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DESIGN AND CHARACTERIZATION OF HOME-MADE MORINGA OLEIFERA LEAF EXTRACT SOAP

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ABSTRACT

The aim of our research work is developing the *Moringa oleifera* leaf extract for skin protection by producing a hygienic soap was prepared by Cold process method which is the easiest and most common method done at home. *Moringa oleifera* leaf extract soap was prepared by using a Soap base, *Moringa oleifera* leaf extract, glycerin, coconut oil, turmeric, vitamin-E mixed together into the Saponification reaction, *Moringa oleifera* leaf extract soap was prepared and evaluated to test the organoleptic properties such as color, odor, clarity, appearance, physical properties such as pH, foam retention, foam height, skin irritation test. Various study proved and found that the *Moringa oleifera*leaf have anti-bacterial activity, anti-oxidant, anti-fungal activity etc. According to the description our research work proved that the *Moringa oleifera* leaf extract soap generates the skin protection for human's use. Skin was affected by Synthetic soaps because it contains more chemical substance which produce harmful effect to the skin like itching, irritation. To overcome these problems human's, need a specialized care for skin. Herbals are rich in phytochemicals and have many unknown and known Therapeutics effect. Now a days peoples are adopted with herbal medicinal products; herbal products and they know the benefits of herbs. It was eco-friendly, less side effect compare to the synthetic, low cost can buy a rural people also.

KEYWORDS: *Moringa oleifera* Leaf extract, Skin protection, Handmade Soap.

INTRODUCTION

Herbal means made up of herbs. which is used from ancient time to till now because it has

many phytochemicals with various therapeutic activity, less side effect and it plays a major rolein minor illness. Traditional medicine as including the knowledge, skill, diverse health practices, approaches and beliefs incorporating plants, animals and mineral based medicines, spiritual therapies, manual techniques and exercise which can be used to maintenance of health as well as in the diagnosis, prevention, improvement or treatment of physical and mental illness. The herbal medicines were used for the skin protection studied by Traditional medicinal systemsuch as Ayurveda, Siddha, Unani, Homeopathy. Herbal Soap was made from natural herbs mainly used plants parts such as root, stem, leaves and fruits these are rich in vitamins, minerals, essential oil. It has many pharmacological activities such as antimicrobial, anti- inflammatory, anti-oxidant, anti-ageing, anti-septic, anti- bacterial, anti-fungal. Herbal Soap have various beneficial effects like skin protection, enhance skin conditioning, better moisturizer, great foam, pleasant and long-lasting aroma, soft the skin. Herbal Soap was free from chemicals, synthetic dyes, fluoride, flavors and other additives which is in the commercial soap. Herbal soap can be used for any skin type.

Benefits of herbal soap

- Low side effect
- Skin protection
- Eco-friendly
- Low cost
- Reduce dryness and remove dirt from skin
- Non irritant
- Moisturizing and Nourishing
- Supporting long term skin care
- Skin cleansing
- Effective anti-microbial activity
- Exfoliating
- Maintain body odor

Skin

Skin is the largest sense organ that act as the outer most layer of the human body which is a complex and dynamic organ covers the entire body surface. Skin act as first-line defense against infection and disease. Skin consists of three main layers such as, epidermis, dermis and hypodermis layers.

Major functions of the skin are protection on, regulate body temperature, maintain homeostasis, facilitate sensation, excretion, produces hormones. Ability to heal wound and repair damage tissue. Regulate water loss and retention, fluid balance inside the body. Maintain skin pH level.

Skin was affected by various factors which lead to many diseases such as Acne, Psoriasis, Itching, Warts, Rosacea, vitiligo and many microbial infections like fungal infection, dermatitis, pimples, redness, dark spot, peeling etc.

