International Journal of Pharmacy and Pharmaceutical Research (IJPPR)
Volume 31, Issue 12, December 2025 **ijppr.humanjournals.com** ISSN: 2349-7203

Formulation and Evaluation of Poly Herbal Whitening Beauty Soap

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Received: 15 November 2025 Revised: 29 November 2025 Accepted: 16 December 2025

ABSTRACT:

The study involves the formulation and evaluation of a poly herbal whitening beauty soap using natural ingredients. The soap was prepared by the saponification method and evaluated for physicochemical properties, foaming characteristics, and skin compatibility. The results showed acceptable pH, good cleansing action, and stability. The formulation was found to be safe, effective, and eco-friendly.

Keywords: Poly Herbal, Whitening Beauty Soap

INTRODUCTION:

Soap molecules have a long non-polar hydrocarbon chain and a polar ionic end(car boxylate group with Na^+ or K^+).The non-polar tail dissolves oils, while the ionic end dissolves in water, allowing oils to be emulsified and washed away. Soap making involves reacting oils with caustic soda and water. Reaction speed and soap quality depend on oil quality, free fatty acid content, amounts of caustic soda and water, heat before mixing, and mixing intensity. Higher free fatty acids, heat, and vigorous mixing speed up the soap formation process.

INGREDIENTS

Goat milk

Goat milk comes from the domestic goat (*Capra hircus*), classified under Kingdom Animalia,Phylum Chordata, Class Mammalia, Order Artiodactyla, Family Bovidae, Genus *Capra*, Species *C. hircus*.

Uses for skin:

Prevents premature aging due to antioxidants like vitamins A, C, and E,and helps remove dead skin. Helps treat acne and blemishes because its proteins are antimicrobial and act against acne-causing bacteria. Keepsskin soft and moisturized as it acts as a natural moisturizer that is easily absorbed, making skin smooth and supple. Reduces irritation and inflammation thanks to its fatty acids and anti-inflammatory properties.

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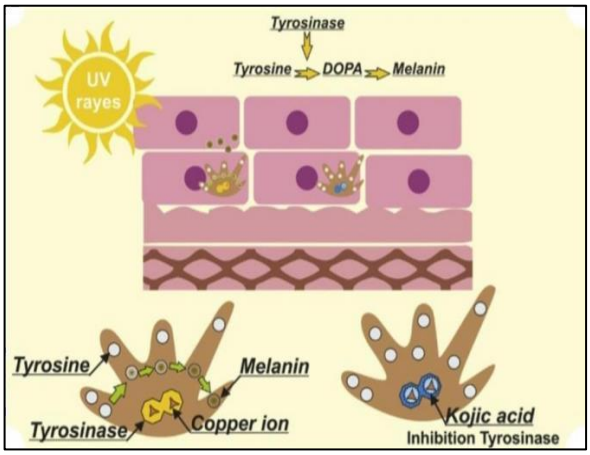
Kojic acid

