

Formulation And Evaluation of Anti-Acne Face Pack Using Neem and Turmeric

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Abstract—The present study focuses on the formulation and evaluation of an anti-acne herbal face pack using natural ingredients such as Neem, Turmeric, orange peel, Multani mitti, Sandalwood, aloe vera, and rose water. Acne is a common skin disorder caused by excess sebum production, bacterial infection, and blockage of skin pores. Herbal cosmetics are widely preferred due to their safety, fewer side effects, and therapeutic benefits compared to synthetic products. The prepared face pack was designed to provide anti-acne, anti-inflammatory, antimicrobial, skin cleansing, and soothing effects. Neem possesses antibacterial and antifungal properties that help reduce acne-causing microorganisms, while turmeric acts as an anti-inflammatory and antioxidant agent. Multani mitti absorbs excess oil and impurities from the skin, orange peel provides vitamin C and improves skin glow, sandalwood gives a cooling effect, aloe vera moisturizes and heals the skin, and rose water acts as a refreshing and soothing agent. The herbal ingredients were dried, powdered, sieved, and mixed in suitable proportions to obtain a fine homogeneous powder.

Index Terms—Anti acne, Harbal face pack, Neem Turmeric, Sandalwood, Natural Formulation

I. INTRODUCTION

Acne is a common skin disorder caused by blockage and inflammation of sebaceous glands due to excess oil, dirt, bacteria, and dead skin cells. The incidence of acne peak of teenage, but substantial numbers of men and women between 20-30 years of age are also affected by the disorder. [1] Acne may be classified as comedonal, popular, pustular, cystic & nodular. (fig.1) Comedonal acne is non-inflammatory & divided into two types: Whiteheads & blackheads. White heads (closed comedo) present as a fresh or white colored, raised bumps whereas blackhead

(open comedo) present as open pores containing dark colored skin roughage consisting of melanin, sebum & follicular cell.[2] The condition is influenced by factors like increased sebum production, bacterial colonization by propionibacterium acnes (P.acnes) altered keratinization, and inflammation, and is prevalent in 8.96% of men and 9.81% of Women globally. Synthetic anti-acne product may cause side effect such as dryness, irritation, and allergic reaction. Therefore, herbal formulation are preferred because they are safer, economical, and have fewer side effects.[3] Herbal face packs are cosmetic preparations applied on the skin to improve complexion, cleanse pores, remove excess oil, treat and turmeric are used as major herbal ingredients because of their medicinal properties. Thus, the anti-acne herbal face pack prepared using neem and turmeric helps in cleansing the skin, controlling oil secretion, preventing acne, and improving overall skin health naturally.

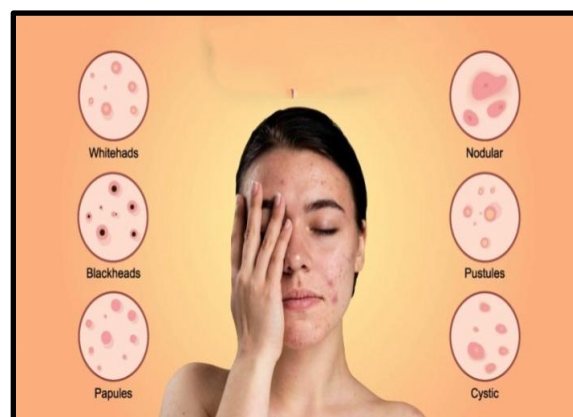


Figure.1 Types of acne

Generally, an herbal face pack should provide necessary nutrients and vitamin to skin while

penetrating into subcutaneous tissues and outermost layer of skin without actually altering the normal physiology of skin. Based on different skin type, face pack can be formulated with variety of ingredients depending on desired property for example in order to prepare nourishing and moisturizing face pack different oils like and butter, cocoa butter etc. Can be used. Vitamins like vitamin C, D and E can be used for enriching skin with required vitamins. Additionally, substances prove to beneficial for skin is also used.[4]

Skin physiology

The largest organ in the body the skin accounts for over 50% of the total weight of the body. Amounts its many vital functions are defence against physical, chemical and biological threats, preventing water loss from the body and aiding in thermoregulation. The skin is the outermost layer of our body that protects our protein from heat, light, bacteria, and injury. It is the largest organ in body, storing fat, water, and vitamin D, which is essential for human health, as well as regulating body temperature.[5]

Skin structure

The outermost layer of skin, the epidermis, provide waterproof barrier and determines our skin tone. The dermis which lies beneath the epidermis, is rich in hair follicles and connective tissue

