WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 6, 521-535. Review Article ISSN 2277–7105

REVIEW ON FORMULATION AND EVALUATION OF POLYHERBAL CREAM

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Article Received on
27 January 2024,

Revised on 16 Feb. 2025,
Accepted on 08 March 2025

DOI: 10.20959/wjpr20256-35897

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ABSTRACT

Since ancient times, medicinal plants have been recognized as a significant source for treating a variety of human ailments. Recently, emphasis has been placed on using environmentally and biologically friendly plant-based solutions to prevent and treat diseases. Consequently, it would be better to use safe, proven, and efficient ayurvedic herbal compositions. Using herbal remedies to treat wounds include debridement, cleanliness, and creating an environment which is conducive to the body's natural healing process**.** Creams were semisolid formulations meant to be applied topically. Various herbal oils, extracts, and excipients were incorporated to formulate the cream compositions. One of the most important medical systems that cures a variety of diseases with herbal plants and extracts is Ayurveda. Polyherbal formulations are those that contain two or more herbs. Several microorganisms, including Staphylococcus aureus, Staphylococcus epidermidis, Enterococcus faecalis, Streptococcus angiosus, Bacillus subtilis, Corynebacterium spp., Escherichia coli, and others, were targeted by the antimicrobial properties of Abrus precatorius extracts from leaves, stem, and seed oil. Significant antifungal action against Candida, including azole-resistant strains, was demonstrated by methyl chavicol and linalool derived from Ocimum sanctum essential oil.

KEYWORDS: Polyherbal cream, antifungal ativity

INTRODUCTION

Since herbal therapies don't have the usual negative effects of allopathic medications, they are becoming more and more popular among patients as a means of treating a variety of illnesses. Consequently, it would be better to use safe, proven, and efficient ayurvedic herbal

compositions. Therefore, in order to improve patient acceptance and compliance, new herbal medications must be researched and developed. There are numerous prescriptions for medicinal conditions like inflammation, wound healing, skin infections, etc. in Indian traditional medicine. Using herbal remedies to treat wounds include debridement, cleanliness, and creating an environment that is conducive to the body's natural healing process.[1] One of the most significant medical systems that treats a variety of illnesses with herbal plants and extracts is Ayurveda.[2]

Drug carriers that provide sufficient localisation or penetration of the drug within or through the skin are used in the formulation of topical dosage forms in an effort to maximise local effects and reduce systemic effects, or to guarantee appropriate percutaneous absorption. Drug delivery methods based on emulsions that target the deeper layers of the skin have attracted renewed attention.[3]

CREAM

A cream is a substance that is applied topically, generally to the skin. Additionally, creams are applied to mucous membranes, like those of the vagina or rectum. Since even cosmetic creams are made using methods created by pharmacies and unmedicated creams are widely used for a range of skin problems (dermatoses), creams may be regarded as pharmaceutical items. When determining how much topical cream is needed to cover various locations, the Fingertip unit idea may be useful. Creams are dosage forms that are semisolid and include one or more medication ingredients that have been dissolved or distributed in an appropriate base.[4] Because they are made using methods created in the pharmaceutical industry, creams are regarded as pharmaceutical products. Both medicated and unmedicated creams are widely used to treat dermatoses and other skin disorders. Ayurvedic, herbal, and allopathic creams are available, and people use them based on their skin issues. They include one or more drug compounds that have been dissolved or distributed in an appropriate base. Based on their phases, creams can be categorised as either o/w or w/o types of emulsion.[5]

POLYHERBAL FORMULATIONS

Polyherbal formulations are those that contain two or more herbs. The two guiding concepts of Ayurvedic medication formulation are the use of several drugs and the use of a single drug. The term polyherbal formulation refers to the latter. Even though it is difficult to describe in terms of contemporary standards, the concept of poly herbalism is peculiar to Ayurveda. The concept of poly herbalism to achieve higher medicinal efficacy was influenced by the

