IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Formulation And Evaluation Of Herbal Cream Using Extracts Of Kapikacchu (Mucuna Pruriens) Seeds As Active Ingredient For Anti-Inflammatory Activity.

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ABSTRACT

The objective of this research was to formulate a cream for the treatment of inflammation using extract of Kapikachhu seed as a key ingredient. The herbal cream namely F1 to F3 were formulated from the ethanol extract of Kapikachhu seed. The Soxhlation procedure carried out the extraction. The cream formulation, comprising Stearic acid, lanolin, potassium hydroxide, sodium benzoate, cetyl alcohol, Glycerine, Peppermint oil, extract of Kapikachhu seeds and purified water, was prepared and evaluated for various parameters including irritancy, Spreadability, Viscosity, after-feel, and Homogeneity. The outcomes showed that the created cream, enhanced with kapikachhu seed extract, demonstrated safety, efficacy, and satisfaction in the management of inflammation. This conclusion Suggests that the formulated cream, devoid of irritancy and possessing anti-inflammatory, anti-oxidant and anti-Microbial activity. These investigations revealed that the F1 and F2 cream's foundation and extract composition are safer and more healthier.

KEYWORDS: Kapikachhu, Anti-inflammatory Activity,Stearic acid, Lanolin.

INTRODUCTION

Herbal extracts are used in cosmetic formulas on a daily basis to enhance appearance and beauty. Herbal cosmetics are divided into two groups: one for the body part or organ to be utilized (hair, skin, nail, mouth, and teeth cosmetics) and another for the dose type (cream, powder, soaps, and solutions).[1] Creams are semisolid

dosage forms that are applied topically to the skin, applied to the eyelid, or administered nasally, vaginally, or rectally for medicinal, preventive, or aesthetic purposes. These products use the skin as the target organ and are made to deliver drugs into the skin to treat dermal ailments. [2] Depending on the ratio of water to oil, cream may be thick and sticky or easily diluted and rinsed off. It's also the most often recommended topical drug. Patients generally find it easier to use because it's less sticky, slick, and messy. [3]

The World Health Organization (WHO) and our nation have been endorsing traditional medicine due to its affordability, accessibility, and comprehensiveness, particularly in poor nations. It's also true that 8% of people on the planet receive their primary medical care from medicinal plants. [4] The developed world, along with every other country, acknowledged the value of traditional medicine and established standards, guidelines, and treatment plans for ethnos medicine. [5] The world's healthcare system was protected by conventional medical practices that had been developed over time, prior to the advent of the allopathic medication system. [6]

The majority of botanists define a herb as a plant that returns to the ground every year without developing woody stem tissue. One of the main sources of medicine is plants, from which a disproportionately large number of currently prescribed medications are derived. Because they are readily available, plants can be used safely, affordably, and effectively for medicinal purposes. [7,8] Herbal cosmetics claim to be effective, naturally acceptable, and free of the adverse effects associated with synthetic products because of their regular usage in daily life. This page discusses the literature on herbal cosmetics and its current state, advantages, Indian extract, treatment of ailments, and properties related to herbal cosmetics. [7,9,10]

Inflammation is a normal protective response to tissue Injury caused by physical trauma, noxious chemical or Microbial agents. Non-steroidal anti-inflammatory medicines are the most widely used medication for treating inflammatory diseases. These treatments have a number of side effects, most notably causing gastrointestinal irritation that can result in the development of gastric ulcers. [11] Oxidative stress results in the generation of reactive oxygen species. These substances have a significant impact on the development of several major illnesses, including inflammation, coronary heart disease, Alzheimer's disease, and age-related malignancies. [12] The negative effects of the various anti-inflammatory medications (both non-steroidal and steroidal) are diverse. Thus, antioxidants that have the ability to scavenge this ROS may prove advantageous in the management of inflammatory conditions. The use of synthetic antioxidants is limited due to its toxicity and ability to damage DNA. [13] In contrast, natural products made from plant extracts work better as a substitute for modern medications that have a lot of negative side effects.