- The stratum spinosum, or layer of thorny cells: sporadic, polyhedral cells with cytoplasmic forms- some time referred to as “spines” – are found in 8-10 cell layer, sometimes referred to as prickles cell layer.
- The stratum germinativum also known as the bottom layer, is the deepest layer. Hemidesmosomes connect it to the store cellular film, which separate it from the dermis.
- The dermis : the deeper layer between the epidermis and the oily subcutaneous layer is called the dermis. It is composed of connective tissue that contain collagen and elastin stands, with a small number of cells such as fibroblasts, macrophages, and adiposide.[5] fig.2

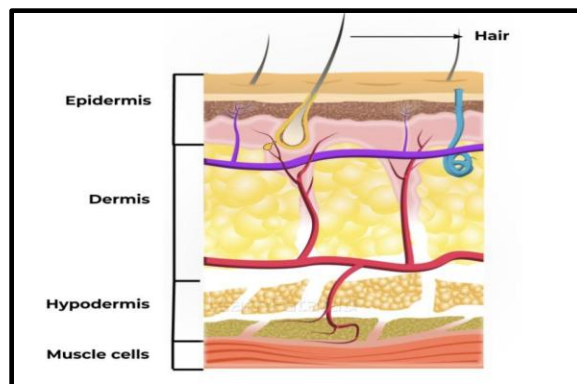


Figure.2 structure of skin

Function of skin

- It provides microbial invanon chemical specialist, other natural specialist, and protective.
- Waterproof layer that guards against damage.
- It also has an impact on maintaining electrolyte and water balance.
- It release metabolites such as urea and sodium chloride.
- The activity of UV beings from starlight effect how vitamin d is combine with skin ergosterol.[7]
- It produce tyrosine, foam, and melanin. Skin is kept sensitive by the sebum it secrete.
- Has an impact on temperature control.

Benefits of applying Face pack

- 1) Nourishes the skin fruit face packs supply essential nutrients to skin.
- 2) Helps to reduce acne, pimples, scars and marks depending on its herbal ingredients.
- 3) Usually face packs made of sandalwood and turmeric helps to reduce acne and pimples. Face packs are recommended for acne, pimples, black heads usually control the over discharge of sebum from sebaceous gland and remove the harmful bacteria inside acnes lesion.
- 4) The scars and marks of skin can be reduced by adding fine powder of sandal and orange lentils with acne face pack.
- 5) Face packs usually remove dead cells of skin.
- 6) These face packs masks provides a soothing and relaxing effect on skin.
- 7) They help to restore the lost shine and glow of skin in short span of time.

8) Regular use of natural face packs brings glow to skin, improve skin texture and complexion. The harmful effects of pollution and harsh climates can be effectively combated with judicious use of face packs.

9) They help to prevent premature aging of skin.

10) Formation of wrinkles, fine lines and aging of skin can be effectively controlled by using natural face packs.

11) Natural face packs made the skin look young and healthy. Face packs which are recommended for acne, pimple, black heads usually control the over discharge of sebum from sebaceous glands and remove the harmful bacteria inside acne lesion. The scars and marks of skin can be reduced by adding fine powder of sandal, rose petals and orange lentils with acne face pack.[4]

Need of herbal Products: -

Herbal product is plant-based product used for health care, skin care, hair care, and wellness. They are important because people prefer natural and safer alternative for daily use.

- Natural and Safe- Herbal product are prepared from natural ingredients like neem, turmeric, aloe vera, tulsi, sandalwood.
- Fewer side effects – many people use herbal product because they may cause fewer side effects compared to synthetic products when used properly.
- Growing health awareness – consumers are becoming more conscious about ingredients and prefer chemical-free or natural products.
- Eco-friendly- herbal products are generally biodegradable and less harmful to the environment than synthetic chemical products.
- Traditional and Ayurvedic value- herbal medicines and cosmetics are based on traditional systems like ayurveda, which has been used in India for thousands of years.
- Wide therapeutic uses- Herbs have antimicrobial, antioxidants, anti-inflammatory, and healing properties useful in healthcare and cosmetics.
- Increasing market demand – Demand for herbal and Ayurvedic products is rapidly increasing in India and globally because of interest in wellness and preventive care.

Type of herbal Face Pack

Numerous herbal face packs have been developed to address distinct skin issues. Here are a few examples:

- For Oily and Acne-Prone Skin: A mixture of fuller's earth, turmeric, and neem powder helps reduce excess oil and combat bacteria that cause acne.
- Aloe vera, honey, and sandalwood packs offer deep hydration and relieve irritated skin for dry and sensitive skin.
- For Evening and Brightening Skin Tone: To lessen pigmentation and give a natural glow, blends of turmeric, gramme flour, and rose water are applied.
- For Anti-Aging: By feeding the skin and increasing its elasticity, herbal packs enhanced with green tea, aloe vera, and honey target fine lines and wrinkles.