Ayurvedic literature *Sarangdhar Samhita*. Because polyherbal formulations have therapeutic and medical uses, they are utilised all over the world. It is also known as herb-herb combination therapy or polyherbal therapy. Pharmacodynamics and pharmacokinetics are the two methods via which synergism operates, depending on the nature of the interaction. Pharmacokinetic synergism refers to a herb's ability to facilitate the other herbs' absorption, distribution, metabolism, and excretion. On the other side, pharmacodynamic synergism examines the synergistic impact that occurs when active ingredients with comparable therapeutic effectiveness are targeted via various mechanisms of action. The current review covers every important aspect of polyherbal formulation.[6] PHFs are more affordable, environmentally friendly, and widely accessible than allopathic medications because they are a natural substance. Demand is rising worldwide due to their improved accessibility and affordability, particularly in rural areas and some underdeveloped nations where expensive current therapies are unavailable. Furthermore, polyherbal medicines have long been accepted as traditional beliefs, customs, and practices in some cultures throughout history. These techniques are rooted in centuries of trial and error.[7]

BENEFITS

- Preventing first pass metabolism.
- Simple and convenient to use.
- Steer clear of risk.
- Difficulties with intravenous therapy and different absorption conditions, such as pH shifts, enzyme presence, gastric emptying time, etc.
- Continuous drug input allows for efficacy with a lower total daily dosage.

DRAWBACKS

- Drug and/or excipients may cause skin irritation or contact dermatitis.
- Some medications have poor skin permeability.
- Potential for allergic responses Only medications that need a very low plasma concentration to work can be used.
- Drugs may be denatured by an enzyme in the epidermis.[8]

Thus, the main objective of this study is to formulate and evaluate poly herbal cream which can be used as Anti-fungal, Anti- microbial and wound healing. This present study involves the extract of . *ABRUS PRECATORIUS, TRIDAX PROCUMBENS*, TULSI ROSE, NEEM,

TURMERIC. From older times these plants are used to treat various diseases separately. But now this formulation can be used as all in one cream for more effective treatment.

ABRUS PRECATORIUS have Kingdom : Plantae, Divison : Magnoliophyta, Class : Magnoliopsida, Order: Fabales, Family: Fabaceae, Subfamily: Faboideae, Tribe : Abreae, Genus: Abrus, Species : Abrus precatorius linn, Partsused: Leaf.[9]

TRIDAX PROCUMBENS have Kingdom : Plantae – Plants, Sub kingdom : Tracheobionta – Vascular plants, Division : Spermatophyta, Subdivision : Magnoliophyta – Flowering plants, Class : Magnoliopsida – Dicotyledons, Subclass : Asteridae, Order : Asterales, Family : Asteraceae – Aster family, Genus : Tridax L. – tridax, Species : Tridax procumbens L. – coat buttons.[10]

TULSI have Kingdom : Plantae, Subkingdom : Tracheobionta, Superdivision : Spermatophyta, Division : Magnoliophyta, Class : Magnoliopsida, Subclass : Asteridae, Order : Lamiales, Family : Lamiaceae, Genus : Ocimum, Species : O. sanctum.[11]

ROSE have Kingdom : Plantae, Division : Magnoliophyta, Class : Magnoliopsida, Order : Rosales, Family : Rosaceae, Subfamily : Rosoideae, Genus : Rosa, Species : alba.[12]

NEEM have Order : Rutales, Suborder : Rutinae, Family : Meliaceae (mahogany family), Subfamily : Melioideae, Tribe : Melieae, Genus : Azadirachta ,Species : indica.[13]

TURMERIC have Kingdom: Plantae Subkingdom: Tracheobionta Superdivision: Spermatophyta Division: Magnoliophyta Subclass: Zingiberidae Order: Zingiberales Family: Zingiberaceae Genus: Curcuma Species: longa Scientific name: Curcuma longa.[14]

