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Research Article

Formulation And Evaluation Of Anti Aging Cream Containing Banana Peel Extract And Pumpkin Seed Oil

Aswathi V. V.^{1*}, Navya Ravindran², Amal joy², Fathima Sherin Musthafa², Suha²,
Risana Mariyam²

¹Assistant professor dept. of pharmaceuticals, Rajive Gandhi institute of pharmaceutical sciences and research, Trikaripur, Kasaragod, Kerala

²Rajive Gandhi institute of pharmaceutical sciences and research, Trikaripur, Kasaragod, Kerala

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ABSTRACT

The present study aimed to develop and evaluate an anti-aging cream formulation using banana peel extract and pumpkin seed oil. The cream was prepared using a combination of banana peel extract, pumpkin seed oil, and excipients. Physicochemical parameters, antioxidant activity, anti-inflammatory activity, and were evaluated. The results showed that the formulated cream exhibited good physicochemical properties, high antioxidant activity (23.88% inhibition of DPPH radicals). Stability studies indicated no significant changes in the cream's properties over 3 months. The combination of banana peel extract and pumpkin seed oil in the cream formulation showed enhanced anti-aging effects, making it a potential natural and effective solution for anti-aging skin care. However, in the present work herbal formulations reported to have more significant advantages over synthetic formulations. Hence, we conclude that the topical cream for anti-aging is effective, safe and ease of manufacturing and in the economic point of view they are cheap when compared to synthetic creams. Further clinical trials are recommended to confirm its efficacy and safety in humans.

INTRODUCTION

In recent years no of peoples aspiring for ant aging, whiter skin complexation has increased dramatically. This leads to discovery of many effective ant aging agents, particularly those derived from plants. The herbal products claim to have no side effect, commonly seen with products

containing synthetic agents. Attractiveness of herbal preparations has socially as well as technologically resulted in flooding of market place in India. So here we planned to develop an anti-aging cream containing banana peel extract

*Corresponding Author: Aswathi V. V.

Address: Pharmacist and Academic Coordinator, Department of Pharmacy, Wellcare Pharmacy, Qatar

Email ✉: navyaravindran2002@gmail.com

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and pumpkin seed oil both are found to exhibit anti-aging and anti-inflammatory activities.

AGING

Health age-related skin changes are inevitable and include thinning, sagging, wrinkling and the appearance of age spots, broken blood vessels and areas of dryness.

ANTIAGING

Anti-aging cream reduces signs of aging and discoloration. It helps to reduce lines and wrinkles and target other concerns like dull skin and rough texture.

MATERIALS AND METHODS FOR PREPARING HERBAL ANTI AGING CREAM

EXTRACTION OF BANANA PEEL

Banana peel Extraction is conducted by maceration. Maceration is a simple Extraction technique, used to extract active ingredients from a plant material using a solvent at room temperature.

Procedure

- Banana peel is washed thoroughly to remove any residues or contaminants.
- Banana peel is placed into a Mortar and crushed them lightly using a pestle. This helps to
- break down the cell walls and makes Extraction more efficient. Banana peels are transferred
- into a conical flask or container.
- 50 ml ethanol is added into the conical flask containing the Banana peels. The container is
- Sealed with lid to prevent the solvent from evaporating.
- Banana peel is placed in ethanol for one week and occasionally agitated.
- After the maceration period, the mixture is filtered to separate the liquid extract from the
- solid banana peel residues. Filter paper or a fine mesh strainer is used to filter the mixture

- into a clean collection vessel.
- Filtered extract is collected in a beaker or conical flask. The extract is stored in a sealed container, preferably in a cool, dark place to maintain its stability and prevent degradation.

EVALUATION TEST FOR PUMPKIN SEED OIL

Physical Evaluation

The pumpkin seed oil was tested for colour, taste, aroma and turbidity through visual observation and touch.