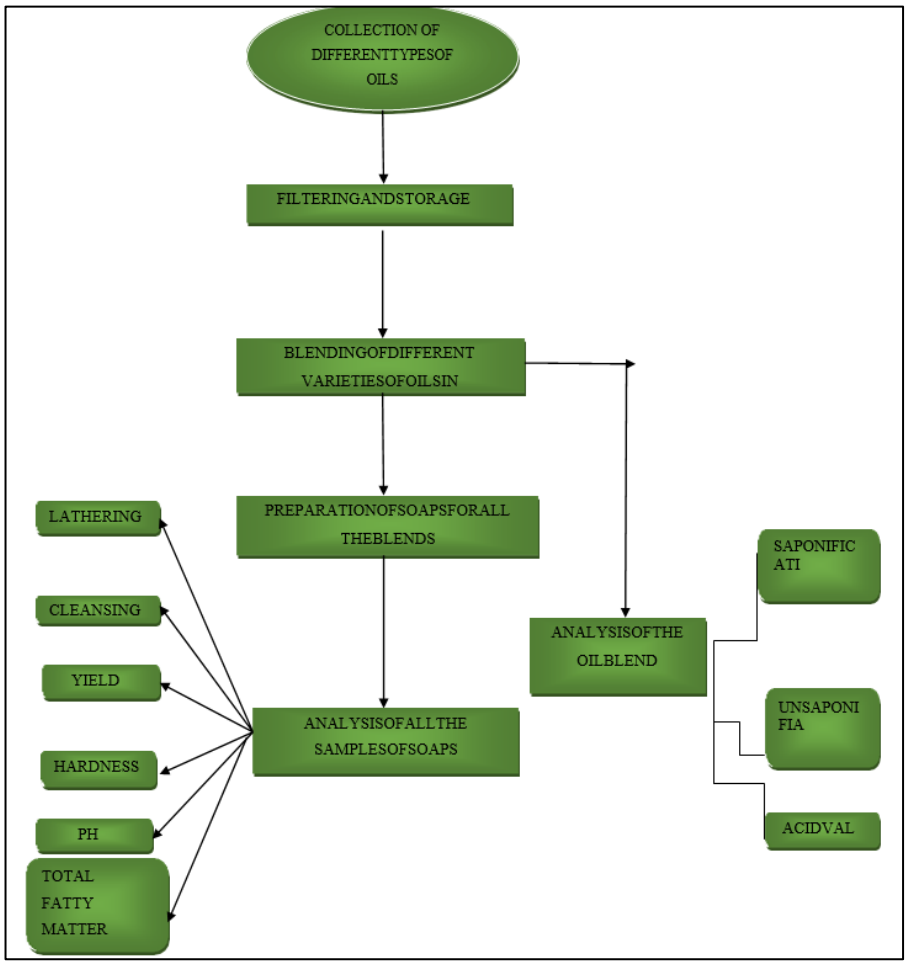


Kojic acid is a fungal metabolite (5-hydroxy-2-hydroxymethyl-4-pyrone) produced mainly by *Aspergillus* species and as a by-product of fermenting foods like soy sauce and rice wine.

Kojic acid is a skin-lightening agent that inhibits tyrosinase, reducing melanin production and helping to fade hyper pigmentation like melasma, sunspots, and post-inflammatory dark spots.

Used in creams, serums, and some pharmaceutical products to brighten and even skin tone, and it also has antioxidant and antimicrobial activity; nano formulations are under study.

METHODOLOGY



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FORMULATION

Soap base formulation:

Use a fire-polished glass rod to stir, never use the thermometer as a stirrer. Measure liquid temperature by suspending the thermo meter bulb in the liquid center; avoid touching container bottom. Remove thermometer after reading. Weigh 8 g KOH pellets in a 150 ml beaker, add 25 ml cold water in a fumehood, and stir until clear. Handle KOH carefully (skin and eye hazard). Weigh 58 g fat in a 250 ml beaker, heat gently on a hot plate until melted and warm to 42–50°C.Remove fat from heat, add KOH solution while stirring continuously to form a stable emulsion (thick, light-yellow milkshake). If it separates, cool and stir more. Optional: add perfume or additives. Pour emulsion into a plastic cup, let sit for 2 weeks to allow reaction and drying. A powdery sodium carbonate layer forms on top; slice it off before use.


Compressed Cold Process Soap Method

Weigh 75 ml coconut oil into 500 ml beaker; heat on water bath at40–45°C with stirring until thick consistency. Monitor temperature with thermometer. Weigh KOH (lye) into clean beaker; dissolve in distilled water, maintain 40–45°C.Add lye solution to coconut oil; stir andheatat4045°C until base forms (emulsified). Transfer to soap molds; freeze 23hours.Remove from freezer; let stand 5 minutes undisturbed for soap to set.

Compressed Poly Herbal Soap Procedure

Place required soap base in 500 ml beaker; heat on water bath at 45°Cwithout stirring until liquefied. Add all herbal ingredients (e.g., extracts like neem, aloevera, turmeric, tea tree oil) to liquid base. Heat mixture on water bath at 45°C without stirring until uniform. Pour into soap molds ;freeze 2–3 hours. Remove from freezer; let stand undisturbed 5 minutes for soap to set. Common poly herbal ingredients include neem, aloe vera, turmeric, and vitamin E for antimicrobial and moisturizing effects. This is a melt-and-pour method using pre-made base.