Some of the properties in these plant extracts have already been demonstrated in scientific studies, and a new formulation has been created. These include the following activities:

1. Anti-microbial
2. Anti-fungal
3. Wound healing
4. Analgesic
5. Anti-inflammatory
6. Anti-allergic
7. Anti-bacterial

8. Anti-oxidant
9. Anti-aging and Skin repair

The Herbs to be used for this study was collected from the different plant species which are Such plants consist specific phytochemicals which are mainly responsible for therapeutic activity. Collected herbs Soon after the collection parts of these plants are cleaned, washed, dried in shade and crushed to a coarse powder and stored in an air tight container.

Fig 01 - *ABRUS PRECATORIUS*

Fig 02 - *TRIDAX PROCUMBENS*

Fig 03 – ROSE

Fig 04 –TULSI

Fig 05 – NEEM

Fig 06 - TURMERIC

DIFFERENT METHODS USED IN PLANT EXTRACTION

SOXHLET EXTRACTION ,TERMAL DESORPTION

- **MACERATION**
- **PHYTONIC DESORPTION**
- **INFUSION**
- **MICROWAVE ASSISTED EXTRACTION**
- **ULTRASONIC ASSISTED EXTRACTION**
- **SUPERCRITICAL FLUID EXTRACTION**
- **EXTRACTION LEACHING**
- **SURFACTANT MEDIATED**
- **ACCELERATED SOLVENY EXTRACTION**
- **STEAM DISTILATION**
- **PERCOLATION**
- **MEMBRANE PROCESS**
- **DECOCTION**
- **PRESSURIZED LIQUID EXTRACTION**[15]

DIFFERENT SOLVENT SYSTEMS USED IN PLANT EXTRACTION

- **METHANOL, ETHANOL, CHLOROFORM, ACETONE, n-HEXANE.**

PREPRATION OF PLANT EXTRACT

1. **ABRUS PRECATORIUS**

- **SOXHLET METHONOLIC EXTRACTION AND SOXHLET n-HEXANE EXTRACTION**

50 g of the sample was weighed into a thimble, which was then loaded into a Soxhlet extractor and connected to a round-bottomed flask that had been previously weighed and contained the solvent and anti-bumping granules. The sample was extracted completely for 6 hours using either methanol or n-hexane, after which the extractant was distilled off, the flask was reweighed, and the extract was recovered for analysis.[16]

2. **TRIDAX PROCUMBENS**

- **CHLOROFORM EXTRACT**

The Tridax procumbens Linn leaves that were gathered were cleaned and let to dry in the shade.After soaking 400 grammes of the coarse leaf powder in 500 millilitres of chloroform,

the mixture was shaken occasionally and left in the freezer for two days. For the purpose of screening for phytochemicals, the solvent from the entire extract was filtered, and the filtrate was then dried in the shade.

- **CHLOROFORM - WATER EXTRACT**

The residue from the chloroform extract was combined with 600 millilitres of distilled water and allowed to sit in the cold for two days, stirring occasionally. The solvent from the entire extract was filtered, and the filtrate which was used for phytochemical screening was concentrated on a water bath for three hours.[17]

3. TULSI (*OCIMUM SANCTUM)*

- **SOXHLET EXTRACTION METHOD**

Five gram of the plant powder was loaded in the thimble of Soxhlet apparatus. It was fitted with appropriate size round bottom flask with 250 ml absolute ethanol, and upper part was fitted with condenser. Constant heat was provided upto completion of the extraction method.[18]

4. ROSE

- **METHOD OF ESSENTIAL OIL EXTRACTION BY USING STEAM DISTILLATION FROM ROSE PETALS**

The first technique for producing rose oil was steam distillation, which involved using a steam distillation unit to extract rose water from 20 kg of rose petals. The resulting rose water had a thin layer of oil on its surface that was collected through a subsequent step. The organic solvent (nhexane; 99% GC grade; hexane was chosen over pentane due to its higher boiling point) was used to recover the oil from hydrosols, and distillation was used to separate the oil from n-hexane**.**[19]

