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# Formulation and Evaluation of semi-herbal anti-acne compact powder by Myristica fragrans and Zingiber officinale.

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**ABSTRACT:** The primary goal of the current investigation was to create a Semi-herbal anti-acne compact face powder and assess its effectiveness. Utilizing materials gathered by the pharmaceutical department such as Kaolin, Zinc Stearate, Calamine, Titanium dioxide and scent. We got nutmeg, ginger oil and talc from a nearby store. We employed the wet method to formulate the compact powder, sifting and thoroughly mixing the materials before evaluating the finished products organoleptic and physiochemical properties. Our composition is designed to be compact and available in many hues to cater to a wide range of skin tones. Its anti-acne and antioxidant effects derived from nutmeg powder and ginger oil, enhance the appearance of skin in everyday situations. Therefore, in this study, we discovered the beneficial qualities of semi-herbal anti acne compact powder.

**KEYWORDS:** Semi-herbal anti-acne compact powder, effectiveness, sifting, composition, hues.

## I. INTRODUCTION

### OBJECTIVES

- The main objective of the present study was to formulate semi herbal anti acne compact powder.
- In order to prevent acne formation, to make skin healthy and to provide complexion.
- To evaluate the semi herbal anti acne compact face powder.
- It provides double advantage that you can apply compact powder without applying foundation and, also to set the liquid formulation.

### WHAT IS A COMPACT POWDER?

Pressed powder is for an on-the-go woman out there. It is portable and convenient for retouching. "Compacts are pressed powders that can be used alone to create a matte base and coverage, or as part of a final set." It is used as a setting powder to set and mattify the complete face makeup for longer wear.

### PRINCIPLE

Acne is caused when tiny holes in the skin, known as hair follicles, become blocked. In acne, the glands begin to produce too much sebum. This excess sebum mixes with dead skin cells and both substances form a plug in the follicle. Normally, harmless bacteria that live on the skin can then contaminate and infect the plugged follicles, causing papules, pustules, nodules, or cysts. This semi herbal anti acne compact powder prevents acne by blocking various pores on the skin surface. Thus, absorbing excess of sebum produced by sebaceous glands (in case of hormonal imbalance or/and infection). During this the herbal ingredients like nutmeg powder and ginger oil provide necessary action.

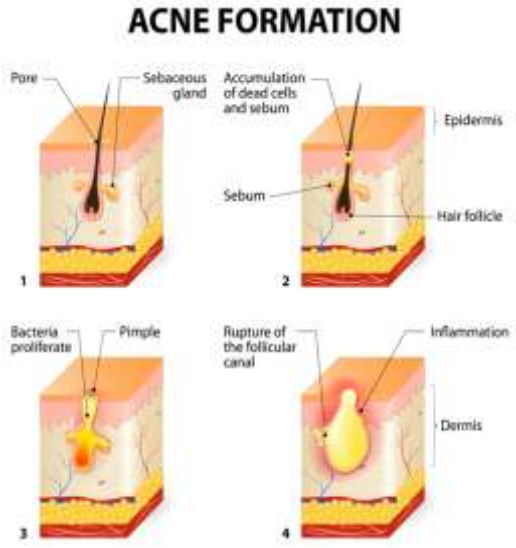


**fig a) Piedmont Healthcare, Mooresville Dermatology,2019[Acne Formation: Online] [Accessed on 21/02/24]**

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**CLASSIFICATION**

Cosmetics broadly categorized into

- SKIN COSMETICS
- HAIR COSMETICS
- NAIL COSMETICS

**SKIN COSMETICS**

The purposes, functions, and roles of skin care cosmetics such as face cleansing cosmetics, lotions, milky lotions, creams, gels, essence, packs, and masks, shaving cosmetics and several other products. The purposes include cleaning the skin, preserving skin's moisture balance, stimulating skin metabolism, and protecting the skin from harmful UV radiation. They must also be safe when used constantly over extended periods.

**POWDERS:**

A face powder is a cosmetic product which has primary function to complement skin color by imparting silky finish.

**CLASSIFICATION OF COSMETIC POWDERS:**

1.Loose powder
2.Compact/pressed powder
3.Setting powder
4.Finishing powder

**COMPACT POWDER**

Compact/pressed powder is a loose powder that was compacted. The main difference between compact and pressed powder is the way of product packaging.

**fig b) Semi Herbal Anti Acne Compact Face Powder.**

## II. METHODOLOGY

The materials used in semi herbal anti acne compact powder are

TALC:

Talc is a hydrous magnesium silicate having a chemical composition of Mg3Si4O10(OH)2.

Talc is a naturally occurring mineral substance used in a variety of cosmetics and personal care products.

