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Research Article

Development And Evaluation Of Polyherbal Anti-Aging Cream

Avinash Mathpati*, Shivani Kanole, Rutuja Waghose, Dr. R. S. Sakhare

Department of Pharmaceutical Quality Assurance, Channabasweshwar Pharmacy College (Degree), Kava Road, Basweshwar Chowk, Latur- 413512.

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ABSTRACT

In this study, creams were formulated based on the anti-oxidant potential of herbal extracts of apricot and giloy. The aim of this study is to prepare and formulate an herbal anti-aging cream and to evaluate its physicochemical properties with an emphasis on safety and efficacy. The creams were formulated (F1, F2, F3, F4, F5, and F6) and evaluated for different parameters like organoleptic properties, ph, homogeneity, irritancy, and stability. The entire formulation gave satisfied results. F2 and F3 were evaluated for stability, and creams were stable during stability studies. The cream is also evaluated for microbial growth, which has not shown any. The formulation was further investigated for its anti-oxidant activity (DPPH radical scavenging activity) by using ascorbic acid as a standard. F1 and F3 show the highest anti-oxidant activity (45% and 55%, respectively). It is possible to suggest that this formulation has the potential to be anti-oxidant and anti-aging for topical use.

INTRODUCTION

Aged skin is a usual progression, and it is a consequence of the continual decaying process because of the harm to cellular DNA and proteins. [1]. Air, harsh sun rays, other environmental pollutants, or other mechanical and chemical insults induce the generation of free radicals (FR) as well as reactive oxygen species (ROS) in our own metabolism when humans are exposed to them. Thus, skin aging is divided into these two categories: Natural, sequential, extraneous, or photo-aging into common terms [2, 3]. A FR is any chemical species (atom, ion, or molecule) that contains an unpaired electron, and in biological systems, the common source of FR is oxygen.[4] FR are created as a consequence of ATP production by the mitochondria when cells use oxygen to generate energy, and they are generally called ROS that result from the cellular redox process and play a dual role as both toxic and advantageous compounds. [5]. FR play a significant role in the development of several skin conditions, such as skin cancers, wrinkles, and aging of the skin. UV light primarily generates free

***Corresponding Author:** Avinash Mathpati
Address: *Department of Pharmaceutical Quality Assurance, Channabasweshwar Pharmacy College (Degree), Kava Road, Basweshwar Chowk, Latur- 413512*
Email ✉: kanoleshivani2@gmail.com

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radicals (FR/ROS) by interacting with endogenous photosensitizers. This process results in cumulative physiological and structural changes, as well as progressive modifications in each layer of the skin and changes in the appearance of the skin. [6, 7]. Anti-oxidative defense mechanisms are the most effective way to eliminate and diminish the action of FR, which causes oxidative stress. [8]. They are inherently FR scavengers, which are known to destroy cells and lead to age-related medical conditions (such as wrinkles in the skin). [9]. Topical application of anti-oxidants may be beneficial for protecting the skin against environmental factors. Anti-oxidant compounds play an important key ingredient in skin-care products such as creams and lotions, which have received importance in the present scenario. [10, 11]. Anti-oxidants such as vitamin E and C, carotenoids, flavonoids, and tannins are present in various plants in substantial amounts and can be utilized to scavenge the overindulgence of FR in the human body. Apricot and Giloy are two of them, which contain potent antioxidants. [12].

Because of the existence of secondary metabolites, plants constitute a natural source of medicine. In both contemporary and traditional medical systems, the bioactive chemicals found in plants have been isolated. [13, 14] Because antioxidants prevent oxidative degradation in food and medicinal items, interest in them has grown. [15] Bioactive substances found in abundance in apricots include vitamins, carotenoids, and polyphenols. [16]. Tinospora cordifolia is a shrub that is commonly utilized in Ayurvedic and folk medical systems. It is said to have antioxidant qualities. [17].