To overcome theseskin problems proper care is need so this article approaches the Herbal soap was protecting our skin from the various skin problems.[31,32]

Types of skin

Normal skin - Well-balanced skin

Oily skin - Heightened sebum production

Dry skin - Produce less serum than normal

Sensitive skin - Sensitive to environment cause redness

Combination skin - Consist of oily and dry

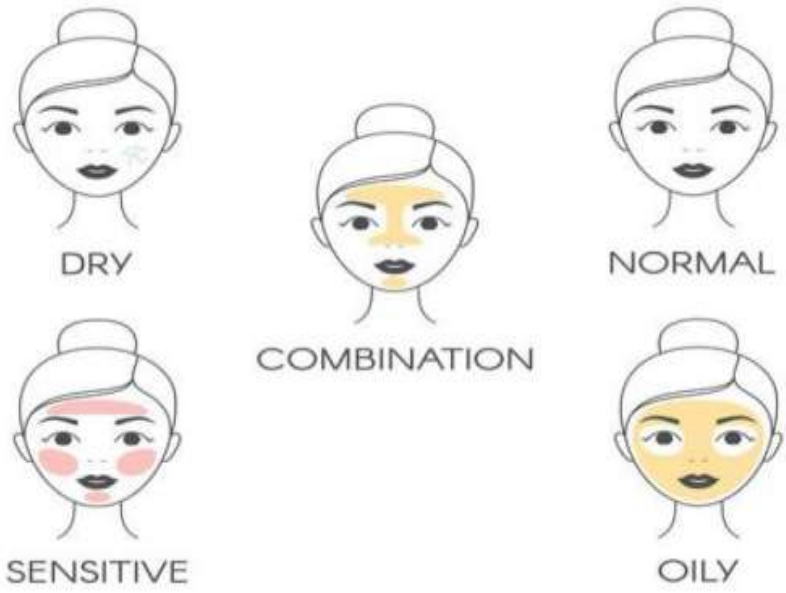
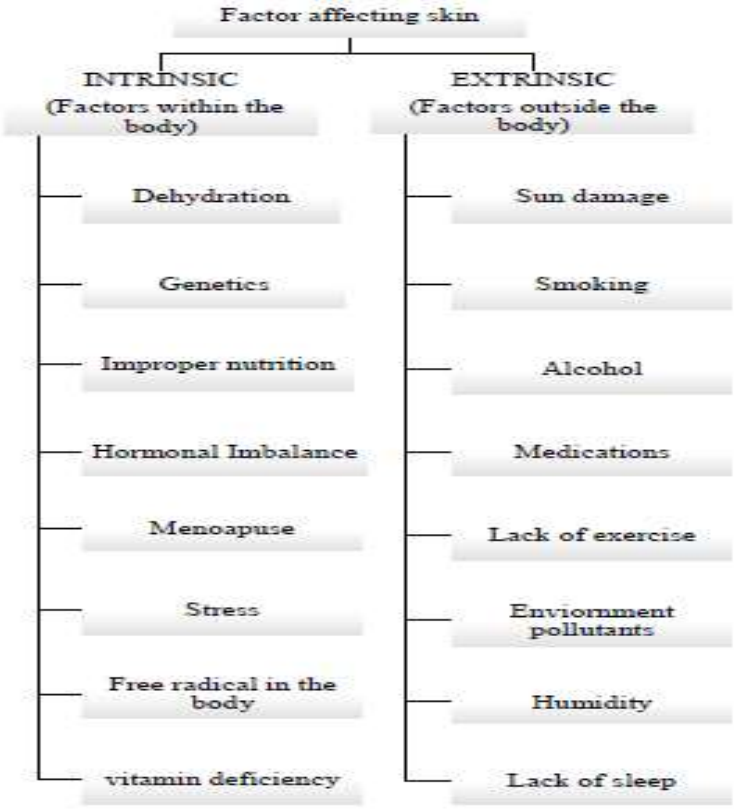


Fig. No. 01: Types of skin.

Factors affecting skin



Plant profile

Moringa oleifera leaves is known as drumstick, it belongs to the family is Moringaceae. *Moringa oleifera* tree is also called as Tree of Life/Miracle Tree. It is a rapidly growing tree it can reach the height 10-12m and diameter is 45cm. The moringa tree was grown in tropical and subtropical region. Moringa bark was whitish grey in color covered by thick cork.[3,4,11] This is the traditional Herbal plant which have many uses such as Skin protection, liver protection, to treat edema, protect and nourishing the hair and skin, fight against the bacterial infection, used to lower the cholesterol, having antioxidant properties, reduce blood sugar level and also treat obesity etc.[1,24]

Fig. No. 02: Fresh leaves of *Moringa oleifera.*

MATERIAL AND METHOD

- The *Moringa oleifera* leaves was gathered from the village of Thiruppalapandal. The *Moringa oleifera* leaves were isolated and cleansed with the distilled water.
- Then the leaves are dried at room temperature at dry shade to remove the moisture content.
- After dried it undergo pulverized with the useof mixer grinder to get fine powdered sample.
- Finally, the powdered sample was undergoing to the extraction process.[6,7,12,16]

Fig. no. 03: Dried moringa leaf.

