

# Formulation And Evaluation of Herbal Cream Using Corn Silk and Annatto Seeds

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**Abstract—** This study focuses on the formulation and evaluation of a herbal vanishing cream utilizing corn silk (*Zea mays*) and annatto seeds (*Bixa orellana*). Corn silk, valued for its antioxidant and anti-inflammatory properties, and annatto seeds, known for their carotenoids and tocotrienols, were selected for their skin benefits. The cream was formulated using an oil-in-water emulsion technique to achieve a smooth, fast-absorbing texture. Various concentrations of the extracts were tested to optimize the formulation for stability and efficacy. Comprehensive evaluations, including pH, viscosity, spreadability, microbial stability, and sensory properties, were conducted.

**Index Terms-** Corn silk, Annatto seeds, Vanishing cream, Evaluation studies.

## I. INTRODUCTION

Creams are semi solid emulsions of oil and water. It is a preparation used for the application to the skin. The rising consumer demand for natural and sustainable skincare products has propelled the exploration of herbal ingredients in cosmetic formulations. Herbal cream is basically oil in water type of emulsion. Herbal vanishing creams, characterized by their lightweight texture and matte finish, offer a promising alternative to conventional synthetic products. The natural ingredients are chosen for preparation of herbal cream i.e corn silk (*Zea mays*) and annatto seeds (*Bixa orellana*), two botanical ingredients known for their beneficial skin properties.

Corn silk, traditionally utilized for its medicinal properties, is rich in phenolic compounds and flavonoids, which provide significant antioxidant and

anti-inflammatory effects. These properties make corn silk a valuable ingredient for skin protection and hydration.

Annatto seeds, derived from the tropical *Bixa orellana* plant, are a rich source of carotenoids, particularly bixin and norbixin, and tocotrienols. These compounds are renowned for their antioxidant, antimicrobial, and anti-inflammatory benefits, making annatto seeds a beneficial addition to skin care products.



CORN SIL (ZEA MAYS)



ANNATTO SEEDS (BIXA ORELLENA)

## II. METHODOLOGY

### PLANT MATERIAL COLLECTION AND AUTHENTICATION:

In Hyderabad, India, corn silk and annatto seeds were gathered from the market and park, respectively. An accredited botanist verified the plant material. After a thorough cleaning, the plant materials were allowed to air dry in the shade for two to three days

### PREPARATION OF ALCOHOLIC EXTRACT OF CRUDE DRUGS:

The air-dried plant materials were ground into a coarse powder with a mechanical grinder. The powdered plant components were then treated to serial solvent extractions with ethanol as the solvent. The extraction process was carried out by maceration, a technique in which the plant material is steeped in the solvent for an extended period of time with continuous agitation to facilitate the breakdown of the soluble phytoconstituents. For the ethanolic extract, 50 g of powdered cornsilk and 50 g of annatto powder were macerated in separate containers with 250 mL of ethanol for 21 days at room temperature. The combinations were agitated on a regular basis, and after 21 days, the extracts were passed through filter paper. The filtrate from both plant materials was collected separately in a China dish and maintained for evaporation. The resultant ethanolic extracts were stored in airtight containers at 4°C for subsequent use

in phytochemical screening, formulation, and cream assessment.

### PHYTOCHEMICAL SCREENING:

To find the existence of several phytochemical elements such as alkaloids, flavonoids, tannins, saponins, and terpenoids, a qualitative phytochemical screening was applied to the ethanolic extracts of corn silk and powdered annatto seeds. To find these phytoconstituents, standard procedures and particular chemical tests were used. Wagner's test was used to detect alkaloids by subjecting the extract to Wagner's reagent (iodine in potassium iodide). Alkaloids were detected by the development of a reddish-brown precipitate. By treating the extract with a few drops of sodium hydroxide solution, flavonoids were found using the alkaline reagent test. When diluted acid was added, the vivid yellow color that had initially shown changed to colorless, indicating the presence of flavonoids. An extract sample was heated with distilled water, and the mixture was filtered to determine the presence of tannins. Following treatment with a ferric chloride solution, the filtrate showed signs of tannin present in the form of a blue-black or greenish-brown precipitate. With the use of distilled water to dilute the extract and a vigorous shaking, saponins were identified using the froth test. Presence of saponins was demonstrated by the development of a persistent 1 cm foam layer. Other phytochemical groups, such as terpenoids, glycosides, and phenolic compounds, were also found using certain chemical assays in addition to these studies

## III. PREFORMULATION STUDIES

Preformulation studies are performed as follows:

Accurately weighed 10mg of extract (corn silk , annatto seeds and combination of two extracts) were taken and the extracts were dissolved in different solvents such as ethanol, methanol, water. The mixtures were shaken for 24hrs at regular intervals. The solution were filtered by using Whatman's filter paper. The filtered solutions were analysed at suitable nm.