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PACKAING INSERT:

WIDTH: 10.1 **LENGTH**: 6.3. **HEIGHT:** 3.3

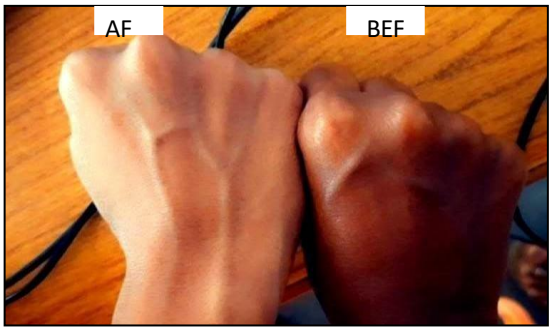
Ingredients:sandalwood,oliveoil,kojicacid,goatmilk,vitamineoil ,roseoil,turmeric,honey

Category:treatssuntan,whitening,treatsacne,softskin,antioxidant,treatsdarkspots ,improvedryskin

Storage:stored in cool place keep away from direct sunlight soap having inert property of loosing moisture but there is parallel again in TFM

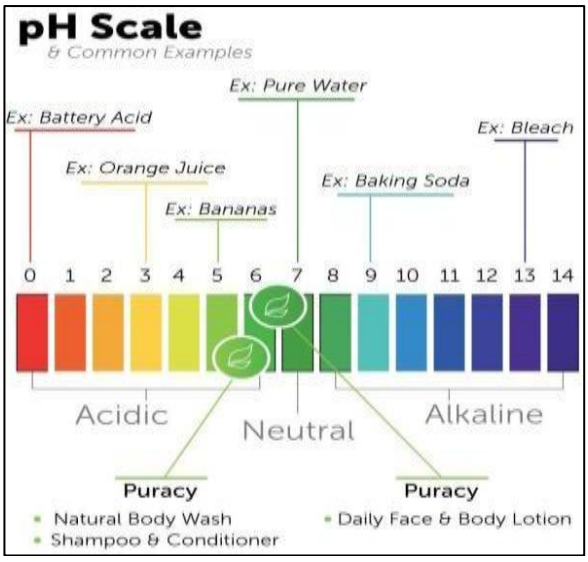
MFGBY:SJCPS **MFG**

MELONOGENESIS:



EVALUATIONTEST:

1. PH: The pH of all the prepared formulations was determined by using digital pH meter. The formulations were dissolved in 100 ml of distilled water and stored for two hours. The measurement of Ph of formulation was done in previously calibrated pH meter.



2. ACCELERATED STABILITY TESTING:

Accelerated stability testing of prepared PHF was at room temperature, studied for one week at 50˚C±1˚C for 3 months. The PHF were kept both at room and elevated temperature and observed on 0th 15th, 20th, 30th, 40th, 50th, 60th, 70th, 80th and 90th day for the following parameters.

3. FOAMHEIGHT: 0.5grams of sample of soap was taken dispersed in 25 ml distilled water. then, transferred it in to 100 ml measuring cylinder; volume was made upto 50ml with water. 25 strokes were given and stand till aqueous volume measured up to 50 ml and measured the foam height, above the aqueous volume.

4.ALCOHOL INSOLUBLE MATTER:

5gm of sample was taken in a conical flask. Added it to 50 ml of warm ethanol and shaken vigorously to dissolve the solution was filtered through a tarred filter paper and washed 2 times with 95% of ethanol and dried it at105 ˚c for one hour in hot air oven. The weight of dried paper was taken.

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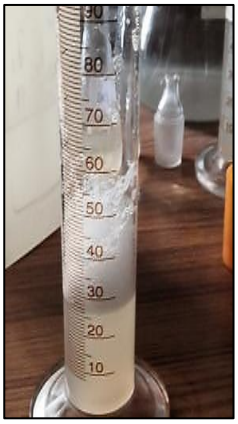


Alcohol Insoluble Matter

Calculation:

- Sample weight=5g;
- Filter paper weight=0.88g;
- Filter paper after drying = 0.75 g.

%Alcohol insoluble matter= ((0.88−0.75)×100)/5=(0.13×100)/5=2.6%.