5. NEEM

- **SOLVENT EXTRACT**

After being crushed into tiny bits, the fresh and dried leaves were combined in a 1:10 ratio with distilled water, ethanol, methanol, ether, and acetone separately. Using a mortar and pestle, the extractions were continuously ground, and then Whattman No. 1 filter paper was used for filtration. After that, a rotary evaporator was used to vacuum dry the filtrates, and the concentrates were kept at 4^0C for further research.[20]

6. TURMERIC

- **SOXHLET EXTRACTION**

Locally, fresh Azadirachta indica (Family: Meliaceae) leaves were collected from the Tectona Biotech Resource Center's (TBRC) greenhouse in Bhubaneswar. The leaves were ground into a fine powder and allowed to air dry. One 200 ml solvent (aqueous and methanol) was used to percolate five grammes of ground powder for extraction, and the mixture was then stored at soxhlet 150° C for 36 hours. Following extraction, the resulting extracts were concentrated and filtered.[21]

DIFFERENT CHEMICAL COMPONENTS

1. TRIDAX PROCUMBENS

- CENTAUREIDIN, CENTAUREIN, LUTEOLIN, GLUCOLUTEOLIN, QUERCETIN, ISOQUERCETIN, FUMARIC ACID.[22]

2. ABRUS PRECATORIUS

- GLYCYRRHIZIN, PTEROCARPAN[23]

3. TULSI

- CIRSILINEOL, CIRCIMARITIN, ISOTHYMUSIN, APIGENIN, ROSAMERIC ACID, EUGENOL, CARVACROL, ORIENTIN, ANDVICENIN[24]

4. ROSE

- CITRONELLOL, NEROL, GERANIOL, PHENYL ETHYL ALCOHOL

5. AZADIRECTA INDICA (NEEM)

- 9-OCTADECENOIC ACID, EICOSANE, HEXADECANOIC ACID, N-HEXADECANOIC ACID, OCTADECANOIC ACID.[25]

6. TURMERIC

- CURCUMINOIDS, DIARYLPENTANOIDS, MONOTERPENES, CURCUMIN, CYCLOCURCUMIN, BISDEMETHOXYCURCUMIN[26]

DEVELOPMENT OF HERBAL CREAM FORMULATION

- **PREPRATION OF O/W EMULSION CREAM**

The oil-soluble and the emulsifiers are mixed in a container in a water bath. In a separate beaker of water, preservatives and water-soluble components are added. After the oil phase

has been heated, it is placed in a mortar and pestle, and the water phase is gradually added and triturated until a clicking sound can be examined. At the end, preservatives and a few additives are added.

- **PREPRATION OF OIL FREE EMULSION CREAM**

In a beaker, mix the oil-soluble components and the emulsifier. Another beaker is used to collect the water and water-soluble components. The aqueous phase should be triturated in a mortar and pestle before adding the oil phase. At the end, preservatives and a few additives are added.[27]

PHYSICOCHEMICAL CHARACTERIZATION OF THE FORMULATION

TABLE: PHYSICOCHEMICAL CHARACTERIZATION OF CREAM FORMULATION.[28]

