific gravity :**

To determine the specific gravity of a polyherbal antiarthritic oil, you'll need a specific gravity bottle or a pycnometer, a balance, and a suitable liquid for comparison, typically distilled water. Clean and dry the specific gravity bottleor pycnometer: Ensure that the container you'll be using for measurement is clean and dry.

1. **Weigh the empty container:** Using a balance, weigh the empty specific gravity bottle or pycnometer and record the mass.
2. **Fill the container with water:** Fill the container with distilled water to the brim. Avoid air bubbles.
3. **Weigh the container with water:** Weigh the container filled with water and record the mass.
4. **Empty and dry the container:** Empty the container and dry it thoroughly.
5. **Fill the container with the oil:** Fill the container with the polyherbal antiarthritic oil to the same level as before. Ensure there are no air bubbles.
6. **Weigh the container with the oil:** Weigh the container filled with the oil and record the mass. [12].

Calculate the specific gravity: Use the formula:
Specific gravity = Density of object /density of water
The density of water can be looked up based on the test temperature. Typically, it's around 0.998 g/cm^3 at 20°C.
specific gravity of antiarthritic herbal formulation was found to be 0.92

Result :- 0.92



Gravity Bottle

Specific Gravity of oil :-

Sp = mass of oil / mass of water

= w3 – w1 / w2 – w1

Where,

W1 = weight of empty specific gravity bottle (20.53)

W2 = weight of gravity bottle with distilled water (51.37)

W3 = weight of specific gravity bottle with sample oil (48.93) Sp = w3 – w1 / w2 – w1

= 48.93 - 20.53 / 51.37 - 20.53

= 28.49 /30.84

= 0.92

4. **patch test :**

A patch test, also known as a skin sensitization test or a patch test, is a method used to determine if a particular substance causes an allergic reaction or irritation when it comes into contact with the skin. Here's how to perform a patch test for a polyherbal antiarthritic oil:

1. **Select a Test Area:** Choose a small, inconspicuous area of skin, such as the inner forearm or behind the ear. Ensure the area is clean and dry before proceeding.
2. **Apply a Small Amount of Oil:** Place a small amount of the polyherbal antiarthritic oil on a cotton swab or cotton ball. Apply the oil to the test area using gentle pressure, ensuring complete coverage of the skin with the oil.
3. **Secure the Patch:** Cover the area with a sterile adhesive bandage or hypoallergenic tape to keep the oil in place and prevent it from spreading to other areas of the skin.
4. **Wait:** Leave the patch in place for 24 to 48 hours without disturbing it. During this time, avoid getting the patch wet or exposing it to excessive sweating or friction.
5. **Remove the Patch:** After the designated time has passed, carefully remove the patch from the skin. Note any signs of irritation, such as redness.
Patch test was performed and no allergic response or redness was observed.

Result :- no skin irritation.

Patch test

5. Organoleptic test :

The organoleptic test evaluates the sensory characteristics of a substance through observation by the senses, including sight, smell, taste, touch, and sometimes sound. Here's how you can perform an organoleptic test on a polyherbal antiarthritic oil:

1. **Sight:** Examine the appearance of the oil. Note its color, clarity, and any visible particles or sediment. A high-quality oil should have a consistent color and clarity without any unusual particles.
2. **Smell:** Take a whiff of the oil and assess its aroma. Note any pleasant or unpleasant odors, as well as any characteristic scents from the herbal ingredients. A well- formulated oil should have a pleasant, natural aroma indicative of its ingredients.
3. **Touch:** Feel the texture of the oil between your fingers. Note its consistency and viscosity. A good-quality oil should feel smooth and non-greasy, with an appropriate level of viscosity for its intended use.
4. **Overall assessment:** Consider the combined sensory experience of sight, smell, and touch to form an overall impression of the oil's quality. Pay attention to any deviations from expected sensory characteristics and evaluate whether they align with your expectations for a high-quality product.

Parameter	Observation
Colour	Slightly green / Brown
Odor	Pleasant
Touch	Oily
Taste	Characteristic

6. Saponification value :

The saponification value was measure of the amount of alkali required to saponify a specific amount of fat or oil. It is often used to determine the average molecular weight of fatty acids in a substance. The saponification value is expressed as milligrams of potassium hydroxide (KOH) or sodium hydroxide (NaOH) required to saponify one gram of the substance.

To determine the saponification value of a polyherbal antiarthritic oil, you would typically follow these steps:

1. **Weigh the oil:** Measure out a known quantity of the oil, usually around 1 gram.
2. **Prepare the solution:** Dissolve the oil in a suitable solvent, such as ethanol or isopropanol.
3. **Add the alkali:** Add a known concentration of either potassium hydroxide (KOH) or sodium hydroxide (NaOH) solution to the oil solution.
4. **Heat and stir:** Heat the mixture while stirring gently until saponification occurs, indicated by the disappearance of oil droplets and the formation of a clear solution.
5. **Titration:** Titrate the excess alkali with a standardized acid solution, such as hydrochloric acid (HCl), using a suitable indicator to determine the endpoint of the reaction.
6. Calculate: Use the volume and concentration of the acid solution, along with the molar mass of the alkali, to calculate the amount of alkali consumed in the reaction. [13].