Kapikacchu (Mucuna pruriens; Fabaceae) is a plant whose seeds and leaves are used in traditional medicine. Kapikacchu act as powerful antioxidant mainly due to the presence of the metabolites like phenol and esters compound and inhibiting the DPPH, nitric oxide and hydroxyl. [14,15]

The Kapikachhu Seed (Mucuna pruriens)

Mucuna pruriens is a tropical legume that is a member of the genus Mucuna, which includes 100 species of climbing vines and shrubs that are primarily found in tropical regions, particularly tropical Africa, India, and the Caribbean. Members of the Leguminosae family, the genus Mucuna is often called cowitch or velvet bean. Seeds are 12 mm long, ovoid and its colour is shiny black or brown. [16-19] Numerous significant bioactive substances, including tannins, flavonoids, alkaloids, and phenolic substances. [20] As a member of the legume family, this plant draws nitrogen gas from the atmosphere and combines it with other substances to form fertilizer, which enhances the quality of the soil. The numerous, varied properties of the seeds aid in the treatment of diabetes, rheumatoid arthritis, Parkinsonism, atherosclerosis, fever, and bodily pain. [21] Stronger muscles and increased endurance are two benefits of kapikacchu for the body. Supplements are often used by athletes to improve their physical performance. It contributes to the body's increased muscular mass and decreases body fat. This plant is helpful for those experiencing depression. There are numerous references to this plant in Ayurvedic literature. [22]

Chemical Constituents and Anti-inflammatory activity

The seeds of this plant contain a high concentration of L-3,4-dihydroxyphenyl alanine (L-DOPA), the pharmaceutical industry uses it extensively. [23] It is an unusual non protein amino acid. Parkinson's disease is treated using this protein. The remaining chemical substances, include mucunain-9, glutathione, lecithin, gallic acid, β-sitosterol, and serotonin. [18] Typically, the mature seed has 3.1–6.1% L-DOPA in it, along with trace levels of nicotine, beta-carboline, 5-hydroxy tryptamine (serotonin), 5-methyl tryptamine (DMT), bufotenine, and 5-MeO–DMT. [24]

The protein denaturation method was used to assess the inhibitory activity of the ethanolic extract of M. pruriens seed as well as conventional, well-known inhibitors of inflammation. Denaturation of proteins results in inflammation. This study assessed the effect of seed extract on anti-inflammatory activity and its capacity to prevent protein denaturation. The extract's inhibitory potential displayed a concentration-dependent pattern. Because ethanol extract of seeds contains metabolites such phenol and esters compound, they showed a significantly stronger anti-inflammatory action than the standard. [14,15,25]

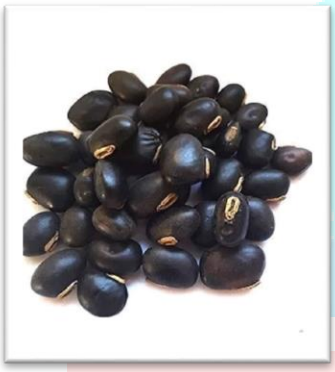

Fig.1 Dried Kapikachhu Seeds

Fig.2 Soxhlet Extraction of Kapikachhu

Fig.3 Kapikachhu Seed Extract

Materials and methods

The methodology and process used for this experiment were carried out in 2014 by Matangi and colleagues, as well as in related works that were cited. [3,26,27] It refers to the method by which the work was done. We make reference to the basic methodology. In 2024, the experiment was carried out as a tutorial project for the partial fulfilment of a Bachelor of Pharmacy degree at Dr..Babasaheb Ambedkar Technology, Lonere Raigad. In this experiment, the formulation was altered, and the work was kept simple and inexpensive in an attempt to reduce the number of components. In accordance with The International Council for Harmonization of Technical Requirements for Pharmaceuticals, prepare cream and assess its potential.[28]

Materials

Stearic acid, lanolin, potassium hydroxide, sodium benzoate, cetyl alcohol, glycerine, peppermint oil, extract of Kapikachhu seeds and purified water (q.s-quantity as per required)

Preparation of Kapikachhu Seed extract

The Kapikachhu seeds were collected from the market. In an effective grinder mixture, air dehydrated Seeds were ground to a satisfactory powder. Dried Powder (50 gm) was extracted with ethanol using the soxhlet extractor. The extracts were evaporated to dryness and the resulting pasty form Extracts were stored in a refrigerator in decreased Pressure and controlled temperature for dryness.