Peroxide value test

Mix acetic acid and chloroform in a 3:2 ratio to prepare the solvent. Prepare a saturated solution of potassium iodide. Prepare a starch solution as an indicator. Weigh accurately about 5-10 grams of pumpkin seed oil and transfer it into a 250 ml Erlenmeyer flask. Add 30 ml of the acetic acid-chloroform solution to the flask containing the oil. - Swirl the flask gently to dissolve the oil completely. Add 0.5 ml of saturated potassium iodide solution to the flask. Swirl the mixture and let it stand for about 1 minute with occasional shaking. Add about 30 ml of distilled water to the mixture. This step reduces the solubility of iodine in the chloroform layer and transfers it to the aqueous layer. Immediately titrate this solution with 0.01 N sodium thiosulfate until the yellow iodine colour almost disappears. Add a few drops of starch solution as an indicator towards the end of the titration. Continue titrating until the blue color disappears. The peroxide value is calculated using the amount of sodium thiosulfate used in the titration. It is expressed in mill equivalent of peroxide per 1000 grams of oil. Formula: Peroxide Value (meq/ kg) = $\frac{1000 \times N \times V}{W}$ Where: 1(VI) = Volume of sodium thiosulfate used (ml), IN V = Normality of sodium thiosulfate, WV = Weight of the oil sample in grams.

CHEMICAL TEST FOR BANANA PEEL EXTRACT



Test For Flavonoids

Shinoda Test Add a small amount of powdered sample to a test tube. Add a few drops of concentrated hydrochloric acid and a small piece of magnesium turnings. Development of a pink, red, or orange color indicates the presence of flavonoids.

Ferric Chloride Test

Add a few drops of ferric chloride solution to the sample solution. Formation of a green or black color suggests the presence of phenolic hydroxyl! groups typical of flavonoids.

Alkaline Reagent Test

Add a few drops of sodium hydroxide solution to the sample solution. A yellow color that becomes colourless upon adding dilute acid indicates flavonoids.

Test For Phenolic Compounds

Litmus test A drop of organic solution or a small crystal was placed on moist blue litmus paper. Blue litmus turns red. Presence of phenolic compound

Ferric chloride test

Organic matter is dissolved in water. Neutral solution of ferric chloride is added slowly drop wise. Violet or blue coloration. Presence of phenolic compound

Liebermann's test

To 1 ml of organic compound 1-2 crystals of sodium nitrite was added and heated for 30 sec and cooled. Concentrate sulphuric acid followed by water is added to the above solution and shaken. Excess of NaOH is added to the above solution. Appearance of red colouration Appearance of blue green colour. Presence of phenolic compound

FORMULATION DEVELOPMENT

Ingredients	F1	F2	F3
Banana peel extract	3 ml	4 ml	5ml
Pumpkin seed oil	4 ml	5 ml	6ml
Glycerine	8ml	8ml	8ml
Stearic acid	10g	10g	10g
Cetyl alcohol	1g	1g	1g
Tri ethanol amine	1.5ml	1.5ml	1.5ml
Methyl paraben	0.15g	0.15g	0.15g
Water	QS 50	QS 50	QS 50

Procedure

- All of the equipment needs to be thoroughly cleaned and washed.
- The ingredients for the oil phase are combined in one beaker, while the ingredients for the water phase are combined in another.
- The temperatures in both procedures range from 70 to 75 °C.
- The heating components are continually stirred.
- Carefully record the heated material's temperature.
- The heating is stopped and the combination is well stirred when the material reaches a temperature of more than 70°C.
- Combine the Water and Oil phases, and then pour the resulting mixture into the mortar.
- Only one direction should be used for the trituration when adding essential ingredients like pumpkin seed oil and banana peel extract.
- Prepare the product, fill the container with it, and label it.

EVALUATION OF PREPARED CREAM FORMULATION

Physical Evaluation



The banana peel cream was tested for odour, appearance, and homogeneity through visual observation and touch.

Determination of Ph

The pH calibrated using standard buffer solutions. About 0.5 g of the cream was weighed and dissolved in 50ml of distilled water in a beaker, and its pH was measured.