Ideal characteristics

It should be non-irritating and non-toxic.

It should be stable both physically and chemically.

It should be free from gritty particles.

It should have pleasant odour.

Benefits [7, 8]

- Helps to reduce, acne, pimple, scars and marks depending on its herbal ingredients.
- Face pack usually removes dead cells of skin.
- These face packs provide a soothing and relaxing effect.
- Regular use of natural face pack brings glow to skin, improves skin texture and complexion.
- The harmful effects of pollution and harsh climates can be effectively combated with judicious use of face pack.
- They help to prevent premature aging of skin.
- Formation of wrinkles, fine lines and sagging of skin can be effectively controlled by using natural face masks.
- Natural face pack makes the skin look young and healthy.

Precaution to be Taken While Applying Face Pack [7]

- Select the face pack according to your skin type. Take opinion of natural therapist or

concerned skin expert before applying face pack.

- The face pack should not be left on face more than 15 to 20 minutes. Keeping for very long time may result in formation of wrinkles, sagging of skin and enlargement of open pores.
- Avoid applying face pack near “eye zone”. The skin around eye is very delicate.

II. AIM AND OBJECTIVE

Aim - To Formulate and evaluate an anti-acne herbal face pack using Neem and Turmeric.

objective

1. To prepare herbal face pack using natural ingredients
2. To study anti- acne properties of neem and turmeric
3. To evaluate pH, stability, spreadability, and skin irritating
4. To provide a safe and economical herbal cosmetic preparation.

III. MATERIALS AND METHODS

List Of Ingredients

Ingredients	Properties
Neem powder	Antibacterial, antifungal, anti-inflammation
Turmeric Powder	Antiseptic, antioxidant,
Aloe Vera	Moisturizing , soothing
Multani Mitti	Oil-absorbing, cleansing, cooling
Sandalwood powder	Fragrance antimicrobial
Orange Peel powder	Rich in vitamin C
Rose Water	Refreshing, hydrating, mild astringent

Table no. 1 Ingredients Chart

Neem Leaves

Botanical name- *Azadirachta indica*

Family- *Meliaceae*

Type- Evergreen tree

Neem is anti-inflammatory, antiseptic and highly beneficial for oily and acne prone skin. An anti-acne effect is due to antimicrobial, anti-inflammatory and anti-oxidant activities of different chemical

constituents. One of the most common benefits of neem for skin is that it treats acne.



Figure.3 Neem (*Azadirachta indica*)

This plant is enriched with antibacterial properties that fight any kind of breakouts and also soothe itchy and irritated skin. For people with acne-prone skin, this herb will come in handy. Apart from this, another superb benefit of neem for the face is that it can efficiently get rid of blackheads and whiteheads when used regularly. It shrinks large pores and works as an exfoliating agent to pull out impurities and tighten pores. This works wonders in reducing blackheads and whiteheads[10]

Turmeric

Botanical name - *curcuma longa*

Family - *zingiberacea*

Types – herbaceous perennial plant

Turmeric is mainly used to rejuvenate the skin. It delays the signs of aging like wrinkles and also possesses other properties like antibacterial, antiseptic and anti-inflammatory. It is best source of blood purifier.



Figure.4 Turmeric (*curcuma longa*)

It is effective in treatment of acne due to its antiseptic and antibacterial properties that fight pimples and

breakouts to provide a youthful glow to your skin. It also reduces the oil secretion by the sebaceous glands.

Aloe Vera

Botanical name – Aloe vera (L.) burm. F.

Family – liliaceae

Type – succulent medicinal herbal

Aloe vera is a short-stemmed succulent plant with thick, fleshy green leaves containing transparent gel. The gel is widely used in herbal medicines and cosmetic preparations.



Figure.5 Aloe Vera

Is a versatile, succulent plant known for its thick leave filled with a soothing gel containing vitamins A, C, and Minerals and antioxidants.

Multani Mitti

Scientific name – solum Fullonum

Family- clay mineral family

Type – Raw stone

Multani Mitti (Calcium bentonite) Multani mitti helps skin by different ways like diminishing pore sizes, removing blackheads and whiteheads fading freckles, soothing sunburns, cleansing skin, improving blood circulation, complexion, reducing acne and blemishes and gives a glowing effect to a skin as they contain healthy nutrients. Multani mitti is rich magnesium chloride. [11]



Figure.6 Multani mitti

Sandalwood

Botanical name – santalum album L.

