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Formulation and Evaluation of Antifungal Herbal Soaps

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ABSTRACT

Fungal skin infections are most common amongst people, requiring significant attention for treatment and also to maintain good and healthy skin. Some herbal plants have antifungal activity. The aim and objective of the present study is to formulate antifungal herbal bath soap using different herbal plants. The antifungal activity of the prepared formulation was tested using agar diffusion method against the organism *Candida albicans*. The prepared herbal soaps formulations exhibited a good antifungal effect.

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1. INTRODUCTION:

Most of the commercial soaps and detergents contain chemicals that can be harmful to the skin. Using a natural herbal soap and detergents can be a good alternative. Herbal soaps and detergents are made using natural herbs and ingredients that are healthier and beneficial for the skin. Now a day people are very much aware of the ingredients in cosmetics products. The benefits of plant products and harmful effects of chemical ingredients. The Soap and Detergent industry is profoundly lucrative with splendid market potential as well as bright future scope. In order to meet the requirement of market demand, many more new units are recommended to be established on small and cottage scale.

Herbal cosmetics are classified on the basis of dosage form like- cream, powder, soaps, solutions, etc. and according to part or organ of the body to be applied for like; cosmetics for skin, hair, nail, teeth and mouth etc., The basic idea of skin care cosmetic lies deep in the Rigveda, Yajurveda, Ayurveda, Unani and Homeopathic system of medicine. These are the products in which herbs are used in crude or extract form.

1.1 SKIN:

The skin or cutaneous membrane covers the external surface of the body. It is the largest organ of the body in surface area and weight. The function of the skin is body temperature regulation, a reservoir for blood, protection from the external environment, cutaneous sensations, excretion and absorption, and vitamin D synthesis. The external defense system prevents microbial microorganisms to enter the body. Skin is biggest external defense system. Skin covers the outside of the body but has other functions beside the defense mechanism. It serves as a mechanical barrier between the inner part of the body and the external world. Temperature of skin varies in a range of 30 to 40°C degree depending on the environmental conditions.

Skin is one of the most readily accessible organs on human body for topical administration and is main route of topical drug delivery system. This research is concern with all detail information regarding rational approach to topical formulation, aim of topical permeation and basic components of topical drug delivery systems. Absorption of ointment through the skin depends on a number of factors, the important of which are concentration, time of contact, solubility of drug, and physical condition of skin layer and part of the body exposed.

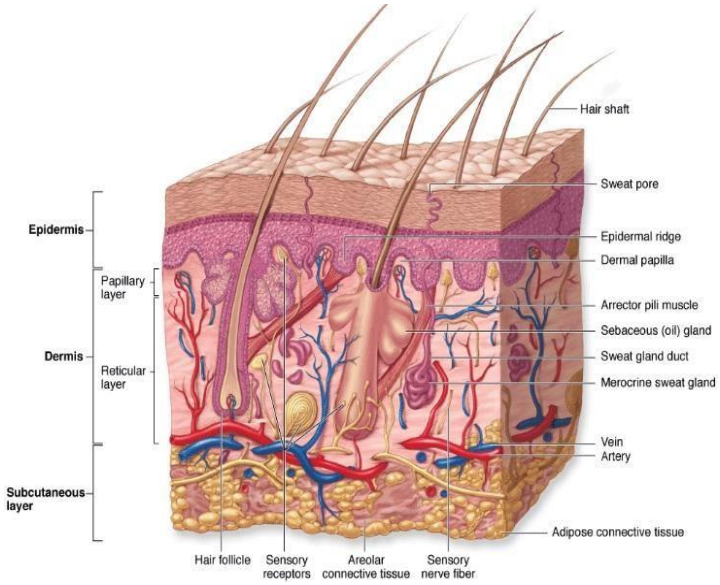


Figure No: 1 Components of Skin

1.2 FUNGAL INFECTION:

A fungal infection, also called mycosis, is a skin diseases caused by a fungus. There are million species of fungi. They live in dirt, on plants, on household surfaces, and on your skin. Sometimes, they can lead to skin problems like rashes or bumps. Different types of fungi can cause fungal infections. In some cases, fungi that aren't typically found on or inside your body can multiply out of control and causes an infection. Fungal infections can be contagious. They can spread from one person to another. Currently, fungal skin infection is one most serious dermatological concerns in the world. It has been found that in developing and underdeveloped countries, about 40 million people have suffered from fungal infections.

