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Preparation and evaluation of caffeinated fairness cream

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ABSTRACT: Background: Thee fairness products are based on one simple formula of controlling dispersion of Melanin (The pigment that controls the skin colour). **Aim:** The study was aimed to prepare and characterize the caffeinated fairness cream. **Method:** The chloroform was used to extract caffeine from an aqueous extract of tea leaves. The emulsifier (stearic acid) and other oil soluble components (Cetyl alcohol and almond oil) were dissolved in the oil phase (Part A) and heated to 75 °C. The preservatives and other water soluble components (Methyl paraben, Propyl paraben, Triethanolamine, Propylene glycol and caffeine) were dissolved in the aqueous phase (Part B) and heated to 75 °C. After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until cooling of emulsifier took place. The fairness cream was evaluated for pH, viscosity, acid and saponification values, dye test, homogeneity, appearance test and after feel emolliency. **Results:** The pH of the cream base was found within the skin pH range. The viscosity of cream was in the range of 2.702 - 2.705×10^4 cps which indicated good spread ability of cream. The acid and saponification value were 5.9 and 25.7 respectively. All other evaluation data are found to be satisfactory. **Conclusion:** The caffeine is a vasoconstrictor, and its topical application may reduce the appearance of under-eye puffiness and dark circles. The study data revealed that the caffeinated cream could be successfully and safely used for enhancing fairness of face.

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INTRODUCTIONS:

Caffeine is a central nervous system (CNS) stimulant of the methylxanthine class. It is the world's most widely consumed psychoactive drug. Unlike many other psychoactive substances, it is legal and unregulated in nearly all parts of the world. There are several known mechanisms of action to explain the effects of caffeine. The most prominent is that it reversibly blocks the action of adenosine on its receptor and consequently prevents the onset of drowsiness induced by adenosine. Caffeine also stimulates certain portions of

the autonomic nervous system [1]. Caffeine is a bitter, white crystalline purine, a methylxanthine alkaloid, and is chemically related to the adenine and guanine bases of deoxyribonucleic acid. Caffeine, chlorogenic acids and diterpenes are important components of coffee. Tolerance often acts as a modulator of the biological actions of coffee. There is a significant impact of coffee on the cardiovascular system, and on the metabolism of carbohydrates and lipids [2].

The caffeine is obtained from matured ripe seeds of *Coffea arabica* [3]. Microscopically, chicory shows numerous thin-walled parenchymatous cells, lactiferous vessels, and sieve tubes with transverse plates. There are also present large vessels with huge, well-defined pits [4]. Thus a research was attempted to prepare and evaluate caffeinated cream with objective to enhance facial fairness.

MATERILAS AND METHODS:

The cetyl alcohol, almond oil and triethanol amine were procured from Universal Chemical, West Bengal. All other chemicals and reagents were of analytical grade and procured from authorized dealer.

Extraction of Caffeine:

The caffeine was extracted by Soxhlation method. In this extraction process, the organic solvent chloroform was used to extract caffeine from an aqueous extract of tea leaves because caffeine is more soluble in chloroform (140 mg/ml) than it is in water (22 mg/ml). However, the tannins that are slightly soluble in chloroform were eliminated by converting it to their salts. About 110 mg of caffeine was extracted from 30 g of tea. Caffeine is 1,3,7 - trimethylxanthine, belongs to a wide class of compounds known as alkaloids [4-6].

Table 1. Formulation design of caffeinated cream.

Ingredients	Quantities (% w/w)
Stearic acid	13
Cetyl alcohol	2
Almond oil	4
Glycerol	3
Methyl paraben	0.02
Caffeine	1
Water	q.s.

q.s. – Quantity sufficient.

Preparation of caffeinated cream:

The emulsifier, stearic acid and other oil soluble components (Cetyl alcohol and almond oil) were dissolved in the oil phase (Part A) and were heated to 75 °C. The preservatives and other water soluble components (Methyl paraban, Propylene glycol and caffeine) were dissolved in the aqueous phase (Part B) and were heated to 75 °C. After heating, the aqueous phase was added slowly in portions to the oil phase with continuous stirring until cooling of emulsifier took place. The cream was stirred unidirectional. The prepared cream was properly packed and stored in cool condition for further studies.