Family- santalaceae

Type – Aromatic medicinal tree

Sandalwood is a highly valued, aromatic tree known for its fragrant heartwood and essential oil. The tree's wood and oil have been used for centuries in traditional medicine, perfumery, and skincare.



Figure.7 sandalwood

There are many species of trees that fall under this genus of which the India sandalwood and Australian sandalwood are the most prominent.[12]

Orange Peel

Botanical name – citrus reticulata

Family – rutaceae

Type – citrus food tree

In the orange peel are medicinal parts of the Citrus aurantium Linn. There are some main Ingredients such as linalool, methyl antranilate, Flavonoids It is obtained from orange peel extract, which is further fried to powder form. It is rich Source of vitamin C and other antioxidants. Vitamin C protects skin from free radical Damage and oxidative stress due to harmful UV rays.[13]

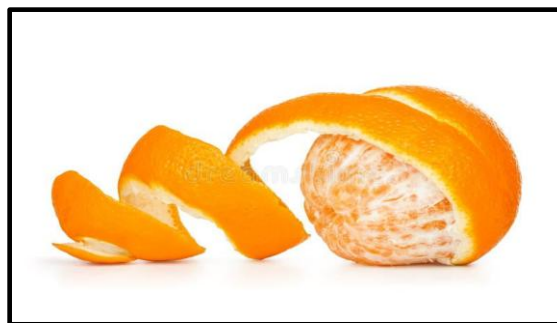


Figure.8 Orange peel

Also poses instant glow property, acts as skin lightening agent, prevent acne, blemishes, wrinkles, and reduces the signs of Aging and sun tan. Other components of orange peel powder are calcium, potassium, and Magnesium, orange. It also contains pectin, cellulose, and hemicelluloses which Contribute towards skin cells strengthening and helps in skin hydration.

Rose

Botanical name – Rosa

Family- Rosaceae

Type – Flowering ornamental shrub

Rose is a flowering ornamental shrub widely used in herbal cosmetics for its fragrance, soothing, and skin-refreshing properties.



Figure. 9 Rose water

Rose water is a flavoured water created by steeping rose petals in water. It is typically made as a by-product during the distillation of rose petals to create rose oil for perfumes.[14]

IV. METHOD OF PREPARATION

Step 1: Collection Of Ingredients

All the natural materials used in the present study i.e., Neem, Turmeric, Multani mitti, orange peel, sandalwood, Roses, Were Purchased from local market (Phaithan Gate, chh. Sambhajinagar), in a form of dried powder and were authenticated at Pharmacognocny department of RCP collage Sambhajinagar. The Deatail of the plant material used for the formulation of face pack are mentioned below [9].

Step 2: Drying And Powder Preparation

- Wash neem leaves and other raw materials.

- Dry them under shade for several days.
- Grind the dried materials separately using a grinder.
- Pass powder through sieve no. 80 to obtain fine powder
- Store in airtight container



Figure.10 Hot air oven

Equpments

1. Mortar pestle
2. Hot air oven
3. Sieve no. 80
4. Weighing balance
5. Spatula
6. Beaker
7. Test tube

Step 3: Weighing Of Ingredients



Figure. 11 Weigh Balance

Weigh all the ingredients accurately according to the required formulation.

Sr. no	Ingredients (in powder form)	Quantity
1.	Neem powder	10g
2	Turmeric powder	5g
3	Orange peel	10g

	powder	
4	Aloevera powder	20g
5	Sandalwood powder	5g
6	Multani powder	5g
7	Rose petal	q.s

Table No. 2 The Quantity Chart

All the powdered ingredients were passed through sieve, with 80 mesh size separately in order to get uniformed sized particles, followed by weighing them accurately. Further all powder ingredients were mixed geometrically to insure uniform and even mixing. Quantity of each ingredient is represented in table 2. The prepared face pack was stored in an airtight container and evaluated by various evaluation parameters.

Step 5 : Mixing of Dry Ingredients

1. Take a clean mortar and pestle or mixing bowl.
2. Add neem powder, turmeric powder, orange peel powder, multani mitti, and sandalwood powder.
3. Mix uniformly to obtain a homogeneous mixture.



