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FORMULATION AND EVALUATION OF HERBAL LOOSE POWDER USING PLANT-BASED INGREDIENTS

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ABSTRACT

The growing demand for natural and chemical-free cosmetic products has encouraged the development of herbal loose powders with skin-beneficial properties. The present study focuses on the formulation and evaluation of a herbal loose powder prepared using natural ingredients such as Kaolin clay, corn starch, nugmet powder, sandalwood powder, Aloe vera, neem powder and rice powder.These herbal ingredients are well known for their antibacterial, anti-inflammatory, antioxidant, oil-absorbing, and skin-soothing activities. The formulation was designed to provide a smooth texture, good spreadability, pleasant fragrance, and effective oil control while remaining gentle on different skin types. The prepared powder was evaluated for physicochemical parameters including color, odor, pH, particle size, flow properties, spreadability, and skin irritation test. The results showed that the formulation possessed good stability, non-irritant nature, and satisfactory cosmetic properties suitable for daily use. Thus, the developed herbal loose powder can serve as a safe, affordable, eco-friendly, and effective alternative to synthetic cosmetic powders. Its natural composition and skin-friendly characteristics make it a promising product for modern herbal cosmetic applications.

KEYWORDS: Herbal loose powder, natural cosmetics, Kaolin clay, antioxidant, skin-friendly formulation, eco-friendly herbal cosmetics.

➢ INTRODUCTION

In recent year, there has been a growing interest in natural and plant-based products due to increasing awareness about the harmful effects of synthetic chemical on the skin. Herbal cosmetic formulations are widely accepted because they are safe, eco-friendly, and provide additional skin benefits along with beautification.

Among various cosmetic products, loose powder is commonly used for facial application to enhance appearance, control oil, and provide a smooth, matte finish. However, conventional loose powder often contain synthetic ingredients that may lead to skin irritation, dryness, or allergic reactions. This has led to development of herbal loose powder using natural ingredients which are gentle and beneficial for the skin.

To understand the action of any cosmetic product, it is important to have basic knowledge about the structure of the skin, as these products are applied directly on it.

➢ STRUCTURE OF SKIN

The skin or cutaneous membrane is the outermost layer which covers and protects the surface of the body from external environment. Normally the texture of skin very smooth but becomes rough due to numerous environmental and age factors.

Cosmetics are the formulations used to beautifying the skin. The functions of skin is protection, regulation of body temperature, excretion, information gathering, vitamin D production.

The skin is broadly segregated into three layers such as:

- Epidermis
- Dermis
- Hypodermi

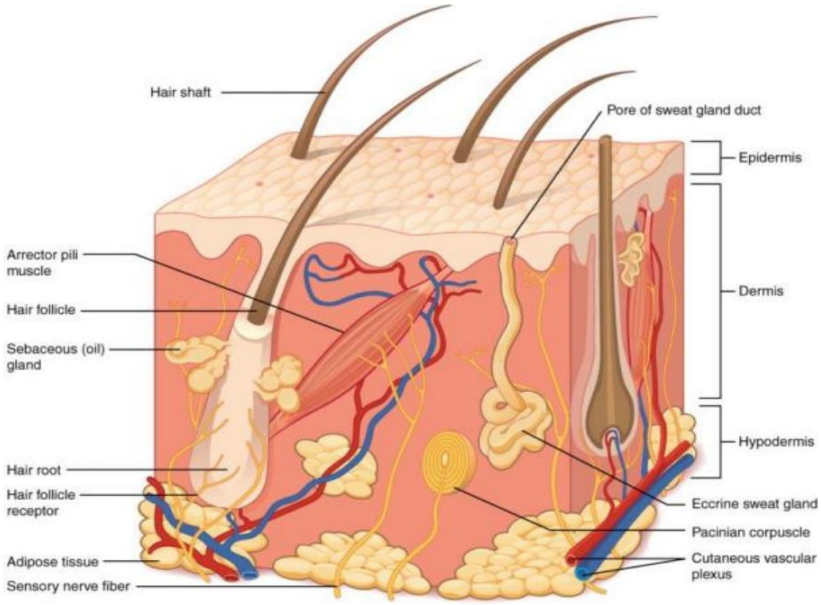

Figure no.1.

1. Epidermis

The epidermis is the outermost layer of the skin, and protects the body from the environment. The epidermis contains layers itself is made up of five sublayers that work together to continually rebuild the surface of the skin.