REVIEW OF LITERATURE

- F. Uckaya, M. Uckaya : Due to the phenols and flavonoids they contain, banana peels are a fruit waste that has antioxidant properties. Topical therapies may be able to lessen oxidative damage in the skin. When applied topically, the banana peel-based composition might offer anti-aging and antioxidant qualities.
- Deepak B. Somavanshi, Dr. Priyadarshini R. Kambale: Polyherbal formulation is a cutting-edge tactic in herbal cosmetics. A polyherbal preparation is said to be more potent than one made with a single herb. Botanists now view herbs as a miraculous source of potent medicinal compounds

➢ **NEED OF STUDY:** Polyhebral formulations offer chances for innovation and integration into contemporary healthcare systems, particularly in light of the increased interest in integrative medicine and natural medicines. Their traditional applications can be validated by scientific study and evidence-based methods, which can also open up new treatment possibilities and close the knowledge gap between conventional wisdom and modern healthcare procedures.

Materials and methods

The herbal drug to be used for this research study was collected from local herbal shop of Raebareli and chemicals required are taken from college lab. The collected herbal drug is dried and sieved and stored in an air tight container.

Method

Phytochemical Screening of extract

Phytochemical screening of the extract was qualitatively tested for the presence of chemical constituents, and it was performed using following reagents and chemicals.

Test for flavonoid

A few drops of diluted sodium hydroxide were added to one milliliter of extract. A few drops of diluted acid were added to plant extract, which first had a pronounced yellow tinge that eventually turned colorless. This implies that flavonoids are present. [18].

Test for terpenoids

To build a layer, plant extract, chloroform, and concentrated H2SO4 were combined. The development of a reddish-brown hue in the vicinity of the contact signifies the existence of terpenoids. [19].

Test for tannins and phenols

The test extract was boiled, filtered, and then added to water. Five milliliters of the filtrate were mixed with one milliliter of a ferric chloride solution. Phenols and tannins are indicated by the hue dark green or deep blue. [20].

Test for the steroid

A green-blue color was produced, signifying the presence of steroids, by gradually adding a strong sulphuric acid solution to the extract following treatment with 0.5 ml of acetic anhydride and 0.5 ml of chloroform. [21].

Test for alkaloid

Wagner's reagent (iodine in potassium iodide) and 1 milliliter of extract are combined, and the resultant reddish-brown precipitate indicates the presence of alkaloids. [22].

Method of preparation

An anti-aging cream contains an aqueous phase. Oil phase like (Stearic acid, an emulsifier and other oil miscible components olive oil) was mixed [Part A] and heated up to 75℃.Components of aqueous phase [Part B] mixed together and warmed to about the same temperature of an oil phase. After heating, the, the aqueous phase and oil phase were mixed by continuous stirring. The therapeutically active ingredient and preservative sodium benzoate were added after cooling to 40℃. [23, 24].

Fig.1: Formulated anti-aging cream

Table no.1: Formulation of anti-aging cream

Sr.no.	Ingredients	F1	F2	F3	F4	F5	F6
	Active ingredients						
1.	Apricot (g)	1.5	2	2	2.5	2.5	2
2.	Giloy (g)	0.5	0.5	0.5	0.5	0.5	1
	Phase A: Oil phase						
3.	Olive oil (ml)	1	1	1	-	1	1
4.	Shea Butter (g)	2	2	2	2	2	-
5.	Ceto stearyl alcohol (g)	-	0.75	0.75	0.75	0.75	0.75
6.	Stearic Acid	6.2	6.2	6.2	6.2	6.2	6.2
	Phase B: aqueous phase						
7.	Glycerin (ml)	2.5	2.5	-	2.5	2.5	2.5
8.	Xanthan Gum (g)	2	2	2	-	-	2
9.	Tween 80 (ml)	2.5	-	2.5	2.5	2.5	2.5
10.	Vit.C (g)	1	1	1	1	-	1
11.	Citric Acid (g)	-	1	1	1	1	-
12.	Sod. Benzoate (g)	-	0.25	0.25	0.25	0.25	0.25
13.	Water (ml)	q. s	q. s	q. s	q. s	q. s	q. s

Evaluation of Cream

a) Organoleptic evaluation

The resulting cream's organoleptic qualities, such as color, odor, and appearance, were assessed. The

roughness and color serve as judges for appearance.