IV. FORMULATION OF THE CREAM:

S.no	INGREDIENTS	F1	F2	F3
1	Corn Silk	0.5 mg	-	0.25 mg
2	Annatto seeds	-	0.5 mg	0.25mg
3	Stearic acid	1.2 mg	1.2 mg	1.2mg
4	Glycerin	2 ml	4 ml	6ml
5	Potassium hydroxide	0.1gm	0.1 gm	0.1 gm
6	Methyl paraben	0.0025gm	0.0025gm	0.0025 gm
7	Rose water	Q.S	Q.S	Q.S
8	Water	5ml	5ml	5ml

TABLE:01 FORMULATION TABLE

Preparation of the oil phase:

Stearic acid was melted at 75°C to prepare the formulation’s oil phase.

Preparation of aqueous phase:

Water soluble components, such as methyl paraben, potassium hydroxide, and glycerine, were dissolved in deionized water at 75°C until all of the materials were dissolved.

Addition of aqueous phase to oil phase:

Aqueous phase is added to oil phase gradually with moderate agitation after both phases—the oil phase and the aqueous phase—have been heated to 70°C. The mixture is then agitated until the temperature falls to 40°C. Once the temperature reaches 40°C, rose water is added for fragrance . A semi-solid cream was formed by cooling the emulsion to room temperature. Extracts from cornsilk and anatto seeds were dissolved in heated deionized water.

Cream of corn silk: An appropriate amount of cream base is mixed with the necessary amount of corn silk solution.

Annatto cream: A reasonable amount of cream base is mixed with the necessary amount of Annatto solution.

Combination of corn silk with annatto seed cream: An appropriate amount of cream base is mixed with the necessary amount of both plant solutions.

V. EVALUATION TEST OF THE HERBAL CREAM

PH OF CREAM:Using a digital pH meter, the prepared herbal cream’s pH is determined. The cream solution was made by mixing one milligram of cream with ten milliliters of distilled water, then letting it sit for two hours. Ph is calculated for each solution three times, and the average value is found.

VISCOSITY: The viscosity of cream is measured at 25 degrees Celsius using a Brooke Field Viscosity Meter and Spindle Number at 5 rpm.

SPREADABILITY: Spread ability of designed cream is assessed by inserting a sample between two slides and compressing it to a consistent thickness with a specific weight for a set period of time. The amount of time required to separate the two slides was measured as spread ability. Less time spent separating two slides resulted in greater spread ability.

$$\text{Spread ability} = m.l/t$$

Where, m=Standard weight is fastened to or put over the upper slide. l= the length of a glass slide. t-time recorded in seconds

WASH ABILITY: The formulation was applied to the skin and the ease of washing with water was evaluated.

NON-IRRITANCY TEST: The formulation of a herbal cream is tested for non-irritancy. The preparation should be free of redness and irritancy. The state is observed for 24 to 28 hrs

PHASE SEPARATION: The cream is moved into an appropriate wide-mouth container. After being stored for a day, the separation of the oil phase and aqueous phase became visible.

CONSISTENCY: A physical hand rub of the cream is used to evaluate the formulation. Smooth consistency is what you want in your cream.

## VI. THE ANTIMICROBIAL METHOD

### CUP AND PLATE METHOD:

Antibacterial activity is performed using the following strains of bacteria. Gram-positive bacterium: Streptococcus

Gram-negative bacterium: Escherichia coli Standard : Zithromax

The medium preparation:

20gm of Agar

Clean water -100 ml pH 7.2+0.2

By heating purified water on a water bath to dissolve a precise amount of agar, the medium was created and then poured into a 100ml volumetric conical flask. The conical flasks were closed with cotton plugs and were sterilized by autoclaving at 121° C for 15min. The contents of the conical flasks were poured aseptically into sterile Petri dish is allowed to solidify. These sterilized medias were used to subculture the bacterial culture to separate the two slides was measured as spread ability. Less time spent separating two slides resulted in greater spread ability.