DETERMINATION OF Ph	By taking a sufficient amount of the formulation diluted with an appropriate solvent in a suitable beaker, the pH of the cream can be determined at room temperature using a standard digital pH meter.
PHYSICAL APPEARANCE	Colour, roughness, and grading are indicators of the cream's physical appearance.
SPREADABILITY	A sufficient quantity of the material is placed between two glass slides, and the slides are subjected to a 100g weight for five minutes. The formula for spreadability is S=m*l/t. where m is the weight placed on the upper slide. l is the distance travelled on the glass slide. t = amount of time
SAPONIFICATION VALUE	A sufficient quantity of the material is placed between two glass slides, and the slides are subjected to a 100g weight for five minutes. The formula for spreadability is S=m*l/t. where m is the weight placed on the upper slide. l is the distance travelled on the glass slide. t = amount of time
ACID VALUE	A precisely weighed 50ml mixture of equal volumes of alcohol and solvent ether was used to dissolve 10g of the material. The flask was then connected to a reflux condenser and heated gradually until the sample was completely dissolved. 1ml of phenolphthalein was then added, and the mixture was titrated with 0.1N NaOH until

	a faint pink colour appeared after 30 seconds of shaking. Value of acid = n*5.61/w where n is equal to the number of millilitres of 0.1 N KOH solution. w is the substance's weight in grammes.
VISCOSITY	A Brookfield viscometer can be used to measure the viscosity of cream formulations.
HOMOGENICITY	Visual appearance and touch were used to test the uniformity of the formulation.
REMOVAL	By using tap water to wash the area where the creams were applied, the creams' ease of removal was assessed
DYE TEST	The cream is combined with the scarlet colour. Examine a drop of cream under a microscope after placing it in a slide and covering it with a cover slip. It is o/w type if the dispersion globule is red and the ground is colourless, while w/o type creams exhibit the opposite circumstance
IRRITANCY TEST	On the left dorsal surface, mark a 1 sq. cm region. After applying the cream to the designated area, the time was recorded. At regular intervals up to 24 hours, any irritability, erythema, or oedema was assessed and reported.

Comparative study on antifungal activity and proximate composition of *Abrus pulchellus* wall and *Abrus precatorius Linn*The goal of the current study was to examine the proximate composition and antifungal activity of *A. pulchellus* Wall and *A. precatorius* seeds. Using the poison food technique, the powdered seed components were extracted with water and employed for antifungal research against *Aspergillus niger, Aspergillus oryzae*, and *Mucor* species. Reduced colony diameter of test fungus on plates poisoned with the aqueous extracts indicated a strong antifungal action.Abrus species extracts showed a strong antifungal effect in the current investigation. Therefore, opportunistic mycotic infections brought on by Aspergillus and Mucor species may be controlled with the use of the extracts. The study demonstrated that, based on their protein, energy, and crude fibre contents, the seeds of the examined Abrus species could be fed to humans or nonruminant animals. Antinutritional factors have been reported to be present in the plant's seeds. Given the current study's findings, it would seem that if the amounts of antinutrient compounds are determined and the best way to lessen or eliminate the antinutrients. For humans and/or livestock, abrus seeds could be used as an inexpensive source of protein, energy, and antioxidant supplements.[29]

Inhibitory effect of *Tridax procumbens* against human skin pathogens.A common herb with important therapeutic qualities, Tridax procumbens has long been used to treat a variety of skin conditions. Microsporum fulvum, Microsporum gypseum, Trichophyton mentagrophytes, Trichophyton rubrum, Trichosporon beigelii, and Candida albicans were among the clinically significant human skin infections against which the methanol extract of T. procumbens shown strong antifungal activity with low minimum inhibitory concentrations. An oily, viscous fluid with antifungal activity was separated and described after a methanol extract was fractionated with dichloromethane. Twenty-six substances were identified by the GC-MS analysis. Hexadecanoic acid ethyl ester (4.86%), 5-cholestane (12.42%), 9,12-octadecadienoic acid ethyl ester (18.04%), and 9-octadecenoic acid ethyl ester (4.72%) were identified as the main ingredients. This study supported the herb's traditional use while proving its effectiveness against clinically significant dermatophytes.[30]