Figure No: 2 Fungal Infections

2. MATERIALS AND METHODS:

2.1 LIST OF CHEMICALS

List of chemicals used in Soap base, Bees wax, SLS, EDTA, Citric acid, Coconut oil, Castor oil.

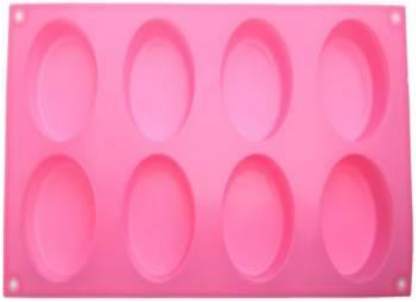


Figure No. 3: Soap Mould

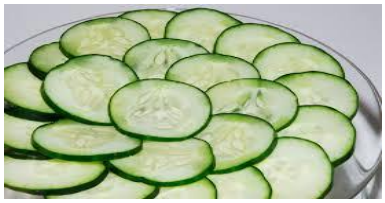
2.2 PLANT AND ACTIVE MATERIAL:

Table No. 1: Plant Materials

S. NO	MATERIALS	CONTENT
1		**NEEM** **SYNONYMS:** Oriya- Nimba; Tam- Vembu. **FAMILY:** Meliaceae. **USES:** Anti Inflammation, Antifungal.
2		**TULASI** **SYNONYMS:** Sacred basil, Holy basil. **FAMILY:** Labiatae. **USES:** Antibacterial, Antifungal, Antioxidant.
3		**TURMERIC** **SYNONYMS:** Curcuma, Curcuma aromatic. **FAMILY:** Zinziberaceae. **USES:** Anti Inflammation, Antifungal, Antifertility agent.

4		**PAPAYA** **SYNONYMS:** *Carica papaya*. **FAMILY:** Caricaceae. **USES:** Papain is used as digesting for protein.
5		**KUPPAIMENI** **SYNONYMS:** Indian nettle, Indian acalypha. **FAMILY:** Euphorbiaceae. **USES: Anti-Pimple, Dandruff, Skin Rashes.**

Table No. 2: Plant & Active Materials

S. NO.	MATERIALS	CONTENT
6		**CUCUMBAR** **SYNONYMS:** *Cucumis sativus*. **FAMILY:** Cucurbitaceae. **USES:** Sunburn, Reverses Skin Tanning.
7		**TULASI** **SYNONYMS:** Sacred basil, Holy basil. **FAMILY:** Labiatae. **USES:** Antibacterial, Antifungal, Antioxidant.
8		**JAVADHU** The Herbal nature of Javadhu powder resists body odor causing germs in the skin. Javadhu powder is not only a Natural body perfume but a herbal remedy to body odor.

9		**CHARCOAL** Common charcoal is made from peat, coal, wood, coconut shell, or petroleum. "Activated charcoal" is similar to common charcoal. Activated charcoal is charcoal that has been treated with either a combination of heat and pressure, or with strong acid or base followed by carbonization.
10		**VIBHUTI** It is also called Thiruneeru, vibhuti. Thiruneer also prevents cold and is very good for preventing all cold related headaches. It prevents allergies on the skin especially if it is made with different herbs.