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Procedure:

Each Petri dish was filled to a depth of 4-5 mm with a nutrient agar medium that was previously inoculated with suitable inoculums of suitable test organism, and then allowed to solidify. The Petri dish were specially selected with flat bottom and were placed on level surface so as to ensure that the layer of medium in uniform thickness. To each portion one cylindrical cavity was made in medium with the help of sterile borer. One cavity for test compounds and one cavity for standard. The Petri dishes were incubated at 37°c for 24hrs. Diameter of the zone of inhibition was measured and the average diameter for each sample was calculated. The diameter obtained by the test sample was compared with that produced by standard penicillin.

## VIII. RESULTS AND DISCUSSIONS

### TABLE: 02 PREFORMULATION STUDIES

1. Solubility studies of Corn silk

S.no	SOLVENT	SOLUBILITY
1.	Ethanol	0.512 = 0.02
2.	Methanol	0.432 = 0.01
3.	Water	0.092 = 0.01

2. Solubility studies of Annatto seeds

S.no	SOLVENT	SOLUBILITY
1.	Ethanol	0.541 = 0.02

2.	Methanol	0.416 = 0.01
3.	Water	0.089 = 0.01

3. Solubility studies of combination

S.no	SOLVENT	SOLUBILITY
1.	Ethanol	0.616 = 0.01
2.	Methanol	0.516 = 0.02
3.	Water	0.097 = 0.02

TABLE: 03 PHYTOCHEMICAL SCREENING OF EXTRACTS

S.NO	Chemical Test	Appearance	Result Corn Silk	Result Annatto Seeds	Result Combination
1.	Test for Alkaloids				
	a) Dragendorff's test	a) Orange- Brown ppt	+ ve	+ ve	+ ve
	b) Mayer's test	b) White ppt	+ ve	+ ve	+ ve
	c) Wagner's test	d) Red Brown	+ ve	+ ve	+ ve
2.	Test for Flavonoids				
	a) Sulphuric acid test	a) Yellow /Red/Blue	+ ve	+ ve	+ ve
	b) Lead acetate test	b) Yellow ppt	+ ve	+ ve	+ ve
3.	Test for Phenols				
	a) Ferric chloride test	a) Blue black colour	+ ve	+ve	+ve
	b) Gelatin test	c) White ppt	+ve	+ve	+ve
4.	Test for Steroids				
a) Liebermann's test	a) Blue colour	-ve	-ve	-ve	
5.	Test for Tannins				
a) Gelatin test	a) White ppt	+ve	+ve	+ve	
6.	Test for Saponins				

	a)Foam test	a) Foam appearance	+ve	+ve	+ve
7.	Test for Glycosides a)Keller-Killani test	a) Lowe reddish brown upper acetic layer	+ve	+ve	+ve
8.	Test for Proteins a)Millons test	a) Brick red	+ve	+ve	+ve
9.	Test for Carbohydrates a)Molish test b)Benedicts test c)Barfoeds test d)Fehlings test	a) Violet ring formation b) Reddish brown c) Red ppt d) Red ppt	-ve +ve +ve -ve	-ve -ve -ve +ve	-ve +ve +ve -ve

1) Physical appearance / visual inspection:

The results of this study indicate that the active ingredients of these drugs, when incorporated into Herbal cream, give more stable products with good aesthetic appeal. The medicinal plants used in the formulation of Herbal face cream were found to be Corn silk and Annatto seeds extract, and other ingredients have been reported for glowing & nourishment. The various quality control parameters like PH, Irritancy, Washability, Viscosity, Phase Separation, Spread Ability, Consistency Test, etc. All parameter gives favorable result.

TABLE: 04 Evaluation of physical characteristics

CHARACTERISTIC	F1	F2	F3
Colour	Faint yellow	yellow	yellow
Odour	Pleasant	pleasant	pleasant
State	Semi solid	Semi solid	Semi solid
Consistency	Smooth	smooth	smooth

2) Determination of PH:

The product's pH balance is crucial since it has an impact on the skin and surfaces that it is applied to.

Our Formulated Face Cream's pH is between 4.5 and 5.5, which is the perfect range for the cream. Table 5 displayed the results.

TABLE :05 Ph test

S.no	FORMULATION	PH OF CREAM
1.	F1	5.7
2.	F2	5.6
3.	F3	6.0

3) Spreadability:

The spreadability of the prepared cream was assessed by sandwiching a sample between two slides and compressing it to a consistent thickness for a predetermined amount of time using a specific weight. Spread ability was determined by measuring the amount of time needed to separate the two slides. A shorter separation time between two slides was associated with improved spread ability. The spread ability was determined using the formula. The range should be between 9.0 to 31.02g/s. The outcome is displayed in Table 6  $\text{Spreadability(s)} = \frac{\text{Weight tide to upper slide (w)} * \text{Length of glass slide (L)}}{\text{Time taken to separate slide (T)}}$