It is added to absorb moisture, smooth, or soften products, and prevent caking.

KAOLIN:

Kaolin or Chinese clay as a natural skin exfoliator, kaolin removes excess oil, balances the skin pH, evens out skin tone and keeps acne at bay.

ZINC STEARATE:

Zinc stearate facilitates the binding of components in powdered cosmetics of the skin and keeps them from caking.

TITANIUM DIOXIDE:

It aids in brightening the complexion and concealing imperfections. Utilized as antimicrobial agent. It can be used in a variety of fields.

CALAMINE:

Genuinely classic is calamine. It is appropriate for sensitive skin and has anti-bacterial and anti-inflammatory properties. It works well as an active ingredient in serums and masks or as a pure lotion in powdered pressed products like compact powders. For pimples, it is advisable to apply calamine selectively.

GINGER OIL:

It is derived from the root of ginger plant, Zingiber officinale. It is the oil of empowerment because it boosts confidence, improves focus and has calming

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properties for the skin. It also helps eliminate toxins from the body and reduces the appearance of aging and skin damage.

NUTMEG POWDER:
Because of its well-known anti-aging qualities, it is a great substance to be used to minimize the appearance of fine lines and wrinkles. It stimulates collagen production which enhances the firmness and suppleness of the skin.

**METHODS OF PREPARATIONS**
Generally, 3 methods are employed to prepare compact powder. Following are the methods,
1. Wet method
2. Dry method
3. Damp method
In our study, we formulated the semi herbal anti acne compact powder using damp method and the method is as follows;

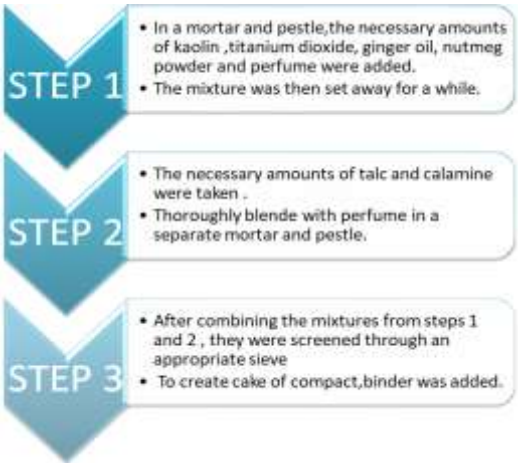


**Fig c) Steps involved in damp method**

**Table no.1: Formulation table**

| Ingredients | Quantity for 100 gm | Quantity taken for 25 gm |
|---|---|---|
| Talc | 69 | 17.25 |
| Kaolin | 18 | 4.5 |
| Titanium Dioxide | 8 | 2 |
| Zinc Stearate | 5 | 1.25 |
| Calamine | 8 | 2 |
| Ginger oil | 0.5 | 0.125 |
| Nutmeg powder | 0.5 | 0.125 |
| Perfume | q.s | q.s |
| Binder | q.s | q.s |

**EVALUATION TESTS**
**I) PHYSICAL EVALUATION**
- Organoleptic Evaluation
- Color
- Odour
- Physiochemical Properties
- Moisture Content
- Total Ash Value
- Determination pf pH
- Powder Characteristics
- Particle Size Distribution
- Sieve Method
- Flow Properties
- Bulk Density
- Tapped Density
- Angle of Repose
- Hausner's Ratio
- Carr's Index

**I) ORGANOLEPTIC PROPERTIES:**
1) Color: The shade test- In this test, color and shade are identified and regulated. A powder sample was spread onto a piece of white paper, and the results were compared to the typical appearance.

2)Odour:
This test was conducted by examining the smell of sample powder.

**II) POWDERCHARACTERISTICS:**
1) Bulk Density:
After the proper amount of powder has dried, it is poured up to 50 ml into a 100 ml measuring cylinder.
**Formula:** Bulk Density = weight of powder/bulk volume of powder.

2)Tapped Density:
After the determination of bulk density, the cylinder is then lowered onto a hard wood surface at intervals of 2 seconds. Starting from a height of 1 inch. Repeatedly measure the powders volume to obtain the average values.
**Formula:** Tapped Density = weight of powder/tapped volume of powder.

3) Angle of Repose:
Angle of repose is defined as "the maximum possible angle between the surface of the pile of powder and the horizontal flow."
Methods for determination:
- Fixed funnel method.

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- Tilting box method.
- Revolving cylinder method.

Fixed Funnel Method:
To create a cone, the material is poured via a funnel. To reduce the effect of falling particles, the funnel tip should be held near to the developing cone and lifted gradually as the pile rises.
**Formula:** Angle of repose = $\tan^{-1}(h/r)$
Where,
h = height of heap,
r = radius of the base.