Figure.11 dry powders

4. The powder were passed through sieve no. 80



Figure.12 Sieving Neem Powder



Figure.13 Sieving Turmeric Powder

Step 6: Addition of Aloe Vera

1. Add aloe vera gel slowly into the the powder blend.
2. Mix properly for uniform distribution

Step 7: Addition of Rose Water

1. Add rose water gradually.
2. Stir continusly until a smooth paste is formed.



Figure. 14 Stiring Facepack

Step 8 : Packaging and Storage

1. Transfer the prepared face pack into an airtight container.



Figure.15 Neem Turmeric Anti-acne face pack

2. Label properly with
 - Batch number

- Manufacturing date
- Expiry (typically 12-24 months with preservatives)
- Instructions: 'For external use only.'

3. Store in a cool and dry place.

Procedure of Face pack Application

Take prepared face pack powder in a bowl as per the requirement and add rose water. Mix well to form a paste with optimum thickness. It should be applied evenly on the face with the help of a brush. Cover the acne and blemishes spots. Keep as it is for complete dryness for 20-25 minutes. Then it should be washed with cold water.

V. METHOD OF EVALUATION

1. Organoleptic evaluation

The prepared face pack was evaluated for various organoleptic parameters such as; color, odor, appearance, texture and consistency. Color, odor and texture were evaluated visually by touch and sensation respectively.

2. Physiochemical evaluation

Physiochemical parameters were determined, including the determination of extractive value, pH and moisture content. [21]



Figure. 16 pH determination using pH meter

3. Physical evaluation

The particle size was tested by microscopy method. The flow property of the dried powder of combined from was evaluated by performing Angle of Repose by funnel method, bulk density and tapped density by Tapping Method.[18]

- Bulk density

Bulk Density refer to the adjustment of particles or granules to pack themselves collectively. The formula for determination of bulk density (d) is $D = M/v$ Where, M is the mass of the particles & V is the total volume occupied by them.

The volume of packing can be determined in a graduated cylinder. 100 grams of weighed formulation powder was taken and slowly added to the cylinder with the help of the funnel. The initial volume was observed firstly; the sample was tapped until no further volume reduction occurred. The bulk density value was obtained from the initial volume and after tapping the volume reduced, from which tapped density was calculated.[2]

- Trapped density
Tapped density = m/V_f
- Hausner's ration

Hausner's ration is associated with the inter particle friction and predicts powder flow properties. It is calculated as- Hausner's ratio= D/D

VI. RESULT AND DISCUSSION

1. Organoleptic Evaluation

Anti acne neem turmeric face pack was evaluated for organoleptic parameters showed in the table 3. The colour of formulation was Yellowish-green. The odour of prepared formulation was pleasant and good acceptable which is desirable to cosmetic formulation. Smoothness was acceptable as per requirement of cosmetic formulation.

Sr. No	Parameter	observation
1.	Colour	Yellowish-green
2.	Odour	Pleasant herbal smell
3.	Appearance	Fine, smooth paste
4.	Texture	smooth
5.	Consistency	Uniform and semi-solid
6.	Feel on application	Non-irritating

Table 3: organoleptic Parameter

2. Physiochemical Evaluation

Anti acne neem turmeric face pack was evaluated for physicochemical parameters showed in the Table 4. The ph of formulation was found close to neutral.

The ash content and moisture content were within limit.

Sr.No	parameter	Observation
1	pH	6.16
2	Ash Content	3.8%
3	Loss on Drying	9%

Table 4: Physiochemical Parameter

3. Physical Evaluation (powder Property)

Anti acne neem turmeric face pack was evaluated for Physical parameter (powder property) Shown in the table 5. Rheological findings justified the flow (powder) properties of the herbal face pack. It was found to be a free-flowing and non-sticky in nature.

Sr. No	Parameter	Observation
1	Tapped density	0.60g/ml
2	Bulk density	0.71g/ml
3	Angle of repose	7.5
4	Hausner's ratio	1.40
5	Carr's index	29.3%

Table 5: physical parameter (powder Property)

VII. CONCLUSION

The formulated anti-acne herbal face pack containing neem, turmeric, aloe vera, multani mitti, sandalwood, and orange peel powder showed good physicochemical and cosmetic properties. Neem possesses strong antibacterial and antifungal activity, which helps reduce acne-causing microorganisms, while turmeric provides anti-inflammatory and antioxidant effects that help in reducing pimples, redness, and skin irritation. The presence of multani mitti and orange peel helps absorb excess oil and cleanse the skin pores effectively.

The prepared face pack showed satisfactory appearance, smooth texture, acceptable pH, good spreadability, and stability during storage. Regular use of the herbal face pack may help in controlling acne, removing excess sebum, improving skin texture, and providing a refreshing effect without causing harmful side effects associated with synthetic products.

Therefore, the study concludes that the neem and turmeric anti-acne herbal face pack is a safe,

effective, economical, and natural formulation suitable for acne-prone skin.

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