The layers of the epidermis include

- Stratum basale
- Stratum spinosum
- Stratum granulosum
- Stratum lucidum
- Stratum corneum.

2. Dermis

The dermis is connected to the epidermis at the level of the basement membrane and consists of two layers, of connective tissue, the papillary and reticular layers which merge together without clear demarcation.

3. Hypodermis

The hypodermis is deep to the dermis to the dermis and is called subcutaneous fascia. It is the deepest layer of skin and contain adipose lobules along with some skin appendages like the hair follicles, sensory neurons, and blood vessels.

➢ ABOUT HERBAL LOOSE POWDER

- Herbal Loose powder is a natural cosmetic product used for setting makeup, controlling oil and enhancing skin appearance. From the mask-like covering in ancient time to the natural look which is the choice of the present day. Tinted, shiny, enhanced by our modern cosmetic, the women of today is able, will only space modest effort to be more attractive.

- A herbal loose powder is basically a cosmetic product which has as its prime function the ability to complement skin color by imparting a velvet finish to it. A good face powder should produce a smooth finish to facial skin, making visible imperfection of the face.

- Herbal loose powder is prepared using natural plant-based ingredients which provide smooth and natural appearance, also offer skin-friendly properties like oil absorption and soothing effect.

➢ CHARACTERISTICS_OF HERBAL LOOSE POWDER

1. A ability to mask skin imperfection such as skin shine, enlarged pore, minor blemisher.
2. The character of spreading over the skin.
3. The ability to absorb skin perspiration and oil secretion.
4. To impact a color effect according to the need.
5. To produce a pleasant odor.

➢ ADVANTAGES OF HERBAL LOOSE POWDER

1. Made from nature ingredients.
2. Safe for skin with minimal irritation.
3. Provide natural glow and smooth finish.
4. Eco-friendly and biodegradable.
5. Suitable for all skin types.
6. pleasant natural fragrances.

➢ **USES**

- Used as a face make-up powder.
- Control excess oil on skin.
- Provide smooth and even skin tone.
- Helps to protect skin from environmental damage.
- Used to reduce and hide pigmentation, dark sport, acne of face.

➢ **LITERATURE SERVEY**

1. **Sumedh G. et.al (2025)** they described the formulation of compact face pack for glowing skin. The ingredients involved such as, Multani mitti, kaolin, aloe vera, turmeric, rose petal powder, sandalwood, neem, tulsi. These ingredients were selected for skin brightening, oil control, hydration. They perform evaluation test like ph determination, moisture contain and irritation test. The review clearly highlights the growing scientific interest and consumer demand for compact. The study concluded that the multifunction cosmetic formulation that enhanced skin glow, convenience of use, improved stability.

2. **Shantanu C. et.al (2024)** developed a polyherbal antibacterial compact powder, the formulation included natural extracts like tulsi, betal leaf, and liquorice, along with the talc, zinc oxide, and excipients. These ingredients were selected for there antibacterial, anti-inflammatory and antioxidant properties. They perform evaluation test like Ph determination, particle size analysis and flow property. The study concluded that the polyherbal face powder showed effective antibacterial activity and good skin protection.

3. **Amalu N. et.cl (2024)** formulated a face powder using cassava powder. Ingredients included cassava powder, corn starch, rose oil, kaolin and benzoic acid. These ingredients selected for antioxidant, anti-wrinkles, and moisturizing properties. Helps in skin hydration , smoothing effect, and oil control. They perform evaluation tests physical properties, pH , moisture contact, particles size, bulk density, and irritation test. The cassava based face powder showed good cosmetic performens and healthy skin. The study concluded that the cassava-based face powder showed good cosmetic properties with moisturizing, oil-controlling, and anti-oxidant effects. Evalution test indicated it is safe and effective product.

4. **Pradnya S. et.al (2021)** she describe the formulation of herbal anti-acne compact face powder by using talc, kaolin, zinc sterate, water soluble binder(gum Arabic), titanium dioxide, garlic extract, nutmeg. These ingredients were selected for there organoleptic properties, and anti-microbial properties. They performs the evaluation test like moisture content, particle size determination, angle of repose, shade test, pay off test. The study concluded that the herbal anti-acne compact powder was stable and suitable for use.

➢ **DRUG AND EXCIPIENTS PROFIL**

1. **Base ingredients**

- Kaolin clay – absorption of oil
- Corn starch -
- Rice powder

2. **Active herbal ingredients**

- Azadirachta indica (Neem powder)
- Myristic fragrans (nutmeg)
- Santalum album (Sandalwood powder)
- Alo-vera powder.