5.ALCOHOL INSOLUBLE MATTER:

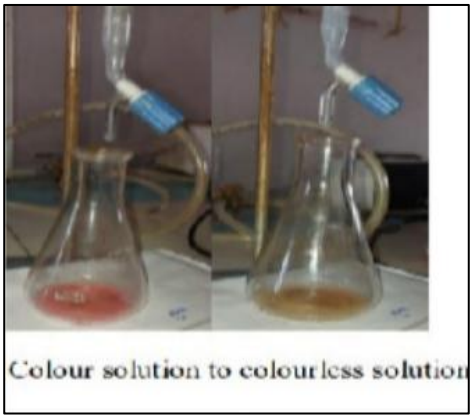
5gm of sample was taken in a conical flask. Added it to 50 ml of warm ethanol and shaken vigorously to dissolve the solution was filtered through a tarred filter paper and washed 2 times with95% of ethanol and dried itat105 ˚c for one hour in hot air oven. The weight of dried paper was taken.

SAPONIFICATION NUMBER:

6.FOAMRETENTION:

25 ml of the 1% soap solution was taken in to a 100 ml graduated measuring cylinder. The cylinder was covered with hand and shaken10times.The volume of foam at 1 minute intervals for 4 minutes was recorded.

7.TOTAL FATTY MATTER: Determination of the Total Fatty Matter in Soaps: 5gm of soap sample is dissolved in 100ml hot water.About40ml of 0.5N HNO3 is added to make it acidic. The mixture is heated until fatty acids are floating as a layer above the solution. It is cooled in ice water to solidify the fatty acids. The fatty acids were separated and the aqueous solution was treated with 50ml chloroform to remove the remaining fatty acids. The separated fatty matter was mixed together, solvent was evaporated and the yield is noted. The total fatty matter can be calculated using the following method.



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Soap fatty matter calculation:

Beaker weight (x) = 47.8 g;

beaker + dried soap (y) = 51.4g;

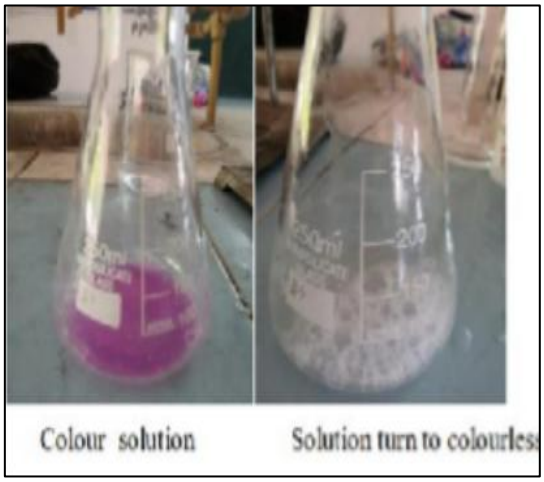
sample=5g.

%Fatty matter=((51.4−47.8)×100)/5

%Fatty matter =72%.

8.FREE ALKALI DETERMINATIONIN SOAP:

Weigh10g soap, dissolve in150mldistilledwater(warm30-40min), transfer to 250 ml flask, dilute to mark. Pipette 10 ml soap solution into titration flask, add 2 drops phenolphthalein(turns pink). Titrate with 0.01M HCl until colorless; record burette



Concentration (mg/ml)	S.aureus	P.aeruginosa	C.albicans
13	19±1	24±1	18±1
10	16±1	20±1	21±1

3. DETERMINATION OF TOTAL ALKALI CONTENTIN SOAP SAMPLE:

5gsoap is dissolved in100mL hot water, acidified with~40mL0.5 N HNO3 to liberate fatty acids as a floating layer up on heating. The mixture cools in ice to solidify fatty acids for separation, followed by chloroform (50 mL) addition to extract residual fatty acids from the aqueous phase.

The calculation uses

Strength=0.00406×56.105 =0.2278g/L; for 100 mL (10 gsoap), free alkali = 0.02278 g, so % = (0.02278/10)×100 =0.23%.

This low free alkali level signifies quality soap via standard titration.

9. ANTIMICROBIALACTIVITY:

The antimicrobial study used Staphylococcus aureus SA812from the Czech Collection of Microorganisms. The bacterial culture was diluted to 10% in nutrient broth (peptone 5 g,NaCl5g,beefextract1.5g,yeastextract1.5g)andincubated24 h at 30 °C.1 mL soap solution at various concentrations was mixed into 19 mL molten agar, poured into Petri dishes in triplicate with controls, incubated at 30 °C; anti-microbial activity was assessed by measuring inhibition zones.