b) ph of cream

The calibration of the pH meter was done with common buffer solutions. In a beaker, 50 milliliters of distilled water were used to dissolve around 0.5 grams of the cream, and the resulting ph was recorded. [25].

c) Viscosity

The measurement of viscosity of the prepared cream was done with Brookfield visometer. The viscosity was measured using spindle LV- 4 spindle.

d) Spreadability

We measured the cream's emolliency, slipperiness, and amount of residue left behind after application.

e) Homogeneity

The uniformity of the formulation was assessed by touch and appearance.

f) Irritancy test

After applying the lotion to the skin, the time was recorded. After applying the cream formulation to a designated region of skin, erythema and irritation were assessed and reported at regular intervals for up to 24 hours. [26].

g) After feel

After application, the amount of cream formulation left as well as its slipperiness and emolliency were measured.

h) Stability Study

For the purpose of determining the formulated cream's stability parameters during storage, stability studies were conducted in accordance with ICH requirements. For two months, the cream-filled bottle was stored in a stability chamber that was kept at 35 + 2 °C and 65 + 5% relative humidity. Samples were examined for their physical characteristics at the conclusion of the research. [27].

i) Microbiological test

Microbiological tests are crucial for cream formulations to ensure their safety, quality and efficacy. The formulated creams are tested for their sterility. A small quantity of the cream was inoculated into agar media and kept at 37ºC for 24 h. After the incubation period, the plates are checked for any microbial growth by comparing with the control plate [28].

Results

Table no.2: Results of the phytochemical screening test

Sr.no.	Tests	Apricot extract	Giloy
1.	Flavonoids	+	+
2.	Terpenoids	+	-
3.	Tannins and phenols	+	+
4.	Alkaloids	+	-
5.	Steroid	-	+

Table no. 3: Result of the formulation

Sr.no.	Parameter	F1	F2	F3	F4	F5	F6
1.	Organoleptic evaluation	Creamy white, smooth	Creamy white, smooth	Creamy white, smooth	Creamy white, smooth	Creamy white, smooth	Creamy white, smooth
2.	ph	5.1	5.3	5.4	5.6	6.2	6.4
3.	Viscosity	39,400 cp	28,050 cp	9,200 cp	29,850 cp	20,150 cp	31,300 cp
4.	Spreadability	Spreadable	Spreadable	Spreadable	Spreadable	Spreadable	Spreadable
5.	Homogeneity	Homogenous	Homogenous	Homogenous	Homogenous	Homogenous	Homogenous
6.	Irritancy	Non-irritant	Non-irritant	Non-irritant	Non-irritant	Non-irritant	Non-irritant

7.	After feel	Smooth, no grittiness	Smooth, no grittiness	Smooth, no grittiness	Smooth, no grittiness	Smooth, no grittiness	Smooth, no grittiness
8.	Microbiological test	No microbiological growth of organisms					

Table no.4: Results of stability study

Sr.no.	Parameters	F2	F3
1.	Appearance	Creamy	Creamy
2.	pH	5.8	6.1
3.	Viscosity	Viscous	Viscous
4.	Irritancy	Non-irritant	Non-irritant
5.	After feel	Smooth, no grittiness	Smooth, no grittiness
6.	Spreadability	Spreadable	Spreadable
7.	Homogeneity	Homogenous	Homogenous

Anti-oxidant activity (DPPH radical scavenging activity)

The anti-oxidant activity of cream formulation was assessed using DPPH radical scavenging activity and by taking ascorbic acid as standard. Formulation F3 shows maximum percent inhibition of DPPH about 55%.fig 2. shows DPPH scavenging activities of formulation F1, F2, F3, F4, F5 and F6 in different concentrations.

Result

Based on the result obtained from the study, moderate Antioxidant property (DPPH scavenging) was observed in sample-F1, F2, F3 F4, F5 and F6 (IC50 = Above Dose Limit i.e. higher than 1000 µg/ml), as compared to standard ascorbic acid (IC50 = 7.591 ± 0.019 µg/ml).