Preparation of Herbal Cream

This is a semisolid formulation of an oil in water (O/W) emulsion based cream. The oil phase was heated to 75°C after the emulsifier, which is stearic acid, and other components that are soluble in oil, such as cetyl alcohol, were dissolved. The preservative, methyl paraben, and additional water-soluble ingredients were dissolved in an aqueous solution and heated to 75 °C. Following heating, parts of the aqueous phase were added to the oil and stirred continuously until the emulsifier cooled.

Table.1: Formulation of the Cream

Sr. No	Ingredients	Formulation 1	Formulation 2	Formulation 3
1.	Extract of kapikacchu	1.12 ml	1.12 ml	1.12ml
2.	Stearic acid	4.24 gm	4.23 gm	4 gm
3.	Cetostearyl Alcohol	0.4 gm	0.5 gm	1 gm
4.	Peppermint Oil	0.2 ml	0.2 ml	0.2 ml
5.	Glycerine	1.5 ml	1.4 ml	1.5 ml
6.	Lanolin	0.8 gm	1 gm	0.5 gm
7.	Potassium Hydroxide	0.125 gm	0.125 gm	0.125 gm
8.	Turmeric	q.s	q.s	q.s
9.	Methyl Paraben	q.s.	q.s	q.s
10.	Purified Water	17 ml	17 ml	17 ml

Evaluation of cream

Organoleptic Evaluation

The organoleptic qualities of the cream, including color, odor, and condition, were evaluated. The cream's color and roughness were used to gauge and rank its look. Result found of every formulation is specified in Table 2.

Homogeneity

The uniformity of the formulations was assessed by touch and visual appearance. Result found of every formulation is specified in Table 4,5,6.

Appearance

The coloured cream's look was evaluated based on its appearance. Result found of every Formulation is specified in Table 2.

Fig.4 Prepared herbal Cream F2

After feel

Emollience, the quantity of residue remaining after a predetermined amount was applied, and the cream's slipperiness were all measured. The results for each formulation are listed in Table 2.

Dye test

It blends the cream with the dye that is scarlet red. Examine a drop of the cream under a microscope after applying a cover slip to a little slide containing it. If the dispersed globules appear red, the ground is colorless. The cream has an o/w quality. The converse situation arises in the w/o form cream, when the dispersed globules appear colorless in the red ground.

Determination of type of smear

The human volunteer's skin surface was used to determine the outcome, and the type of smear or film that resulted from applying the cream was subsequently evaluated. It was discovered by putting the cream to a volunteer's skin surface (self), and as it contains only natural, safe, and non-toxic ingredients, there is no requirement for ethical approval. [29]

Irritancy

The cream was administered to a 1-sq.-cm area on the dorsal side of the left hand, and irritation, redness, and edema were noted at equal intervals for up to 24 hours. [30]

Patch test

The sensitive area of the skin was coated with 1-3 grams of the item to be tested that had been placed on a piece of cloth or a funnel. E.g. skin behind ears. One sq. m of skin was covered with the cosmetic that was going to be evaluated. Additionally, control patches of a comparable cosmetic brand were used. After a day, the patch location is examined. The test was conducted three times since there was no response. Since there was no reaction after the third application, the person might not be considered hypersensitive. [31]

Viscosity

The Brookfield Viscometer (DV-I PRIME, USA) was utilized to measure the viscosity of the compositions. There were three different rotation speeds for the gels: 0.3, 0.6, and 1.5. The appropriate dial measurement was multiplied by the factor listed in the Brookfield Viscometer catalogue to get the viscosity of the cream.

Evaluation of cream pH of the cream

A pH meter was used to measure the pH; it was calibrated with standard buffer solutions at pH 4, 7, and 9 before to each usage. The sample was electrode-inserted ten minutes before the room temperature reading was taken. The results for each formulation are listed in Table 3.