Antifungal activity of Ocimum sanctum Linn. (Lamiaceae) on clinically isolated dermatophytic fungi.The 38 A NCCLS method was used to assess the antifungal activity of Ocimum sanctum leaves. Additionally, the minimum fungicidal concentration (MFC) and minimum inhibitory concentration (MIC) of certain Ocimum sanctum leaf extracts and fractions were ascertained. At a concentration of 200 microg/mL, Ocimum sanctum leaves demonstrated antifungal efficacy against clinically isolated dermatophytes. The water fraction (200 microg/mL) has a high MIC and MFC against the employed dermatophytic fungus. Leaf extracts from Ocimum sanctum may be a helpful treatment for dermatophytic infections, and the plant contains antifungal properties.[31]

Neem leaf extracts in aqueous, ethanolic, and ethyl acetate forms were tested for their impact on the in vitro development of several human pathogens, including Aspergillus flavus, Aspergillus fumigatus, Aspergillus niger, Aspergillus terreus, Candida albicans, and Microsporum gypseum. The development of the test pathogens was suppressed by various concentrations (5, 10, 15, and 20%) made from these extracts, and the effect grew progressively as concentration increased. When compared to the activity of the other extracts at the same concentration, the 20% ethyl acetate extract demonstrated the highest inhibition. Generally speaking, C. albicans and M. gypseum were the weakest tested Aspergelli, while A. flavus and A. niger were the most sensitive. When compared to the same concentrations from other extracts, the 20% concentration of ethyl acetate extract demonstrated the best inhibitory activity against all test pathogens in all employed doses.[32]

Antifungal activity of turmeric oil extracted from Curcuma longa (Zingiberaceae)Curcumin and turmeric oil, which are derived from Curcuma longa L., were tested against six yeast isolates, four pathogenic mould isolates, and fifteen dermatophyte isolates. Turmeric oil's ability to prevent Trichophyton-induced dermatophytosis in guinea pigs was examined. The findings demonstrated that turmeric oil, at dilutions of 1:40–1:320, could suppress all 15 dermatophyte isolates. Curcumin did not inhibit any of the dermatophyte isolates. At dilutions of 1:40–1:80, turmeric oil inhibited the other four isolates of pathogenic fungus, but curcumin did not inhibit any of them. It was shown that none of the six yeast isolates examined were responsive to either curcumin or turmeric oil.[33]

Rosa damascena MILL. Essential Oil, Different Extracts of Rose Petals.Water, hexane, and ethanol were used to extract the petals of Rosa damascena. Butanol, ethyl acetate, and chloroform were used to further fractionate the latter. Eleven Gram-positive, Gram-negative, and acid-fast bacteria as well as three fungi were tested against rose oil and various petal extracts. All extracts, including rose oil, demonstrated broad-spectrum antibacterial activity against the pathogens under evaluation. Aspergillus niger, Candida albicans, and Penicillium notatum were the three antifungal species that rose oil and its various extracts were most effective against. Compared to the other examined extracts, the ethyl acetate extracted fraction exhibited a comparatively higher level of activity against the tested microorganisms. Staphylococcus aureus, Bacillus subtilis, Streptococcus pyogenes, and other Gram-positive bacteria were more susceptible than Gram-negative bacteria, with MICs and MBCs ranging from 0.125 to 2 mg/ml and 0.5 to 4 mg/ml, respectively. Compared to other Gram-negative bacteria, Acinetobacter baumannii was comparatively more susceptible while having an inherent resistance to the majority of antibiotics. Conversely, the least sensitive Gram-negative bacterium was Klebsiella pneumoniae. Gram-positive bacteria had considerably (p 0.05) lower minimum inhibitory concentrations (MICs) to several extracts than K. pneumoniae. In comparison to both Gram-positive and Gram-negative bacteria, the acid-fast bacterium Mycobacterium phlei exhibited an intermediate level of sensitivity to the extracted fractions. The potential use of rose petal boiling water following rose oil distillation is suggested by the antibacterial properties of aqueous extracts of petals. To use petals pharmaceutically, more research is needed to extract and identify their active antibacterial phytoconstituents.[34]

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