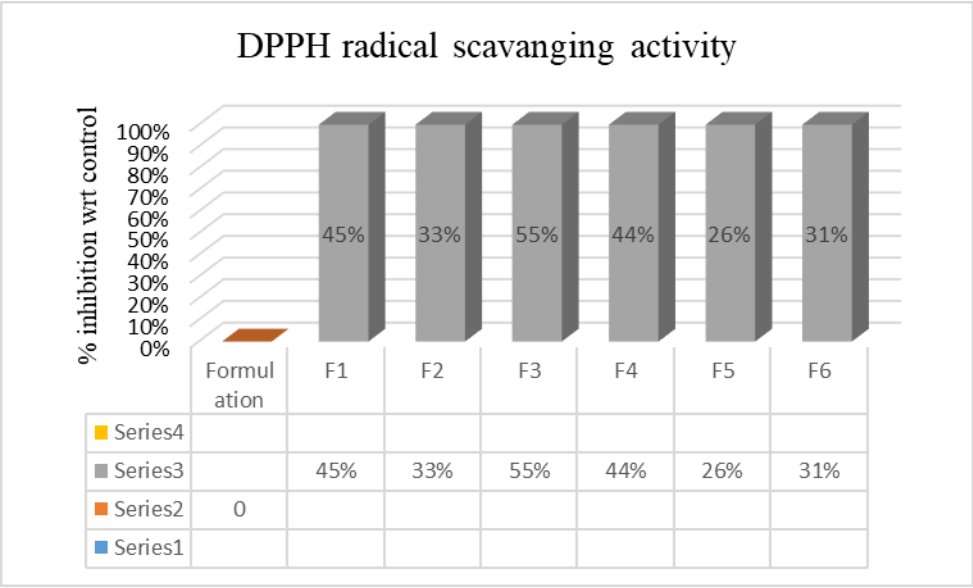

Fig 2: Anti-oxidant activity of cream formulation

RESULT AND DISCUSSION: The physicochemical parameters of the various cream formulations were assessed and are displayed in Table No. 3. It was discovered that every preparation had a creamy white tint. All of the formulations' ph values fell between 6 and 7, which is the neutral range. As they were created, they had a smooth, grittiness-free texture, which is

ideal for cosmetic formulations. The prepared formulation was spreadable and homogeneous. All of the formulations had viscosities between 9,000 and 40,000 cp. The formulation was tested for stability and found to be free of microbial growth; the stability evaluation findings are displayed in Table No. 4. When the anti-oxidant capabilities of the formulation were assessed, F3 displayed the highest anti-oxidant properties, at 55%.

CONCLUSION: People today require side-effect-free care for a variety of skin conditions. Herbal ingredients have paved the way for the safe formulation of cosmetics. Herbal creams are regarded as an effective and aesthetically pleasing method of improving skin appearance. Therefore, the formulation and development of the herbal cream using ingredients that are readily available in nature is a very good attempt in the current work.