Determine the saponification value: Calculate the saponification value using the formula: Saponification value = 28.05 x (b-a)/w

= 28.05 x (24-1.8)/2.5

= 249.05

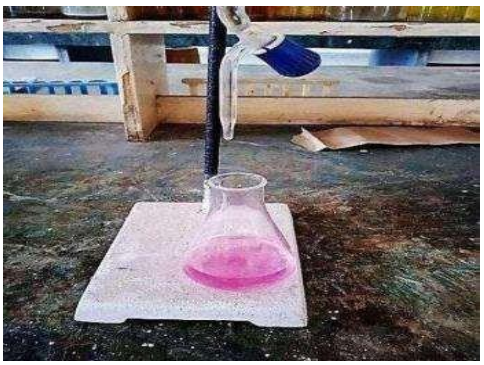
1. Saponification value of antiarthritic oil was found to be 249.05

7. Acid value :

To determine the acid value of a polyherbal antiarthritic oil, you would typically follow these steps:

1. **Prepare the sample:** Weigh out a known quantity of the oil, typically around 1 gram, into a clean and dry flask.
2. **Dissolve the sample:** Dissolve the oil in a suitable solvent, such as a mixture of ethanol and diethyl ether.
3. **Titration:** Add a standardized alcoholic potassium hydroxide (KOH) solution to the oil sample using a burette until the solution's pH reaches a specified endpoint, often indicated by a color change using a pH indicator, such as phenolphthalein.
4. **Calculate:** Use the volume and concentration of the KOH solution used in the titration to calculate the amount of KOH consumed in the reaction.
5. **Determine the acid value :-** Calculate the acid value using the formula Acid value =
6. 5.61x n/w= 5.61x1/1=5.61
   acid value of herbal oil was found to be 5.61.

Result :- 5.61



Acid Value

8. Antimicrobial test :

Conducting an antimicrobial test on a polyherbal antiarthritic oil involves evaluating its ability to inhibit the growth of microorganisms such as bacteria, fungi, and yeast. Here's how you can perform an antimicrobial test:

1. **Preparation of Microbial Cultures:** Obtain pure cultures of the microorganisms you want to test, such as common skin pathogens like Staphylococcus aureus, Escherichia coli, Candida albicans, or other relevant strains. Ensure the cultures are actively growing and are at the appropriate concentration for testing.
2. **Preparation of Test Samples:** Dilute the polyherbal antiarthritic oil to various concentrations using a suitable solvent or diluent. Typically, a range of concentrations should be tested to determine the minimum inhibitory concentration (MIC) of the oil against the microorganisms.
3. **Inoculation of Test Plates:** Use sterile techniques to inoculate agar plates with the microbial cultures. Spread the cultures evenly across the surface of the agar using a sterile loop or spreader.
4. **Application of Test Samples:** Apply a known volume of each concentration of the polyherbal antiarthritic oil onto the agar plates using a sterile technique. Ensure even distribution of the oil on the agar surface.
5. **Incubation:** Incubate the agar plates at the appropriate temperature for the growth of the microorganisms (e.g., 37°C for bacteria, 25-30°C for fungi) for a specified period, typically 24-48 hours.
6. **Evaluation of Results:** After incubation, examine the agar plates for the presence or absence of microbial growth around the oil application sites. Measure zones of inhibition (clear areas) around the oil to determine the antimicrobial activity.
7. **Data Analysis:** Calculate the diameter of inhibition zones for each concentration of the oil. Plot concentration against inhibition zone diameter to determine the MIC, which is the lowest concentration of the oil that completely inhibits microbial growth.
8. **Interpretation:** Compare the MIC values with established guidelines or standards to assess the antimicrobial efficacy of the polyherbal antiarthritic oil.
9. **Antimicrobial test was performed**. It conclude that oil sample shows antimicrobial property and zone of inhibition was found to be 7 to 8 mm.

RESULT:

The formulation and evaluation of the antiarthritic polyherbal oil represent a significant stride towards addressing the prevalent issue of arthritis, which affects millions worldwide. This project aimed to develop a natural remedy that harnesses the therapeutic potential of various medicinal herbs to alleviate the symptoms associated with arthritis while minimizing adverse effects.

TABLE:1 Organoleptic Evaluation●

Formulation Code	Color and Appearance	Odour	Touch	Taste
FI	Slightly Green	Pleasant	Oily	Characteristics

TABLE:2 EVALUATION TEST:

Sr,NO	TEST Name	TEST Result
1	PH Test	7
2	Viscosity Test	0.9240cp
3	Specific Gravity	0.92
4	Patch Test	NO SKIN IRRITATION
5	Saponification Value	249.05

6	**Acid Value**	**5.61**
7	**Antimicrobial Test**	**7 to 8 mm**

Conclusion:

The creation and testing of the antiarthritic polyherbal oil is a major step in the right direction toward treating the common problem of arthritis, which impacts millions of people
globally. The goal of this effort was to create a natural treatment that minimizes side effects while reducing arthritic symptoms by utilizing the therapeutic potential of several medicinal herbs.
We have successfully created a polyherbal oil with a synergistic blend of herbs known for its anti- inflammatory, analgesic, and immunomodulatory qualities by using rigorous formulation methods and evaluation methodologies. Our formulation's stability, safety, and effectiveness were confirmed by thorough physicochemical characterization the importance of the main components of our antiarthritic polyherbal oil formulation, such as green tea, fenugreek, and turmeric, as well as the
essential oil component like eucalyptus oil and the carrier oils like coconut and sesame oil. Because of their well-established anti-inflammatory, analgesic, and antioxidant qualities—all of which are
essential in battling the inflammatory processes that underlie arthritis—these substances were carefully chosen.