Table No. 3: Composition Of Herbal Soap's

S. NO.	INGREDIENTS	F1 NEEM	F2 TURMERIC	F3 THULASI	F4 KUPPAIMENI	F5 JAVADHU
1	HERBAL POWDER	5 gm	5 gm	5 gm	5 gm	5 gm
2	SOAP BASE	33.5 gm	33.5 gm	33.5 gm	33.5 gm	33.5 gm
3	BEES WAX	4.5 gm	4.5 gm	4.5 gm	4.5 gm	4.5 gm
4	GLYCERIN	5.3 ml	5.3 ml	5.3 ml	5.3 ml	5.3 ml
5	SLS	1.5 gm	1.5 gm	1.5 gm	1.5 gm	1.5 gm
6	EDTA	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
7	CITRIC ACID	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
8	COCOUNT OIL	2.5 ml	2.5 ml	2.5 ml	2.5 ml	2.5 ml
S. NO.	INGREDIENTS	F6 VETTIVER	F7 CHARCOAL	F8 VIBUTHI	F9 PAPAYA	F10 CUCUMBAR
1	HERBAL POWDER	5 gm	5 gm	5 gm	5 ml	5 ml
2	SOAP BASE	33.5 gm	33.5 gm	33.5 gm	33.5 gm	33.5 gm
3	BEES WAX	5 gm	5 gm	5 gm	5 gm	5 gm
4	GLYCERIN	4.2 ml	4.2 ml	4.2 ml	4.2 ml	4.2 ml
5	SLS	1.5 gm	1.5 gm	1.5 gm	1.5 gm	1.5 gm
6	EDTA	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
7	CITRIC ACID	0.5 gm	0.5 gm	0.5 gm	0.5 gm	0.5 gm
8	CASTOR OIL	2 ml	2 ml	2 ml	2 ml	2 ml

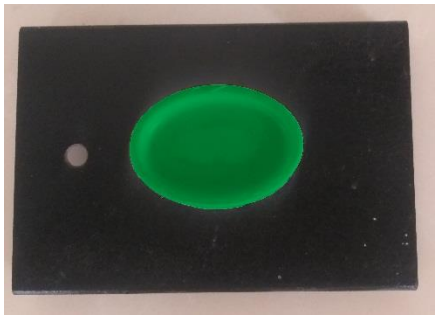
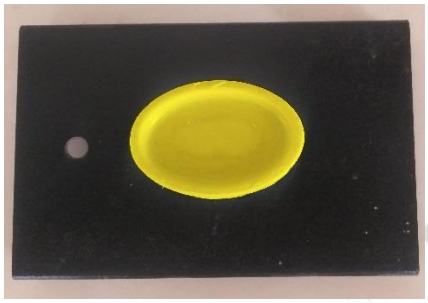
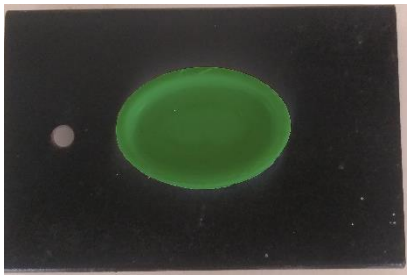
2.3 FORMULATION OF HERBAL SOAPS:

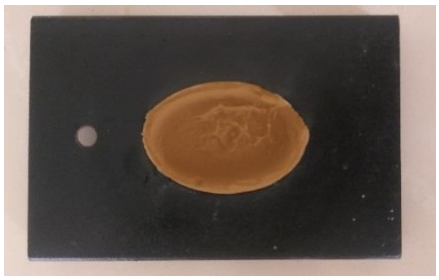
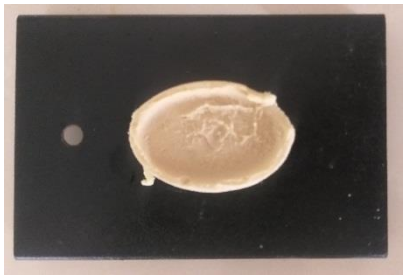
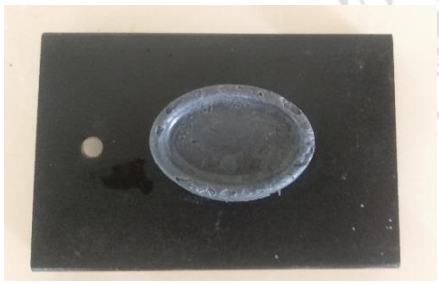
PROCEDURE:

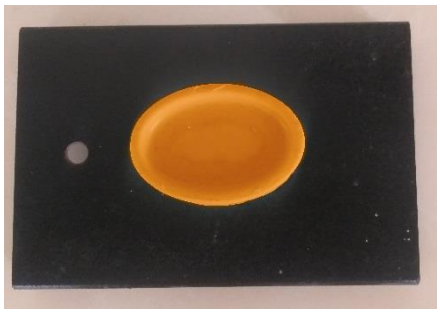
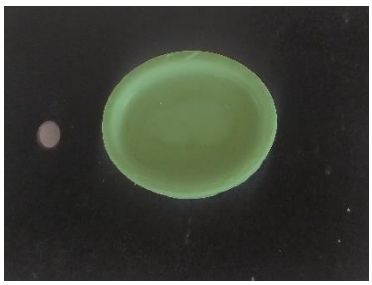
The oil phase ingredients were weighed mixed with continuous stirring at the temperature 120^{o}c to form uniform liquid. The water phase ingredients were weighed mixed with continuous stirring at the temperature 80^{o}C to form uniform liquid. The oil phase was incorporated in the water phase at 80^{o}C with continuous stirring until the semisolid consistency is obtained and added as preservative. Continuous stirring to soap bases till the uniform dispersion of the ingredients was achieved. The soap base fill the suitable soap mould stored the room temperature and its evaluated.

Figure No. 4: Trail Formulation

Table No. 4: Herbal Soap's & Label

S. NO.	F	PRODUCT	LABEL
1	**F1**		
2	**F2**		
3	**F3**		
4	**F4**		

5	**F5**		
6	**F6**		
7	**F7**		
8	**F8**		

9	**F9**		
10	**F10**		

3. EVALUATION OF HERBAL SOAPS:

3.1 Physical Parameter

The prepared herbal soap's were inspected visually for their color, weight variation, odour, appearance. The pH was measured in each cream, using a pH meter.

3.2 Weight Variation

Collected 10 soap's to calculate the individual weight finally calculated the average weight of herbal soap's.

3.3 Percentage Yield

The empty container was Weighed in which the herbal soap's formulation was stored then again the container was weighed with herbal soap's formulation. Then subtracted the empty container weighed with the container with herbal soap's formulation then it gives the practical yield. Then the percentage yield was calculated by the formula.

Percentage Yield = Practical Yield / Theoretical Yield × 100

3.4 Solubility

2gm of soap added 10ml of solvents and shake it 2min view the solubility result.

3.5 Determination of Percentage Free Alkali

Dissolved 5 gm of prepared herbal soap in 50 ml of neutralized alcohol in a conical flask. Then boiled under the reflux on a water bath for 30 minutes. Then cooled and added 1 ml of phenolphthalein solution as an indicator. Then the solution was titrated with 0.1 HCL.

3.6 Foam Height

Dissolved 0.5 gm of prepared soap in distilled water then make up the volume up to 50 ml with distilled water in 100 ml measuring cylinder. Measured the foam height, above the aqueous volume by given 25 strokes.

3.7 Foam Retention

Prepared the 25 ml of the 1% soap solution and transferred into the 100 ml of measuring cylinder. Then the cylinder was shaken 10 times. The volume of foam was recorded at one minute for 4 to 5 minutes.

3.8 Skin Irritancy Test

Mark an area (1sq.cm) on the left hand dorsal surface. The herbal soap was applied to the specified area and time was noted. Irritancy, erythema, edema, was checked if any for regular intervals up to 24 hrs and reported.

3.9 Total Fatty Matter

5 g of soap was accurately weighed and transferred into 250 ml beaker. 100 ml of hot water was added to completely dissolve the soap. 40 ml of 0.5 N Nitric acid was added until contents were slightly acidic. The mixture was heated in a water bath until the fatty acids were floating as a layer above the solution. The fatty acids were cooled in ice and separated them. 50 ml of chloroform was added to the remaining solution and transferred it to a separating funnel. Shaken the solution and allowed the solution to separate into two layers. The bottom layer was drained. Added 50 ml of chloroform to the remaining solution in the separating funnel. Separated the fatty acid dissolved in chloroform again as in the previous case and transferred it to the collected fatty matter. The fatty matter was weighed in a pre-

weighed china dish. Allowed the contents to evaporate and weighed the residue. From the difference in weight, calculated the percentage of fatty matter in the given soap sample.

3.10 Anti-Fungal Activity

The formulated herbal soapwere inoculated on the plates of agar diffusion method and a control Amphotericin-B was prepared by herbal soap. The plates were placed in to the incubator and are incubated at 37 °C for 24 hours. After the incubation period, plates were taken out and check the microbial growth by comparing it with the control.