3. **Excipient**

- Zinc oxide

4. **Natural colorant**

- Pink tone- beetroot powder
- Whitish-Brown tone- coco-powder

➢ **METHOD OF PREPARATION**

1. **Selection of ingredients**

- All ingredients are used in dry powdered form, such as:
- Kaolin clay
- Corn starch
- Rice powder
- Herbal powders such as, sandalwood powder, neem powder, alovere powder, nutmeg powder
- These are selected based on properties like oil absorption, smootheness, and skin compatibility.

2. **Accurate weighing**

- Each ingredient is weighted precisely using a digital balance according to formulation batches.
- Proper weighing ensures consistency and reproducibility

3. **Addition of color**

- Natrual colourant such as beetroot powde(pink tone) or cocoa powder(whitish-brown tone) are taken in small quantity.
- Color is first mixed with a small portion of base powder.

4. **Mixing by geomatric dilution**

- Powders are mixed using the geometric dilution method:
- Take the smallest qyantity of ingredients.
- Add an equal quantity of base powder and mix thoroughly.
- Continue adding remaining powders stepwise.
- This ensures uniform distribution of all ingredients, especially color and all ingredients.

5. **Final blending**

- The mixture is blended thoroughly using a spatula.

- continue mixing until a homogeneous, smooth and lump-free powder is obtained.

6. Packaging

- The final product is filled into clean, dry, airtight containers.
- Label properly

7. Storage

- Store in cool and dry place away from moisture and sunlight.

➢ **FORMULATION BATCHES FOR PINK TONE 10g.**

Ingredients	F1	F2	F3	F4	F5	F6
Kaolin clay	2g	2.5g	2g	3g	2.5g	3g
corn starch	2.5g	2g	2.5g	2g	2g	1.75g
Rice powder	2g	1.5g	2g	1g	2g	1.5g
Neem powder	1g	0.5g	1g	0.5g	0.5g	0.5g
Sandalwood powder	1g	1g	1g	1g	1g	1g
Aloe-vera powder	0.5g	0.3g	0.5g	0.5g	0.5g	0.5g
Zinc oxide	0.5g	0.5g	0.5g	0.5g	0.5g	0.5g
Nutmeg powder	0.5g	1.2g	0.75g	0.5g	0.5g	0.5g
Beetroot powder	0.25g	0.25g	0.5g	0.75g	1g	1.5g

➢ **FORMULATION BATCHES FOR WHITISH-BROWN TONE.**

Ingredients	F1	F2	F3	F4	F5	F6
Kaolin clay	2g	2.5g	2g	3g	2.5g	3g
corn starch	2.5g	2g	2.5g	2g	2g	1.75g
Rice powder	2g	1.5g	2g	1g	2g	1.5g
Neem powder	0.5g	0.5g	1g	0.5g	0.5g	0.5g
Sandalwood powder	1g	1.5g	0.5g	1g	1.5g	1.5g
Aloe-vera powder	0.5g	0.5g	0.5g	0.5g	0.5g	0.5g
Zinc oxide	0.5g	0.5g	0.5g	1g	0.5g	0.5g
Nutmeg powder	0.5g	0.5g	0.5g	0.5g	0.5g	0.5g
Cocoa powder	0.25g	0.5g	0.5g	0.5g	0.25g	0.75g

➢ **EVALUATION TEST**

- Organoleptic evaluation
- Shade test
- pH test
- Oil absorption test
- Spreadability test
- Washability test
- Skin irritation test
- Stability study

1. Organoleptic Evaluation

- Parameters: color, odor, appearance, texture
- Method:
- Take a small quantity of powder.
- Observe color and appearances visually.
- Check odor by smelling gently.
- Rub between figure to evaluate texture (smooth/coarse).

2. Shade Test

- Purpose: To evaluate suitability of powder shade on skin
- Method:
- Apply a small amount of powder on skin (forearm or face).
- Spread evenly using fingers or brush.
- Observe in natural light.
- Check the shade matching with skin tone, uniformity of color and natural appearance.

3. pH Test

- Purpose: To ensure skin compatibility.
- Method:
- Dissolve small quantity of powder in distilled water.
- Measure pH using pH paper.

4. Oil absorption test

- Purpose: To check oil control property.
- Method:
- Add oil dropwise to powder.
- Note amount required to form paste.

5. Spreadability test

- Purpose: To determine ease of application.
- Method:
- Apply powder on skin or glass plate.
- Spread and observe smoothness.