Fig. no. 04: Moringa leaf powder.

Chemical ingredients: Soap base, *Moringa oleifera* leaf extract, glycerine, coconut oil, turmeric, vitamin E.[40,38,34]

Tab No. 01: chemical Ingredients and Its uses.

S. No.	Ingredients	Uses
1.	Soap base	Cake formation
2.	Moringa oleifera leaves extract	Vitamin C, skin protection
3.	Glycerine	Humectant
4.	Coconut oil	Nourish dry skin, Anti-ageing
5.	Turmeric Powder	Antioxidant, Colouring agent
6.	Vitamin E	Anti-Acne. Skin glow

Images of ingredients

(a) Soap base

(b) Moringa leaf extract

(c) Glycerine

(d) Turmeric **(e) Coconut oil** **(f) Vitamin E**

Fig. no. 05: Ingredients for preparation of *Moringaoleifera* leaf extract soap.

Preparation of *moringa oleifera* leaves extract

Decoction method

- It is used for the extraction process.
- Firstly, *Moringa oleifera* leaves weighed accurately 15g mixed with the 60 ml of distilled water and boiled for 15mins.
- Then the crude extract was filtrated by using muslin cloth to prevent the wastage of extract.
- The aqueous extract was used for the preparation of *Moringa oleifera* leaf extract soap.[33,37]

Images of extract preparation

(a) Boiling **(b) Filtration** **(c) Extract**

Fig. no. 06: Preparation of *moringa oleifera* leaf extract.

Preparation of soap

Weighed 50g of soap base cut into small pieces, poured into the boiling water and melted. Add 10ml of extract, 2g of Turmeric, 5ml of Glycerin, 4mlCoconut oil, 5ml of Vitamin E to the melted soap base, mixed completely by continuous stirring for 30-40mins to form the homogenous mixture. The prepared semisolid soap mixture was filled into the mould and the

mould is place into the refrigerator for the 30mins *Moringa oleifera* leaves extract soap was formed.[2,13,35]

Images of preparation of soap

(a) Semisolid soap **(b) Freezing** **(c) Soap**

Fig. No. 07: preparation of *moringaoleifera* leaf soap.

Fig. No. 08: Formulated *Moringa oleifera* leaf soap.

Evaluation parameter for herbal soap[5,8,9,10]

1. **Organoleptic evaluation:**

a) Color: Observe if the soap has a uniform and appealing color that reflects its natural ingredients. There should be no discoloration or uneven tones.

b) Odor: Assess the natural aroma of the soap. It should be pleasant and true to the herbal ingredients used, without any artificial or chemical undertones.

c) Appearance: Check the surface of the soap for smoothness and consistency. It should not be gritty, cracked, or overly greasy.

d) Shape: Evaluation of soap shape can be determined by both sensory and visual examination.

2. **Physical evaluation**

a) pH: The pH of herbal soap should be close to the skin's natural pH, typically between 4.5 and 5.5, to prevent irritation and maintain skin balance. Use pH test strips or a pH meter to

measure the soap's acidity or alkalinity.

b) **Foam retention:** To evaluate the foam retention of herbal soap, a standardized foam retention test is conducted to measure how well the soap maintains its lather over time. In this test, a consistent amount of soap is lathered with a fixed volume of distilled water, and the foam generated is observed and measured at specific intervals, such as immediately after lathering and then at 1, 5, and 10 minutes. The volume or height of the foam is recorded to assess its stability and longevity. The foam's texture is also evaluated to ensure it remains creamy and stable rather than collapsing or thinning rapidly. This test helps determine the soap's performance in maintaining a satisfactory lather throughout use, which is critical for effective cleansing and overall user satisfaction.