Viscosity

The measurement of viscosity of the prepared cream from banana peel was done with a Brookfield viscometer. The reading was taken at 100 rpm using spindle no. 6.

Spreadability

Emolliency, slipperiness, and amount of residue left after the application of the cream was checked.

Thermal Stability

Stability studies were carried out as per ICH guidelines for the formulated cream to assess its stability parameters during its storage period. The cream-filled bottle was kept in a humidity chamber maintained 35 ± 2 °C with 65±5% relative humidity (RH) for two months. At the end of the studies, samples were analysed for their physical properties.

Determination of Antioxidant Activity

Prepare a stock solution of the anti-aging cream in methanol or ethanol. Dilute the stock solution to various concentrations (e.g., 1-100 µg/mL). Add 1 mL of DPPH reagent to each concentration. Mix well and incubate for 30 minutes at room temperature. Measure the absorbance at 517 nm using a UV-Vis spectrophotometer. Calculate the percentage inhibition of DPPH radicals using the formula:

$$\% \text{ Inhibition} = \left(\frac{\text{Absorbance of control} - \text{Absorbance of sample}}{\text{Absorbance of control}} \right) \times 100$$

Control = Ascorbic acid

RESULTS

Evaluation Test

Identification Test For Flavonoids

Alkaline reagent test:

Deep yellow colour but it gradually becomes colourless by adding few drops of dilute HCL. Presence of flavonoids.

Shinoda test:

Deep pink colour. Presence of flavonoids

Lead acetate test:

Appearance of yellow colour precipitate Presence of flavonoids

Identification Test for Phenolic Compounds

Litmus test:

Blue litmus turns red. Presence of phenolic compound

Ferric chloride test:

Violet or blue colouration. Presence of phenolic compound

Liebermann's Test:

Appearance of red colouration Appearance of blue green colour. Presence of phenolic compound.

Evaluation Test of Pumpkin Seed Oil

Physical Evaluation

The physical parameter such as color, taste, aroma, turbidity were checked and the result is showed in the given.

Parameter Observation	Parameter	Observation
Color		Ranges from dark green to deep red
Taste		Nutty flavor
Aroma		Rich, nutty aroma
Turbidity		Absence of turbidity

Result of peroxide value

The peroxide value of pumpkin seed oil was found to be 2.5 meq/kg. This result indicates that the pumpkin seed oil has relatively low level of peroxides, suggesting it is of good quality and has not undergone significant oxidation.

Evaluation of Anti-Aging Cream

Physical Evaluation

The physical parameters such as color, odour and appearance were checked and result showed given.

Color- white

Odour- characteristic

Appearance- pleasant

Nature –homogenic

Determination of pH

The Anti-aging cream prepared by using F3 showed favourable pH determined by digital pH meter. Ph was determined to be 5.96 ± 0.05

Determination of Spreadability

The term Spreadability used to calculate extent area to which the cream readily spread onto the skin. The Spreadability of anti-aging cream was found to be 2.0626 ± 0.0003

Spreadability, $S = M.L/T$

M=weight placed over slide, L=length of slide, T=Time for slip off in second

Viscosity

Viscosity of the formulation indicates the consistency. It is determined by Brookfield viscometer, three measurements taken and average viscosity calculated. The viscosity of Anti-aging cream was in the range of 27020-27050 cps which indicates Spreadability of cream.

Thermal Stability

Stability studies were carried out as per ICH guidelines for the formulated cream to access its stability parameters during its storage period. The cream does not show any phase separation or signs of deterioration.

Determination of anti-oxidant property

Result of DPPH test

Anti-oxidant activity of prepared formulation was evaluated by DPPH test. Absorbance of sample solution (1ml to 5ml) was determined and their %inhibition was calculated. Cream was determined to show anti-oxidant activity in all above sample. Sample containing 5ml shows maximum %inhibition.