TABLE :06 Spreadability test

S.no	FORMULATION	SPREADABILITY
1.	F1	4.61
2.	F2	4.76
3.	F	5.08

4) Washability:

Formulation was applied on the skin and then ease extends of washing with water was checked. Results were shown in table.7

TABLE: 07 Washability test

S.no	FORMULATION	SPREADABILITY
1.	F1	4.61
2.	F2	4.76
3.	F	5.08

5) Non-Irritancy test:

Herbal Cream formulation was evaluated for the nonirritancy test. Preparation shown no redness, edema, inflammation and irritancy. Observation of the state was done for 24 h

TABLE: 08 Non irritancy test

S.no	FORMULATION	NON-IRRITANCY
1.	F1	NIL
2.	F2	NIL
3.	F3	NIL

6) Phase separation:

The prepared cream was put into a wide-mouth container that was appropriate. The oil phase and aqueous phase separation were visible after 24 hours and were set aside for storage. The Table 9 displayed the results.

TABLE: 09 Phase separation test

S.no	FORMULATION	PHASE SEPERATION
1.	F1	No phase seperation
2.	F2	No phase seperation
3.	F3	No phase seperation

6) Consistency:

Herbal cream formulation was evaluated for consistency results were shown in table 10.

TABLE: 10 Consistency test

S.no	FORMULATION	CONSISTENCY
1.	F1	Smooth
2.	F2	Smooth
3.	F3	Smooth

TABLE 11: Results for the optimized formulation F3.

S.NO	Parameters	Results
1.	Colour	Yellow
2.	Odour	Pleasant
3.	State	Semisolid
4.	Consistency	Smooth
5.	pH	6.0
6.	Spreadability	5.08
7.	Washability	Easily washable
8.	Non Irritancy	NIL
9.	Phase seperation	No phase seperation

ZONE OF INHIBITION (AGAINST STREPTOCOCCUS GRAM +VE BACTERIA)

TEST COMPOUND	µg /ml	STANDARD COMPOUND	µg /ml
Corn silk	10	Azithromycin	10
Annatto seeds	10	Azithromycin	10
Corn silk and Annatto seeds	10	Azithromycin	10

ZONE OF INHIBITION (AGAINST STREPTOCOCCUS GRAM +VE BACTERIA)

NAME OF	µg /ml	ZONE OF INHIBITION	ZONE OF INHIBITION FOR

THE COMPOUND		FOR TEST	STANDARD
Corn silk	10	1.5 mm	2mm
Annatto seeds	10	3 mm	3.5 mm
Corn silk and Annatto seeds	10	3.5 mm	4 mm

and Annatto seeds			
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**CONCLUSION**

The study's investigation led to the discovery that all the formulations F1, F2 and F3 show improved results.. Based on the results we suggest that all these formulations are suitable /safe for skin and were stable. However, the F3 formulation showed best results against the gram positive ( streptococcus ) and gram negative ( E. coli ) bacteria when compared to the individual formulations F1 and F2 .

- The pH of the formulation F3 was found to be 6.0
- The Spreadability of the optimized formulation F3 was found to be 5.08g.cm/s
- \*The formulation F3 was not observed of any phase separation.
- The formulation F3 is easily washable with tap water.
- The formulation F3 does not show any irritation
- The formulation F3 does not show any greasiness.
- There is no separation in formulation F3 so it is found to be stable.

**ZONE OF INHIBITION (AGAINST E. COLI GRAM -VE BACTERIA)**

TEST COMPOUND	µg /ml	STANDARD COMPOUND	µg /ml
Corn silk	10	Azithromycin	10
Annatto seeds	10	Azithromycin	10
Corn silk and Annatto seeds	10	Azithromycin	10

However, the Formulated Herbal face cream shows good physical appearance with faint yellow Color, Smooth consistency, Pleasant odor, and Semi-solid state, good rheological properties and shows good physical properties like pH, Spreadability, No Phase separation, Washability.

**ZONE OF INHIBITION (AGAINST E. COLI GRAM +VE BACTERIA)**

NAME OF THE COMPOUND	µg /ml	ZONE OF INHIBITION FOR TEST	ZONE OF INHIBITION FOR STANDARD
Corn silk	10	1.5 mm	1.5 mm
Annatto seeds	10	2 mm	3mm
Corn silk	10	3 mm	3.5 mm



F1 CORN SILK CREAM      F2 ANNATTO SEED CREAM      F3 COMBINATION OF CORN SILK AND ANNATTO SEED CREAM



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