Spreadability

The amount of time, in seconds, that it takes for two slides to separate from the gel when placed in between the slides under the path of a specific load. A finite quantity of weight was placed on the two glass slides with the extra sample sandwiched between them. slides to crush the uniformly thick glass slides. The time needed to separate the two slides was recorded and a weight of 70 g was added. The formula was used to determine the spreadability. [32,33] The results for each formulation are listed in Table 7.

Spreadability = m ×l /t

M = weight tied to the upper slide (30g)

L =length of glass slide (5cm)

T =time taken in sec

Result and Discussion

In a conversation, we made a unique batch of polyherbal cream with kapikachhu seed extract that has no negative responses or side effects. The addition of lanolin, glycerine, potassium hydroxide, stearic acid, and cetostearyl alcohol in different amounts produced a variety of formulation (O/W) oil was created for each water type (F1 to F3). These investigations revealed that the formula of F1 and F2 cream, as well as the content of the extracts, are safer and more stable.It is safe to use these formulations on skin. During irritancy trials, formulation exhibit no redness, edema, inflammation, or irritation.We have examined each of the assessment test's parameters.We have demonstrated that the F1 and F2 formulations demonstrated good performance after finishing and verifying the evaluation parameters. pH, appearance, consistency, lack of phase separation, and easy removal.Because of the anti-inflammatory properties of kapikachhu extract, we created a polyherbal anti-inflammatory cream that is safe for skin irritation and allergic sensitization and contains the extract in different quantities. Depending on the quality of the components utilized and the state of the environment, different results may be produced from this study.

Table.2: Physical Properties of herbal Cream

Sr. No	Physical Properties	F1	F2	F3
1	Colour	Yellowish Grey	Yellowish Grey	Yellowish Grey
2	Odour	Characteristics	Characteristics	Characteristics
3	Appearance	Semi-solid	Semi-solid	Semi-solid

Table.3: pH of the cream

pH of Formulation	F1	F2	F3
	5.85	5.83	5.82

Table.4: Homogeneity, type of smear & Viscosity of Formulation 1

Time Interval (Day)	Homogeneity	Type of smear	Viscosity (cp) mm^2/s	Physical changes	pH
0	Good	Good	1.342	No change in colour and odour	5.82
5	Excellent	Good	1.375		
15	Good	Excellent	1.420		
20	Average	Average	1.450		

Table.5: Homogeneity, type of smear & Viscosity of Formulation 2

Time Interval (Day)	Homogeneity	Type of smear	Viscosity (cp) mm^2/s	Physical changes	pH
0	Good	Good	1.405	No change in colour and odour	5.84
5	Excellent	Excellent	1.430		
15	Excellent	Good	1.480		
20	Average	Average	1.495		

Table.6: Homogeneity, type of smear & Viscosity of Formulation 3

Time Interval (Day)	Homogeneity	Type of smear	Viscosity (cp) mm^2/s	Physical changes	pH
0	Good	Good	1.507	No change in colour and odour	5.69
5	Excellent	Excellent	1.580		
15	Average	Average	1.590		
20	Average	Average	1.601		

Table.7: Spreadability test

S.N.	Time (sec)	F1	F2	F3
1	15	13.20	13.21	12.15
2	20	14.15	14.17	13.3
3	25	13.5	13.7	12.5

Conclusion

It was successful to formulate an anti-inflammatory herbal skin cream that complied with the necessary pharmacological requirements. The produced formulations displayed favorable physical and chemical properties, and the pH was in line with skin secretions. Release for Formulation F2 was optimal. The F1 and F2 formulations demonstrated facile removal, no phase separation, good consistency, appearance, and pH. The formulations F1 and F2 exhibit no signs of irritation, edema, redness, or inflammation in tests of irritancy. The arrangements Safe for application on skin. These investigations show that F1 and F2 have a more stable and healthful extract and base cream composition.

Acknowledgement

This project was carried out under the guidance of Miss. Vrushali Satpute in JBVP'S Vidya Niketan college of Pharmacy, Lakhewadi . University of Dr. Babasaheb Ambedkar Technological (DBATU) for the B.Pharm 8th Sem Final academic Project in the year 2024. Authors would like to thank Miss.Sayali Chavan (Assistant Professor, Department of Quality Assurance, DBATU Technology, Lonere, Raigad.) for the guidance and help during this research.

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