4. RESULTS AND DISCUSSION:

4.1 Physical Parameters

Table No. 5: Physical Parameters

FORMULATION	COLOR	ODOUR	AVERAGE WEIGHT	PERCENTAGE YIELD
F1	GREEN	AROMETIC	44.07	93.5%
F2	YELLOW	AROMETIC	44.11	93.8%
F3	GREEN	AROMETIC	43.88	91.8%
F4	GREEN	AROMETIC	45.43	97.6%
F5	BROWN	AROMETIC	45.31	90.5%
F6	BROWN	AROMETIC	41.88	85.9%
F7	BLACK	AROMETIC	46.02	98.5%
F8	WHITE	AROMETIC	46.22	99.3%
F9	YELLOW	AROMETIC	40.06	83.7%
F10	GREEN	AROMETIC	42.75	87.5%

Table No. 6: Physical Parameters

F	TOTAL FATTY MATTER	PH	FREE ALKALI	FOAM HEIGHT	FOAM RETENTION
F1	77.8	7.5	0.35	26cm	03 min
F2	81.0	7.3	0.31	28cm	03 min
F3	78.9	6.9	0.47	24cm	04 min
F4	73.6	6.8	0.51	22cm	03 min
F5	74.4	7.7	0.40	29cm	05 min
F6	77.6	7.3	0.43	30cm	04 min
F7	77.8	6.9	0.39	33cm	04 min
F8	78.9	7.8	0.50	25cm	06 min
F9	79.7	6.4	0.44	27cm	05 min
F10	73.8	6.6	0.55	31cm	03 min

4.2 Solubility

Table No. 7: Solubility

FORMULATION	HOT WATER	COOL WATER	ETHANOL	ACETONE
F1	+++	+++	+++	++
F2	+++	+++	+++	++
F3	+++	+++	+++	++
F4	+++	+++	+++	++
F5	+++	+++	++	++
F6	+++	+++	++	++
F7	+++	+++	+++	+++
F8	+++	+++	+	++
F9	+++	+++	+++	+
F10	+++	+++	++	+

Keys: + (weakly soluble), ++ (Partially soluble), +++ (soluble),

4.3 Anti-Fungal Test

Table No. 8: Anti-Fungal Test

F	MICROORGANISMS	CONTROL	10	20	30	40	AMPHOTERICIN-B
F1	*Candida albicans*	-	9	9	10	16	10
F2	*Candida albicans*	-	8	9	9	14	10
F3	*Candida albicans*	-	7	9	10	12	10
F4	*Candida albicans*	-	5	7	7	9	10
F5	*Candida albicans*	-	5	6	8	8	10
F6	*Candida albicans*	-	4	5	5	7	10
F7	*Candida albicans*	-	5	6	8	8	10
F8	*Candida albicans*	-	3	4	5	6	10
F9	*Candida albicans*	-	7	9	10	12	10
F10	*Candida albicans*	-	5	7	7	9	10

4.4 Skin Irritancy Test

Table No. 9: Skin Irritancy Test

FORMULATION	2hr	4hr	8hr	16hr	24hr
F1	NIL	NIL	NIL	NIL	NIL
F2	NIL	NIL	NIL	NIL	NIL
F3	NIL	NIL	NIL	NIL	NIL
F4	NIL	NIL	NIL	NIL	NIL
F5	NIL	NIL	NIL	NIL	NIL
F6	NIL	NIL	NIL	NIL	NIL
F7	NIL	NIL	NIL	NIL	NIL
F8	NIL	NIL	NIL	NIL	NIL
F9	NIL	NIL	NIL	NIL	NIL
F10	NIL	NIL	NIL	NIL	NIL

5. CONCLUSION:

The present work involves the formulation of herbal soap by using different oil base. Literatures regarding, herbal soap form preparation, excipients selection, manufacturing method, etc., has been collected and reviewed. based on the optimization of the parameters concluded that herbal soap can be prepared by using soap base, Neem, Vibuthi, Turmeric, Thulasi, Papaya, Javathu, Vettiver, Charcoal, Cucumber, Kuppaimeni, Glycerin, Beeswax, SLS, EDTA, Citric acid, Coconut oil, Castor oil. Hence all the formulation F1 to F10 which satisfied all the for herbal soap like shape, color, odour, total fatty matter, skin irritation test. The anti fungal activity evaluated by agar medium, the F1 , F2 , F3 , F9 formulation compare to other formulation good antifungal activity was evaluated.

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