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RESULTS AND DISCUSSION;

Anti-microbial Activity

Total Fatty Matter in Commercial Soaps

Soap Name	% Fatty Matter
Lux	68.2
Sunlight	41.8
Breeze	79.2
Johnson Baby	77.6
Pears	71.6
Fiamadi Wills	69.6
Angelina Aromatic	47.8

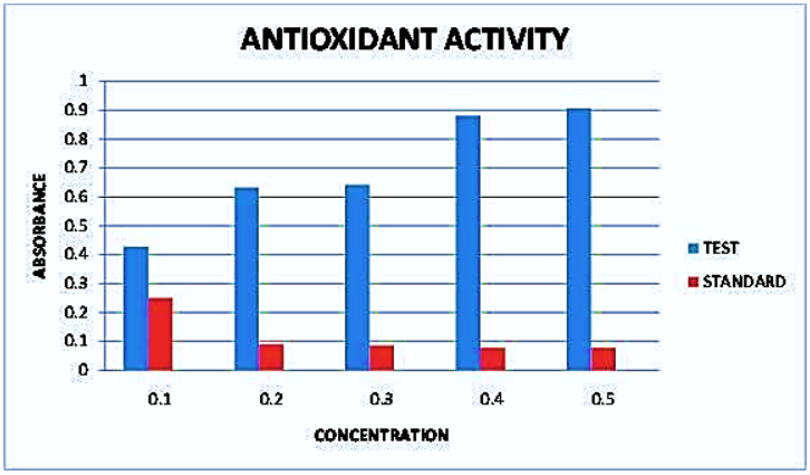
PHYSICO–CHEMICALPARAMETERSOFFORMULATIONPHYSICALPARAMETERS:

Chemical parameters:

S.NO	Chemical parameters	Herbal soap	Standard
1	PH	7.3	6.5-7.5
2	High temperature stability	Soapmeltsabove45˚C	45^0c
3	Foam height(cm)	2.5cm	2.5-3.0
4	Foam Retention(min)	2cm	0.5-2.5
5	Alcohol in soluble matter	2.6%	6.2%-61.8%
6	Total fatty matter	72	>70
7	%Free alkali	0.22%	0-0.62%
8	Total alkali content in soap	0.18%	<2%
9	Saponification number	182.325	185-196
10	Unsaponified matter	0.5gms	0.4-1.0gms
11	Acid value	1.12	0.3-1.0

Biological parameters

Anti-oxidant activity phosphor molybdenum free radical scavenging activity of a selected are listed in the following table.



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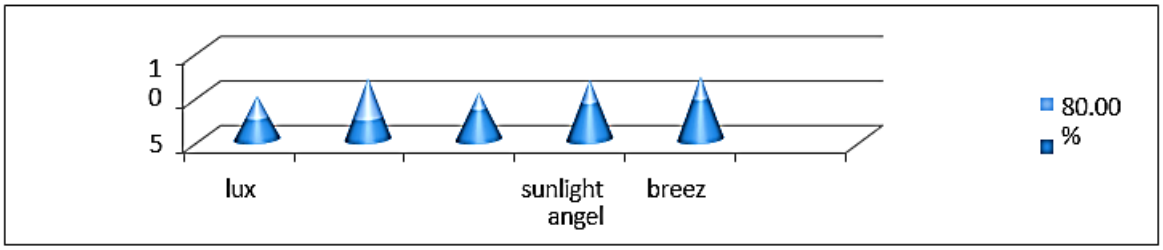
TOTAL FATTY MATTER CONTENTON SOAP SAMPLES



CONCLUSION

❖ Poly herbal soap prepared by cold process was transparent, particle free, and stable, showing good physical characteristics and compatibility. It exhibited excellent foaming and was free from free alkali.

❖ Micro biological and antioxidant studies confirmed antimicrobial and anti-aging properties superior to marketed brands. Soaps with high total fatty matter(TFM)and low alkali content are of good quality, with bathing soaps studied within standard TFM ranges.

❖ The soaps analyzed showed alkali content 3-5% and TFM 70-80%, close to Indian and international standards, indicating good quality suitable for health and environment. Total free alkali was around 2%, and total fatty matter 76%.

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KeenMA,HassanI.VitaminEindermatology

How to cite this article:
K.Harika et al. Ijppr.Human, 2025; Vol. 31 (12): 559-567.
Conflict of Interest Statement: All authors have nothing else to disclose.