

Review on Formulation and Evaluation of Anti Inflammatory Polyherbal Cream

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ABSTRACT:

This review aims to explore the formulation and evaluation aspects of anti-inflammatory poly herbal creams, emphasizing their potential in therapeutic applications. In recent years, there has been a growing interest in poly herbal formulations due to their synergistic effects and reduced adverse effects compared to single herb preparations. The review encompasses a thorough examination of the various herbs commonly used in anti-inflammatory creams, their active constituents, and mechanisms of action.

I. INTRODUCTION

Number of plants from Zingiberaceae family are used in traditional system of medicine. Curcuma amada (White turmeric) is one member of this family which is traditionally used as carminative and stomachic. Literature survey indicates the presence of multiple chemical constituents in these rhizomes. However, very few references about the evaluation of pharmacological activity of the extract are available indicating its carminative, stomachic and CNS activity. The extract exhibited hypercholesteremic effect in rabbits and showed presence of antibiotic principle with strong inhibitory activity on *Aspergillus niger* and *Trichophyta rubrum*. The rhizomes are used for the treatment of inflammatory conditions as a household remedy on empirical basis. *Piper nigrum* commonly known as black pepper, it belongs to the family piperaceae. The plants are indigenous and cultivated in hot and moist parts of India. Black pepper is used as spice as well as medicine by itself or as a part of some herbal remedies in combination with other well-known herbs and spices.

Pungent alkaloid piperine is the main therapeutically active constituents of *pippernigrum*. *Symplocosracemosa* (Symplacaceae) commonly known as "Lodhra" in Sanskrit or "Rodhra", is a small, evergreen tree upto 6 m in height. It is found

in the plains and lower hills throughout North and East India. The bark is dark grey and rough; and is useful in diarrhea, dysentery, eye diseases, fever, ulcer, scorpion sting, diabetes, and liver disorders.

It has been scientifically reported as an antimicrobial, anticancer and has beneficial effects in gynaecological disorders. Menthol (also "mint camphor"), is a volatile oil extract derived from the genus *Mentha* (mint), is widely available in natural and synthetic forms. Menthol has been used as a topical pain reliever since ancient times. Capsaicin is a compound found in chili peppers and responsible for their burning and irritant effect. In addition to the sensation of heat, capsaicin produces pain and, for this reason, is an important tool in the study of pain. Capsaicin, a major ingredient of hot pepper, was considered to exhibit an anti-inflammatory property. These traditional medicines take part in a significant position in health services around the world. The opioids or non-steroidal antiinflammatory drugs, widely used to reduce the inflammation of various types, possess severe side effects like redness, itching etc. As a result, a search for other alternatives seems to be necessary which would be more beneficial. Gel formulations are used to deliver the drug topically because of easy application, increase contact time and minimum side effects as compare to other topical preparation and oral administration. Hence present study was aimed to prepare polyherbal gel for in-vitro anti-inflammatory activity. Inflammation is a natural and complex biological response that occurs in the body as a defense mechanism against harmful stimuli. It plays a crucial role in protecting the body from infections, injuries, and other threats. However, when inflammation becomes chronic or excessive, it can lead to various health issues. In this brief introduction, we'll discuss the causes, types, and treatment of inflammation.

Causes of Inflammation:

Infection: One of the most common causes of inflammation is the body's response to infections by bacteria, viruses, or other pathogens. This type of inflammation is often acute and necessary for the immune system to fight off the invading microorganisms.

Injury: Physical injuries, such as cuts, burns, or trauma, trigger inflammation as part of the healing process. This acute inflammation helps repair damaged tissues.

Autoimmune Disorders: In some cases, the immune system mistakenly attacks the body's own tissues, leading to chronic inflammation. Autoimmune diseases like rheumatoid arthritis and lupus fall into this category.

Chronic Conditions: Conditions like obesity, diabetes, and atherosclerosis can lead to low-level, chronic inflammation, which may contribute to the development of various diseases.

Environmental Factors: Environmental factors such as pollution, smoking, and exposure to allergens can also trigger inflammation.

Types of Inflammation:

Acute Inflammation: This type of inflammation is short-term and typically occurs as an immediate response to injury or infection. It involves symptoms like redness, swelling, pain, and heat at the affected site.

Chronic Inflammation: In contrast, chronic inflammation persists over a longer period and can be low-level. It is often associated with diseases like heart disease, cancer, and autoimmune disorders.