DISCUSSION

The present work is to develop topical herbal formulation containing phytopharmaceuticals to be applied in the treatment of aging. The aim of the study is to make topical cream containing methanolic extract of banana peel and oil of pumpkin seeds. Preliminary phytochemical

screening of selected plants was performed by using different solvents like ethanol, methanol, water and the result showed the presence of various phytoconstituents like phenolic compounds and flavonoids etc. The major component which is responsible for providing anti-aging activity is present in methanolic extract of the plant material. Maceration is done to make the banana peel extract. The herbally medicated cream for anti-aging activity was prepared by using the alcoholic extract of banana peel and pumpkin seed oil. The physical parameters like colour, appearance etc. were observed and the result showed that the formulated cream was white in colour and of good homogeneity. The Ph., viscosity, thermal stability etc. are performed and showed good results. The in-vitro anti-aging/anti-oxidant activity was performed by DPPH test and the result is compared with standard.

CONCLUSION

The aim of the study is to formulate the anti-aging cream using the materials of the plant parts of banana peel and pumpkin seed oil for anti-aging activity. The preliminary phytochemical screening of the plant extracts showed the presence of major constituent like flavonoids, phenolic compounds etc. contribute anti-oxidant activity which is beneficial for treatment of aging. Phytoconstituents present in plant material is extracted by maceration using alcohol as solvent. The physical evaluation of prepared anti-aging cream was done like colour, Spreadability, wash ability, viscosity etc. The in vitro anti-aging activity is evaluated by DPPH test that showed the prepared anti-aging cream has anti-oxidant activity which makes contribution against aging. However, in the present work herbal formulations reported to have more significant advantages over synthetic formulations. Hence we conclude that the topical cream for anti-aging is effective, safe and ease of manufacturing and in the economic



point of view they are cheap when compared to synthetic creams.

REFERENCE

1. Singh HP: Harnessing the Potential of banana and plantain in asia and the pacific for inclusive growth. *International Society for Horticultural Science* 2011; 495-06.
2. Sharma M, Patel S, Narayan S, Rajender S and Singh SP: Biotransformation of banana pseudostem extract into a functional juice containing value added biomolecules of potential health benefits. *Indian Journal of Experimental Biology* 2017; 55: 453-62.
3. Sidhu JS and Zafar TA: Bioactive compounds in banana fruits and their health benefits. *Food Quality and Safety* 2018; 2: 183-88.
4. Chueh CC, Lin LJ, Lin WC, Huang SH, Jan MS, Chang SC, Chung WS and Lee TT: Antioxidant capacity of banana peel and its modulation of Nrf2-ARE associated gene expression in broiler chickens. *Italian Journal of Animal Science* 2019; 18(1): 1394-03.
5. Sulaiman SF, Yusoff NAM, Eldeen IM, Seow EM, Sajak AAB, Supriatno and Ooi KL: Correlation between total phenolic and mineral contents with antioxidant activity of eight Malaysian bananas *Musa sp.* *Journal of Food Composition and Analysis* 2011; 24(1): 1-10.
6. Nagarajaiah SB and Prakash J: Chemical composition and antioxidant potential of peels from three varieties of banana. *Asian Journal of Food and Agro-Industry* 2011; 4: 31-46.
7. Singh S and Prakash P: Evaluation of antioxidant activity of banana peels (*Musa acuminata*) extracts using different extraction methods. *Chemical Science Transactions* 2015; 4: 158-60.
8. Ghany TMA, Ganash M, Alawlaqi MM and Al-Rajhi AMHW: Antioxidant, anti tumor, antimicrobial activities evaluation of *musa paradisiaca* l. pseudostem exudate cultivated in Saudi arabia. *Bio Nano Science* 2019; 9: 172- 78.
9. Vashi NA, de Castro Maymone MB and Kundu RV: Aging differences in ethnic skin. *The Journal of Clinical and Aesthetic Dermatology* 2016; 9: 31-8.
10. Lephart ED: Skin aging and oxidative stress: Equol's antiaging effects via biochemical and molecular mechanisms. *Aging Research Reviews* 2016; 31: 36-54.
11. Shon MS, Lee Y, Song JH, Park T, Lee JK, Kim M, Park E and Kim GN: Anti-aging potential of extracts prepared from fruits and medicinal herbs cultivated in the Gyeongnam area of Korea. *Preventive Nutrition and Food Science* 2014.
12. 178-86. 19. Sekar M, Sivalingam P and Mahmad A: Formulation and evaluation of novel antiaging cream containing rambutanfruits extract. *International Journal of Pharmacy and Pharmaceutical Sciences* 2017; 8: 1056-65.
13. Rodrigues F, Gaspar C, Oliveira AP, Sacramento B, Amaral MH and Oliveira MBPP: Application of coffee silverskin in cosmetic formulations: physical/antioxidant stability studies and cytotoxicity effects. *Drug Development and Industrial Pharmacy* 2016; 42: 99-106
14. Siddique S, Nawaz S, Muhammad F, Akhtar B and Aslam B: Phytochemical screening and in-vitro evaluation of-pharmacological activities of peels of *Musa sapientum* and *Carica papaya* fruit. *Natural Product Research* 2017; 1-4.
15. Azizuddin A, Ghafoor S, Qadeer A, Makhmoor T and Mahmood T: Evaluation of physiochemical and antioxidant properties in different varieties of banana (*Musa acuminata*), Indigenous to Pakistan. *Journal of the Chemical Society of Pakistan* 2015; 36(6): 1088-95.