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REFERENCE

1. Gavarkar P, Thorat S, Adnaik R,Mohite S, Magdum C. Characterization and formulation of skin cream from seed oil extracted from Cucumis Melo.Pharm Lett 2016;8:90-3.
2. Poljsak B, Glavan U, Dahmane R. Skin cancer, free radicals and antioxidants. Int J Cancer Res Prev 2011;4:193-217
3. Ortolan MC, Simoes ML, Baroni ER, Auersvald A, Auersvald LA, Rodrigues M, et al. Influence of aging on the skin quality of white skinned women: The role of collagen, elastic material density, and vascularisation. Rev Bras Cir Plást 2013; 28:41-8.
4. Wickens AP. Ageing and the free radical theory. Respire Physiol 2001; 128:379-91.
5. Kabel AM. Free radicals and antioxidants: Role of enzymes and nutrition. World J Nutri Health 2014; 2:35-8.
6. Herrling T, Jung K, Fuchs J. The important role of melanin as protector against free radicals in skin. SOFW J Cosmet 2007; 9:26-32.
7. Ganceviciene R, Liakou AI, Theodoridis A, Makrantonaki E, ZouboulisCC. Skin anti-aging strategies. Dermatoendocrinol 2012; 4:308-19.
8. Veeru P, Mishra PK, Mishra M. Screening of medicinal plant extracts for antioxidant activity. J Med Plant Res 2009; 3:608-12.
9. Uwa LM. The anti-aging efficacy of antioxidants. Curr Trends Biomed Eng Biosci 2017; 7:1-3.
10. Khare N, Khare PP, Yadav G. Recent advances in anti-aging-a review. Global J Pharmacol 2015; 9:267-71.
11. Makarova K, Zawada K, Wagner D, Skowyra J. Optimization of antioxidant properties of creams with berry extracts by artificial neural networks. Acta Phys Pol 2017; 132:44-51.
12. Dua D, Srivastava NS. A study on antioxidant and anti-aging properties of few medicinal plants. Int J Pharm Pharm Sci 2015;8:344-7
13. Parveen A, Parveen R, Akhatar A, Parveen B, Siddiqui KM, Iqbal M Concepts and quality considerations in Unani system of medicine. Journal of AOAC International 2020; 103: 609-33
14. Maher PA: Focus: Plant-based Medicine and Pharmacology: Using Plants as a Source of Potential Therapeutics for the Treatment of Alzheimer's Disease. The Yale J of Biology and Medicine 2020; 93(2): 365.
15. Gulcin İ: Antioxidants and antioxidant methods: an updated overview. Archives of Toxicolo 2020; 94: 651-15.
16. Fratianni F, Ombra MN, d'Acierno A, Cipriano L and Nazzaro F: Apricots: Biochemistry and functional properties. Current Opinion in Food Scie 2018; 19: 23-29.
17. Ramya Premanath and N. Lakshmidevi.Studies on Anti-oxidant activity of tinospora cordifolia leaves using in vitro models.Journal of American Science.2010;6(10)
18. Mhatre J, Nagaral S, Kulkarni S. Formulation and evaluation of antibacterial activity of a herbal ointment prepared from crude extracts of Aegle marmelos, (bael). Int J Pharm Pharm Sci 2014; 6:575-9.

19. Sivaraj R, Balakrishnan A, Thenmozhi M, Venckatesh R. Preliminary phytochemical analysis of Aegle marmelos, Ruta graveolens, Opuntia dellini, Euphorbia royleana and Euphorbia antiquorum. Int J Pharm Sci Res 2011; 2:132-6.
20. Khatri P, Rana JS, Jamdagni P, Sindhu A. Phytochemical screening, GC-Ms and FT-IR analysis of methanolic extract leaves of Elettaria cardamomum. Int J Res Granthaalayah 2017; 5:213-24.
21. Tariq AL, Reyaz. AL. Phytochemical analysis of Camellia sinensis Leaves. Int J Drug Dev Res 2012; 4:311-6.
22. Inamdar P, Desai S, Patel D, Meshram D. Phytochemical screening and in vitro antifungal activity of Camellia sinensis. Int J Pharm Pharm Sci 2014; 6:148-50.
23. Rao PK, Khaliq K, Kharat SS, Sagare P, Patil SK. Preparation and evaluation o/w cream for skin psoriasis. Int J Pharm Bio Sci 2010; 1:1-11.
24. Mishra AP, Saklani S, Milella L, Tiwari P. Formulation and evaluation of herbal antioxidant face cream of Nardostachys jatamansi collected from Indian Himalayan region. Asian Pac J Trop Biomed 2014; 4:S679-82.
25. Gupta N, Dubey A, Prasad P, Roy A. Formulation and evaluation of herbal fairness cream comprising hydroalcoholic extracts of Pleurotus ostreatus, Glycyrrhiza glabra and Camellia sinensis. U K J Pharm Biosci 2015; 3:40-5.
26. Singh M, Sharma S, Khokra SL, Sahu RK, Jangde R. Preparation and evaluation of herbal cosmetic cream. Pharmacologyonline 2011; 2:1258-64.
27. F.Uchkaya,M.Uchkaya.Formulation and evaluation of anti-aging cream using banana peel extract.ijpsr.2022;Vol,13 (1):181-191
28. S.E.Okafo,C.O Anie.Formulation and Evaluation of anti- microbial topical creams from ethanol extract of veronia ambigua leaves. Nig.J. pharm.Res.2019, 15 (2)pp 249-255.

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