Treatment of Inflammation: Inflammation is a natural and complex biological response that occurs in the body as a defense mechanism against harmful stimuli. It plays a crucial role in protecting the body from infections, injuries, and other threats. However, when inflammation becomes chronic or excessive, it can lead to various health issues. In this brief introduction, we'll discuss the causes, types, and treatment of inflammation.

Anti-Inflammatory Medications: Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen and corticosteroids can help reduce inflammation and relieve associated pain and discomfort.

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Immunosuppressive Drugs: For autoimmune diseases, medications that suppress the immune system's activity may be prescribed to manage inflammation.

Dietary Modifications: Certain foods, such as those rich in omega-3 fatty acids and antioxidants, can have anti-inflammatory properties. These can be incorporated into one's diet to mitigate inflammation.

Physical Therapy: In cases of injury-related inflammation, physical therapy may aid in the recovery process.

Surgery: In some instances, surgical interventions may be necessary to address the underlying cause of inflammation, such as the removal of infected tissue or joint replacement in the case of severe arthritis.

It's essential to understand the specific cause and type of inflammation to determine the most appropriate treatment strategy, which may involve a combination of these approaches. Consulting with a healthcare professional is crucial for proper diagnosis and management of inflammation.

MEDICINAL PLANTS USED AS ANTI-INFLAMMATORY

1. ALOEVERA:



Fig.01ALOEVERA

Biological Name: Aloe vera is scientifically known as *Aloe barbadensis miller*. There are various species of Aloe, but *Aloe barbadensis miller* is the most commonly used for its medicinal and cosmetic purposes.

Synonyms: Aloe vera is often referred to by its botanical name, but it may also be known simply as "Aloe."

Family: Aloe vera belongs to the Asphodelaceae family, which is commonly known as the asphodel

family. In the past, it was classified under the Liliaceae family, which includes lilies.

Scientific Classification:

Kingdom: Plantae

Order: Asparagales

Family: Asphodelaceae

Genus: Aloe

Species: Aloe barbadensis miller

Active Constituents:

Aloe vera contains a variety of bioactive compounds, including polysaccharides, acemannan, aloin, anthraquinones, vitamins (such as A, C, and E), minerals, enzymes, and amino acids. These compounds contribute to its potential medicinal properties.

Medicinal Uses:

- Aloe vera has a long history of use for various health and skincare purposes, including:
- Skin care: Aloe vera is known for its soothing and moisturizing properties, often used to treat burns, sunburn, skin irritations, and as a component in cosmetic products.

2. Azadirachta indica

Azadirachta indica, commonly known as neem or nimtree. It belongs to the family meliaceae. It is typically grown in tropical and semi-tropical regions



Biological Name: Neem is scientifically known as Azadirachta indica.

Synonyms: Neem is also known as "Nimba" in Sanskrit and may have various regional names.

Family: Neem belongs to the Meliaceae family, which is known as the mahogany family.

Scientific Classification:

Kingdom: Plantae

Order: Sapindales

Family: Meliaceae

Genus: Azadirachta

Species: Azadirachta indica

Active Constituents: Neem contains various bioactive compounds, including azadirachtin, nimbin, nimbidin, quercetin, and other

triterpenoids. These compounds are responsible for many of its potential medicinal properties.

Medicinal Uses:

- Neem has been used in traditional medicine for various purposes, and its potential health benefits include:

3. Garlic



Biological Name: Allium sativum is the biological name of garlic.

Synonyms: Garlic is also known as "lassan" in Hindi and has various regional names.

Family: Garlic belongs to the Alliaceae family, commonly known as the onion family. It is closely related to onions, leeks, and shallots.

Scientific Classification:

Kingdom: Plantae

Order: Asparagales

Family: Alliaceae

Genus: Allium

Species: Allium sativum

Active Constituents: Garlic contains various sulfur compounds, with allicin being the most well-known bioactive compound responsible for its health benefits. Other important constituents include alliin, ajoene, and diallyl disulfide.

Medicinal Uses:

- Garlic has been used traditionally for its potential health benefits,
- Immune system support: It may have immune-boosting properties.

4. Ginger



Biological Name: Ginger is scientifically known as Zingiber officinale.

Synonyms: Ginger is commonly referred to by its botanical name, but it may also be called "Adrak" in Hindi and has various regional names.

Family: Ginger belongs to the Zingiberaceae family, which is also known as the ginger family. It

is related to other aromatic herbs and spices like turmeric and cardamom.

Scientific Classification

Kingdom: Plantae

Order: Zingiberales

Family: Zingiberaceae

Genus: Zingiber

Species: Zingiber officinale

Active Constituents: Ginger contains various bioactive compounds, including gingerol, shogaol, and zingerone, which are responsible for its pungent and spicy flavor. These compounds contribute to its medicinal properties.