Evaluation of caffeinated cream [6-9]:

pH of the Cream: The digital pH meter was calibrated using standard buffer solution. About 0.5 g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

Viscosity: The viscosity of the formulation was determined by using digital Brookfield Viscometer. The viscosity of prepared cream was determined at 100 rpm, using spindle no 7.

Dye test: The scarlet red dye was mixed with the cream. A drop of cream was placed on a microscopic slide which was covered with a cover slip. Then it was examined under a compound microscope. If the disperse globules is appear as red, then the ground is colorless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colorless in the red ground.

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

Appearance: The appearance of the cream was judged by its color, pearlscence and roughness and was accordingly graded as excellent or good or poor.

After feel: Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was checked.

Type of smear: After application of cream, the type of film or smear formed on the skin were checked.

Removal: The ease of removal of the cream applied, was examined by washing the applied part with tap water.

Acid value: About 10 g of cream accurately weighed and was dissolved in 50 ml distilled water and mixed with equal volume of alcohol and solvent ether. The flask was connected to reflux condenser and slowly heated, until the cream was dissolved completely. To the mixture, 1 ml of phenolphthalein added and it was

titrated with 0.1N NaOH, until faintly pink color appears after shaking for 30 s. Then the acid value was calculated using formula,

Acid value = [N × 5.61]/W ……. (1)

Whereas, N is the number of ml of NaOH required and W is the weight of substance.

Saponification value: About 2 g of prepared cream was introduced into reflux condenser and refluxed with 25 ml of 0.5 N alcoholic KOH for 30 min. To the solution, 1 ml of phenolphthalein indicator was added and finally it was titrated immediately, with 0.5 N HCl. The saponification value (SV) was calculated using following equation,

SV = [(b-a) ×28.05]/W …… (2)

Whereas, a is the volume in ml of titrant, b is the volume in ml of titrand, SV is saponification value and W is the weight of substance in g.

Skin irritation test:

The skin irritation study was carried out on Healthy Brazilian Rabbits. The study protocol was approved by Institutional Animal Ethical Committee of Jeypore College of Pharmacy prior study. Before stude, the animals were stabilized by keeping in normal day and night cycle of 12: 12 h. During the study the animals were feeded with normal food pellets and water ad libidum. In one confined body surface of rabbit, feathers were scraped out. The cream was applied over skin. The normal behavior, hypersensitivity reaction like redness, inflammation, itching were observed.

RESULTS AND DISCUSSIONS:

The pH of the cream base was found to be in range of 6.2-6.9 which is good for skin pH, signified that the cream formulation would be compatible and non irritant to skin. The viscosity of was cream was in the range of 27021-27053 cps which indicates spreadibilty of cream. The viscosity value demonstrated that the spreadability of cream would be good and the viscosity value also ascertains stability of cream. Acid and saponification value of prepared cream was 5.9 and 25.7. This value represented that the cream stability would be more and chances of degradation or rancidity will be less. Irritancy test revealed that the cream formulation does not shows any significant irritation, itching, redness ofr inflammation to the skin, thus the cream was found to be safe for commercial use. Dye test result confirmed that the cream formulation was o/w type emulsion cream. In homogeneity study, it was seen that the formulation of base produce uniform distribution in cream. This was confirmed by visual appearance and by touch. The appearance of cream was found to be good, as the formulation on long time storage, no color change was found and no grittiness was observed in cream. In after feel test, the emolliency, slipperiness and amount of residue left after the application of fixed amount of cream base was determined. After application of cream base, the type of smear formed on the skin were non greasy. The cream applied on skin was easily removed by washing with tap water. The formulation found to be satisfactory.

CONCLUSION:

The research study could be concluded that the caffeinated fairness cream possessed good surface and rheological properties. Thus this cream would be safely and successfully used by women for achievement of fairness.

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