16. Fawole OA, Makunga NP and Opara UL: Antibacterial, antioxidant and tyrosinase-inhibition activities of pomegranate fruit peel methanolic extract. *BMC Complementary and Alter Medicine* 2012; 12: 200-18.
17. Butsat S and Siriamornpun S: Effect of solvent types and extraction times on phenolic and flavonoid contents and antioxidant activity in leaf extracts of *Amomum chinense* C. *International Food Research Journal* 2016; 23(1): 180- 87.
18. Maisarah AM, Nurul A, Asmar R and Fauziah O: Antioxidant analysis of different parts of *Carica papaya*. *International Food Research Journal* 2013; 20(3): 1043-48.
19. Someya S, Yoshiki Y and Okubo K: Antioxidant compounds from bananas (*Musa cavendish*). *Food Chemistry* 2002; 79: 351-54.
20. Palanisamy P, Sugumar M, Kandasamy S, Karthikeyan S, Thirumalai and Mohanraj P: In- vitro antioxidant effects of different local varieties of banana (*Musa sp.*). *International Journal of Pharma and Bio Sciences* 2012; 3: 634-44.
21. Dahham SS and Agha MT: Antioxidant activities and anticancer screening of extracts from banana fruit (*Musa sapientum*). *Academic Journal of Cancer Research* 2015; 8: 28-34.
22. Hashim, S. A survey on cosmetic products marketed in Malaysia: Microbiological aspect. *Oil Palm Bulletin* 47, 37-48 (2003).
23. Chew, S.C.; Tan, C.P.; Nyam, K.L. Application of response surface methodology for optimizing the deodorization parameters in chemical refining of kenaf seed oil. *Sep. Puri. Tech.*
24. Foucquier, J.; Guedj, M. Analysis of drug combinations: Current methodological landscape. *Pharmacol. Res. Perspect.* 3, e00149 (2015).
25. Saket K.; Aarti, T.; Nitesh K.; Maen M. H. A novel oil-in-water drilling mud formulated with extracts from Indian mango seed oil. *Pet. Sci.* 1, 1-15(2019).
26. Censi, R.; Peregrina, D.P; Lacava, G.; Agas., D.; Lupidi, G.; Sabbieti, M.G.; Martino, P.D. Cosmetic formulation based on an Açai extract. *Cosmetics* 5, 48(2018).
27. Kerdudo, A.; Burger, P.; Merck, E.; Dingas, A.; Rolland, Y.; Michel, T.; Fernandez, X. Development of a natural ingredient - Natural preservative: A case study. *C. R. Chimie* 19, 10771089.
28. Singh, M.; Seth, P.; Poddar, S. Comparative analysis of four facial foundation lotions with reference to its antioxidant richness and bio-safety. *Cosmetics* 4, 12
29. Cornara, L.; Biagi, M.; Xiao, J.; Burlando, B. Therapeutic properties of bioactive compounds from different honeybee products. *Front. Pharmacol.* 8, 412(2017).
30. Fratini, E; Cilia, G.; Turchi, B.; Felicioli, A. Beeswax: A mini review of its antimicrobial activity and its application in medicine. *Asian Pac. J. Trop. Med.* 9, 839-843 (2016).
31. Altuntas, E.; Yener, G. Anti-aging potential of a cream containing herbal oils and honey: Formulation and in vivo evaluation of effectiveness using non-invasive biophysical techniques. *IOSR J. Pharm. Bio. Sci.* 10, 2319-7676(2015).
32. National Center for Biotechnology Information (NCBI). Antioxidant activity and protective effect of banana peel against oxidative hemolysis of human erythrocyte at different stages of ripening [Internet]. [cited 2024 Feb 13].
33. National Center for Biotechnology Information (NCBI). Detection of antimicrobial activity of banana peel (*Musa paradisiaca* L.) on *Porphyromonas gingivitis* and *Aggregatibacter actinomycetemcomitans*:

- An in vitro study - PMC [Internet]. [cited 2024 Feb 13].
34. National Center for Biotechnology Information (NCBI). The comparative absorption of silicon from different foods and food supplements - PMC [Internet]. [cited 2024 Feb 13].
 35. National Center for Biotechnology Information (NCBI). Use of silicon for skin and hair care: an approach of chemical forms available and efficacy. PMC [Internet]. [cited 2024 Feb 13].
 36. In Vitro and in Vivo Removal Efficacies of a Formulated Pumpkin Seed Oil Makeup Remover
 37. Physicochemical Properties of Pumpkin Seed Oil & Therapy of Inflammatory Facial Acne Vulgaris.
 38. Oil from Pumpkin (cucurbita Pepo L.) Seeds: Evaluation of Its Functional Properties on Wound Healing in Rats.
 39. Characterization and Formulation of Skin Cream from Oil Extracted from Cucumis Melo.
 40. A Comprehensive Review of the Versatile Pumpkin Seeds (cucurbita Maxima) as a Valuable Natural Medicine.
 41. Nutritional Value, Phytochemical Potential and Therapeutic Benefits of Pumpkin.
 42. Anti-Inflammatory and Skin Barrier Repair Effects of Topical Application of Some Plant Oils
 43. Macro- and microelements in pumpkin seed Oils: Effect of processing crop season and country of origin.
 44. Bioactive Compounds for Skin Health: A Review.
 45. Facial Acne Therapy by Using Pumpkin Seed Oil with Its Physicochemical Properties.
 46. Evaluation of Fatty Acid Compositions, Antioxidant, and Pharmacological Activities of Pumpkin (Cucurbita moschata) Seed Oil from Aqueous Enzymatic Extraction.
 47. Combined Oral and Topical Application of Pumpkin (Cucurbita pepo L.) Alleviates Contact Dermatitis Associated With Depression Through Down regulation Pro-Inflammatory Cytokines.
 48. New Cosmetic Formulations With Broad Photo-protective and Anti-oxidative Activities Designed by Amaranth and Pumpkin Seed Oils Nano carriers.
 49. Amelioration of Uv Radiation-Induced Photoaging by a Combinational Sunscreen Formulation Via Aversion of Oxidative Collagen Degradation and Promotion of Tgf-B-Smad- Mediated Collagen Production.
 50. A Red Pumpkin Seed Extract Reduces Melanosome Transfer to Keratinocytes by Activation of Nrf2 Signaling

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