Medicinal Uses:

- Ginger has a long history of use in traditional medicine and is known for its potential health benefits, which include
- Digestive health: Ginger is often used to alleviate nausea, indigestion, and motion sickness.

METHOD OF PREPARATION OF HERBAL CREAM

Steps carried out in the preparation of herbal cream were as follows.

Preparation of alcoholic extract of crude drugs:

All above mentioned powdered crude drugs of 5gms were taken into the conical flask and then 100ml. of ethanol was added to it, then the conical flask was capped with aluminum foil. Then this mixture was placed for maceration for 5 days.

Preparation of oil phase:

Stearic acid (17%), potassium hydroxide (0.5%), sodium carbonate (0.5%) was taken into one porcelain dish and this mixture was melted at 70°C.

Preparation of aqueous phase:

Alcoholic extract of crude drugs mentioned in step-1 (4.5%), Glycerin (6%), Water (71%) were taken into another porcelain dish and heated this mixture at 70°C.

Addition of aqueous phase to oil phase:

The aqueous phase was added to the oil phase with continuous stirring at 70°C. Now, once the transfer was completed it was allowed to come at room temperature, all the while being stirred. Perfume (0.5%) was added at last just before the finished product was transferred to suitable container. Then cream was evaluated for various physical parameters.

EVALUATION OF CREAM

Determination of organoleptic properties:

The appearance of the cream was judged by its color, pearlscence and roughness and graded.

pH :

The pH meter was calibrated and measured the pH by placing in the beaker containing 20mg of the cream.

Determination of homogeneity:

The formulations were tested for the homogeneity by visual appearance and by touch

Spreadability test:

500mg of the cream was sandwiched between 2 slides. A weight of 100gm was placed on upper slide. The weight was removed and extra formulation was scrapped off. The lower slide was fixed on board of apparatus and upper slide was fixed with non-flexible string on which 20g load was applied. Time taken by upper slide to slip off was noted down.¹¹

$$S = m \times l / t$$

Where,

S – Spread ability m- Weight tied to upper glass slide. l- Length moved on a glass slide t- Time taken.

The determinations were carried out in triplicate and the average of three readings was recorded.

Dye test: The test was done by mixing the cream with red dye then place the drop of cream was placed on a slide and covered with cover slip, observed under microscope. If the dispersion phase appears in red colored globules the cream was O/W type. If the continuous phase appears red color the cream was w/o type.

Homogeneity:

The test was done by physical touch with hands.

Patch Test:

About 1-3gm of material to be tested was placed on a piece of fabric or funnel and applied to the sensitive part of the skin e.g. skin behind ears. The cosmetic to be tested was applied to an area of 1sq.m. of the skin. Control patches (of similar cosmetic of known brand) were also applied. The site of patch is inspected after 24 hrs. As there was no reaction the test was repeated three times. As no reaction was observed on third application, the person may be taken as not hypersensitive.

Appearance:

The appearance of the cream was found by observing its color, opacity, etc.

Smear type:

The test was conducted after the application of cream on the skin the smear formed was oily or aqueous in nature.

Determination of Emolliency:

Emolliency, slipperiness and amount of residue left after the application of fixed amounts

of cream was checked. Determination of viscosity: The viscosity determinations were carried out using a Brookfield Viscometer (DV II+ Pro model) using spindle number S-64 at a 20 rpm at a temperature of 25°C. The determinations were carried out in triplicate and the average of three readings was recorded. **Wash ability:**

The removal of the cream applied on skin was done by washing under tap water with minimal force to remove the cream.

Irritancy test:

The cream was applied on left hand dorsal side surface of 1sq.cm and observed in equal intervals up to 24hrs for irritancy, redness and edema.

II. CONCLUSION:

In conclusion, the review on the formulation and evaluation of anti-inflammatory polyherbal cream underscores the significance of integrating traditional knowledge with modern scientific techniques in developing effective topical treatments. Through a meticulous analysis of various formulations and evaluation parameters, it becomes evident that polyherbal creams offer promising avenues for managing inflammatory conditions. However, further research is warranted to optimize formulations, enhance efficacy, and ensure safety profiles. Additionally, standardized protocols for evaluation are imperative to facilitate comparison and reproducibility across studies. Overall, this review provides valuable insights into the potential of polyherbal creams as novel anti-inflammatory agents, encouraging continued exploration and development in this field.

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