c) **Foam height:** The foam height parameter is a crucial aspect of evaluating herbal soap's lather quality, as it directly influences user satisfaction and cleansing efficacy. To assess foam height, a specific quantity of the herbal soap is combined with a measured volume of distilled water, and the mixture is agitated to generate foam. The height of the foam is then measured immediately after lathering and at subsequent intervals, such as 1, 5, and 10 minutes, using a standardized measurement method. This evaluation provides insights into the soap's ability to produce a rich, stable foam that maintains its height over time. A higher and more stable foam height indicates better lather performance and overall quality, contributing to a more enjoyable and effective washing experience.

d) **Skin irritation test:** The skin irritation test is a critical parameter for evaluating the safety and dermatological suitability of herbal soap. This test involves applying the soap to a small, controlled area of skin, typically on the forearm, to monitor for any adverse reactions. The application is done according to standardized procedures, such as using a patch test or a controlled usage method over a set period, often 24 to 48 hours. During and after this period, the test area is closely observed for signs of irritation, including redness, itching, swelling, or any other discomfort. This assessment helps ensure that the herbal soap is gentle and non- irritating, confirming its suitability for sensitive skin and minimizing the risk of a) adverse reactions.[14,17,18]

e) **Washing Capability:** When evaluating the washability of herbal soap, several key parameters are considered to ensure its effectiveness and user satisfaction. Firstly, the soap’s solubility in water is assessed to determine how well it lathers and rinses off,

which impacts its ease of use. The residue left on the skin or washcloth after use is examined, as excessive residue can affect the soap's performance and user comfort. Additionally, the soap's pH level is tested to ensure it is compatible with the skin's natural pH, minimizing irritation and dryness. The duration of lather stability and the soap's ability to remove different types of dirt and oils are also evaluated to ensure thorough cleansing. These parameters collectively help in assessing the overall washability and effectiveness of herbal soaps in daily use.

f) Moisture content: Adequate moisture content is crucial for the soap's usability and longevity. It affects the soap's hardness and shelf life. Measure the initial weight of soap before drying and then fix the temperature and time to dry the sample, after dried measure the weight of soap and compare withthe initial weight of soap it was used to determine the percentage of water content in the soap.[20,36,39]

Moisture Content = (difference in weight/initial weight) x 100

RESULT

The *Moringa oleifera* leaf extract homemade soap was prepared and evaluated for its organoleptic properties such as color, odor, appearance and shape in addition to physiochemical evaluation including pH, foam height and retention time, skin irritation, washing capability and moisture content level. The evaluation parameters result of the homemade Moringa leaf extract were tabulated and given below.

Tab No. 02: Results of evaluation parameters of Moringa leaf extract homemade soap.

S. No	Parameters	Formulated Moringa leaf extract soap
1.	Color	Dark yellowish green
2.	Odor	Characteristics
3.	Appearance	Good
4.	Shape	Round
5.	pH	8
6.	Foam retention time	5 -8 mins
7.	Foam height	12 ml
8.	Skin irritation test	Non-irritant
9.	Washing Capability	Good
10.	Moisture Content	8.5%

(a) Appearance

(b) Foamability

Fig. No. 09: Results of evaluation of *moringa oleifera* leaf soap.

CONCLUSION

The preparation and evaluation of *Moringa oleifera* leaf extract homemade soap have demonstrated its exceptional potential as a natural effective and sustainable cleansing agent, offering a vast range of benefits for skin health and protection. It reveals a better physical property such a good pH, excellent foaming property, best moisture content, superior organoleptic property like color, odor. Turmeric had antioxidants activity and vitamin E is used to reduce the acne and coconut oil is maintain moisture level, anti-inflammatory properties derived from Moringa's nutrient-dense profile, provide numerous clinical significances including moisturizing, nourishing and protecting the skin while addressing concern like acne, ageing, hyperpigmentation. It's gentle and non-irritating nature make its suitable for various skin type including sensitive skin. The simplicity of its preparation, using locally sourced material, enhance its accessibility, eco-friendliness and cost effectiveness.

The soap's ability to promote healthy, radiant skin while supporting sustainable practices make it's an excellent alternative to commercial soap. Furthermore, its potential for widespread adoption and impact on skin health and the environment is significant, it assures that further exploration and development. The incorporation of Moringa leaf extract into homemade soap has proven to be valuable innovation, showcasing the potential of natural ingredient in promoting skin wellness and sustainability. As consumers increasingly seek natural and eco-friendly product, the Moringa leaf extract homemade soap is well-positioned to meet this demand, offering an effective, sustainable and accessible solution for skin care.

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