6. Washability test

- Purpose: To check ease of removal
- Method:
- Apply herbal loose powder on skin.
- Wash with water.
- Observe removal.

7. Skin irritation test

- Purpose: important for safety
- Method:
- Apply herbal loose powder on forearm
- Observe for 24 hours.
- Check for irritation or redness

- Purpose: To evaluate stability over time
- Method:
- Room temperature
- Elevated temperature (40 C)
- Observe changes in color, odor,texture.
-

8. Stability study

➢ **Evaluation results for pink tone.**

Test result	F1	F2	F3	F4	F5	F6
Organoleptic test	Light pink	Light pink	Greenish	Dull pink	Pink	Dark pink
Shade test	Light pink shade	Light pink shade	Greenish shade	Slight dull shade	Balance pink	Dark pink shade
pH test	6.5	6.7	6.5	6.6	6.8	6.7
Oil absorption test	Moderate	Good	Good	Good	Very good	Good
Spreadability test	Good	Very good	Moderate	Good	Excellent	Good
Washability test	Easy	Easy	Easy	Easy	Easy	Easy
Skin irritation test	No irritation	No irritation	No irritation	No irritation	No irritation	No irritation
Stability study	Stable	Stable	Slight change	Stable	Stable	Stable

➢ **Evaluation result for whitish-brown tone.**

Test result	F1	F2	F3	F4	F5	F6
Organoleptic test	Dusky white	Off white	Greenish	Light beige	Whitish brown	Brown
Shade test	Dusky shade	White shade	Greenish shade	Beige shade	Whitish-brown shade	Brown shade
pH test	6.5	6.8	6.2	7.2	6.6	6.8
Oil absorption test	Moderate	Good	Good	Good	Very good	Good
Spreadability test	Good	Very good	Moderate	Good	Excellent	Good
Washability test	Easy	Easy	Easy	Easy	Easy	Easy
Skin irritation test	No irritation	No irritation	No irritation	No irritation	No irritation	No irritation
Stability study	Stable	Stable	Slight change	Stable	Stable	Stable

➢ **RESULT AND DISCUSSION**

All formulated herbal loose batches (F1-F6) prepared in both **pink tone & whitish-brown tone** showed satisfactory results in both for evaluation parameters such as color, texture, spreadability, skin irritation and stability. The formulation exhibited good appearance with smooth and uniform texture, making them suitable for cosmetic application. The pH of all batches was found to be within the acceptable range for skin compatibility, indicating safety for topical uses. No signs of irritation or adverse reaction were observed during the skin irritation test, confirming the non-toxic and skin friendly nature of the formulation.

Among all formulation, **batch F5** in both pink tone & whitish-brown tone showed the best overall performance with excellent smoothness, good spreadability, suitable pH, no irritation, and high stability. Therefore, **F5 batch** was considered as the optimized formulation for both tone variation and successfully passed all evaluation parameter.

➢ **Final Formula Result**

- **For pink tone shade**

Ingredients	Quantity in gm
Kaolin clay	2.5g
Corn starch	2g
Rice powder	2g
Neem powder	0.5g
Sandalwood powder	1g
Alo-vera powder	0.5g
Zinc oxide	0.5g

Nutmeg powder	0.5g
Beetroot powder	1g
Total	10g

- **For whitish-brown tone**

Ingredients	**Quantity in gm**
Kaolin clay	2.5g
Corn starch	2g
Rice powder	2g
Neem powder	0.5g
Sandalwood powder	1.5g
Alo-vera powder	0.5g
Zinc oxide	0.5g
Nutmeg powder	0.5g
Cocoa powder	0.25g
Total	10g

➢ CONCLUSION

The herbal loose powder was successfully formulated using natural ingredients and evaluated for its properties. All batches of pink tone and whitish-brown tone showed good texture, stability, spreadability, and skin compatibility without irritation. Among all, F5 batch was found to be best formulation due to its excellent overall performance. The study confirm that herbal loose powder is a safe, effective, and natural alternative to synthetic cosmetic powders.

➢ FUTURE PERSPECTIVE

Herbal loose powder has strong future potential due to increasing demand for natural cosmetics. Future research can focus on adding multifunctional herbal ingredients for benefits like sun protection and anti-aging. Improvement in stability, shelf life, and use of advanced techniques like nanotechnology can enhance product performance.

Development of customized shades for different skin types and eco-friendly packaging can increase market acceptance. Further clinical and dermatological studies can help in improving product reliability and commercial value.

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