To guarantee the formulation's quality and effectiveness, it was put through a battery of evaluation tests. To ensure optimum performance and safety, parameters including viscosity, stability, pH test, saponification value, and acid value were carefully evaluated. These tests verified that the polyherbal oil was suitable for topical use, guaranteeing its absorption and effectiveness in addressing the
aflicted joints.
Our polyherbal oil's topical treatment strategy guarantees that the active ingredients are
delivered locally to the aflicted joints. A tiny amount of the oil should be applied immediately to the aflicted area, and users are advised to massage it in gently until it is absorbed. In order to create the finished product, the active ingredients in the chosen plants were extracted using the appropriate solvents, then combined with carrier oils and essential oils.

REFERENCES :

1. Chopra RN, Nayar SL, Chopra IC. Glossary of Indian Medicinal Plants. New Delhi: Council of Scientific & Industrial Research, 1956.

2. Bhaskar VH, Balakrishnan N. Anti-arthritic activity of ethanolic extract of Trigonella foenum graecum seeds. International Journal of Green Pharmacy (IJGP). 2014 Jan 1;8(1):22.

3. Kang N.J., Han S.C., Yoon S.H., Sim J.Y., Maeng Y.H., Kang H.K., Yoo E.S. Cinnamomum camphora leaves alleviate allergic skin inflammatory responses in vitro and in vivo. Toxicol. Res. 2019;35:279–285.

4. Subendu Sarkar , Rajender Pal Singh , Gorachand Bhattacharya Exploring the role of Azadirachta indica (neem) and its active compounds in the regulation of antimicrobial and anti inflammatory activity.2021 April ; 11 (4) : 178.

5. Jiali Chen, Cailin Tang, Yang Zhou,Rongfei Zhang, Shaoxia Ye, Zhimin Zhao,Ligen Lin, Depo Yang Anti-Inflammatory Property of the Essential Oil from Cinnamomum camphora (Linn.) Presl Leaves and the Evaluation of Its Underlying Mechanism by Using Metabolomics Analysis. 2020 Oct; 25(20): 4796. Published online 2020 Oct 19.

6. Abhijeet Alok, Indra Deo Singh, Shivani Singh, Mallika Kishore, and Prakash Chandra Jha. Curcumin - Pharmacological Actions And its Role in Oral Submucous Fibrosis: A Review. 2015 Oct; 9(10): ZE01-ZE03. Published online 2015 Oct 1.

7. Kilambi Pundarikakshudu et al. Indian J. Pharmacol.Anti-inflammatory activity of fenugreek (Trigonella foenum- graecum Linn) seed petroleum ether extract. 2016 Jul- Aug

8. S. Intahphuak, P. Khonsung & A. Panthong Anti-inflammatory, analgesic, and activities of virgin coconut oil. Pages 151-157 | Received 28 Apr 2008, Accepted
02 Jan 2009,Published online: 29 Dec 2009.

9. Edmund Hsu and Sam Parthasarathy Anti-inflammatory and Antioxidant Effects of Sesame Oil on Atherosclerosis: A Descriptive Literature Review; 2017 Jul; 9(7): e1438. Published online 2017

10. Tomokazu Ohishi et al. Antiinflamm Antiallergy Agents Med Chem. 2016.Anti- inflammatory Action of Green Tea. 2012;22:617–622

11. Khaled Qabaha, Sari Abu Ras, Jehad Abbadi, and Fuad Al-Rimawi ; ANTI- INFLAMMATORY ACTIVITY OF EUCALYPTUS SPP. AND PISTASCIA LENTISCUS
LEAF EXTRACTS ; 2016; 13(5): 1-6. Published online 2016 Aug 12.

12. Swingle KF, Shideman FE (1972): Phases of the inflammatory response to subcutaneous implant-action of cotton pellet and their modification by certain anti- inflammatory agents. J Pharmacol Exp Ther 183: 226–234.

13. Gaestel M, Kotlyarov A, Kracht M. Targeting innate immunity protein kinase signalling in inflammation. Nat. Rev. Drug Discov. 2009;8(6):480–499.

14. Kang N.J., Han S.C., Yoon S.H., Sim J.Y., Maeng Y.H., Kang H.K., Yoo E.S. Cinnamomum camphora leaves alleviate allergic skin inflammatory responses in vitro and in vivo. Toxicol. Res. 2019;35:279–285.