4) Hausner's Ratio:
It is the ratio of tapped density to bulk density.
It is a simple method to measure powder flow properties. It is unitless
**Formula:** Hausner's ratio = tapped density/bulk density

5) Carr's Index:
Also known as compressibility index.
It is expressed in terms of percentage.
**Formul**a: Carr's index= tapped density – bulk density/ tapped density * 100.

## III) PARTICLE SIZE DISTRIBUTION.

1) By Sieving Method:
Sieve analysis is used to determine the particle size distribution of a solid material by determining the amount of powder retained on a series of sieves with different sized apertures.
Method:

- A sample is added to the top of a series of sieves arranged in descending order of size from top to bottom.
- As the sieves vibrate, the sample is segregated onto the different sized sieves.
- The weight of the sample on each sieve is weighed and used to determine the particle size distribution as well as mean diameter of sample.

**Fig d) Sieve Shaker**

## IV) PHYSIOCHEMICAL PROPERTIES

1) Moisture Content:
It is defined as the amount of water that can be removed without altering the chemical structure of grains.
Methods to determine moisture content can be divided into two categories;
i) Direct Method:

- Oven method
- Brown Duvel fractional distillation method
- Infra-red method

ii) Indirect Method:

- Electrical resistance method
- Dielectric method
- Chemical method
- Weigh about 2gm of powder preparation into a flat, round, weighed porcelain dish.
- Dry at 100° C to 105° C in the hot air oven for 1 hour until constant weights are attained.
- Cool in desiccator and weigh it.
- Weight loss is reported as moisture.

2) Ash Value:
It can be determined by different methods such as;
A) Total Ash value**.**
Used to measure the total amount of material remaining after incineration.

- In a crucible take 2 gm of powder sample, place it in the incinerator and allow it to ignite at 500° to 600°C for about 2 hours.
- Allow the sample to cool.
- Place the cool sample in a desiccator for a while
- Weigh immediately.
- Calculate the total ash content of air-dried material, in mg per gm.
- Formula:

Total ash value = weight of ash/ weight of sample*100.

B) Water soluble ash value.
The difference between total ash and residue after treatment of total ash with water.

- Add 25ml of water to the crucible containing total ash and boil it for 5 minutes.
- Collect insoluble matter on ashless filter paper.
- In a clean crucible above matter is warmed with water for 15 minutes and heated up to a temperature not exceeding 450°C.
- The weight of residue is then subtracted from the total ash weight.

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- Calculate water soluble ash content per g of air-dried material in mg

C) Acid insoluble ash value**.**

- The residue obtained after boiling the total ash with dil.Hcl and igniting the remaining insoluble matter.
- To the ash containing crucible add 25ml of HCL, close the watch glass and boil thoroughly for 5 minutes.
- Wash the watch glass with 5ml of water and transfer this liquid into the crucible.
- On an ashless filter paper gather the insoluble matter and wash until the filtrate is neutral with warm water.
- Transfer this matter in the original crucible and dry on a hot plate.
- Enable the residue in a desiccator to cool for 30 minutes. Weigh immediately.
- Calculate acid insoluble ash value in mg per g of air-dried content.

D) Sulphate ash value.

3) pH: Ph was determined using pH paper.

**V) PAY OFF TEST:**

This test is performed to verify the adhesive properties of the puff powder.

**VI)) IRRITANCY TEST:**

The subject was selected for the skin irritancy test. Redness and swelling were checked at regular intervals of 24 hours.

## III. RESULT AND DISCUSSION

**TABLES**

**Table no.2: Organoleptic Properties**

| Sr.no | Evaluation Test | Observation |
|---|---|---|
| 1. | Nature | Powder |
| 2. | Color | pearl |
| 3. | Odour | Pleasant |
| 4. | Texture | Soft |

**Table no.3: Powder Characteristics**

| Sr.no | Evaluation Test | Observation |
|---|---|---|
| 1. | Bulk Density | 0.5 gm/ml |
| 2. | Tapped Density | 0.625 gm/ml |
| 3. | Angle of Repose | 14.74046◦ |
| 4. | Hausner's ratio | 1.25 |
| 5. | Carr's Index | 20% |
| 6. | Particle Size Distribution (Geometric mean diameter) | 2.818 micrometer |

**Table no.4: Physicochemical Properties**

| Sr.no | Evaluation Test | Observation |
|---|---|---|
| 1. | Total Ash Value | 87.5% |
| 2. | Moisture Content | 0.14844% |
| 3. | pH | Neutral |

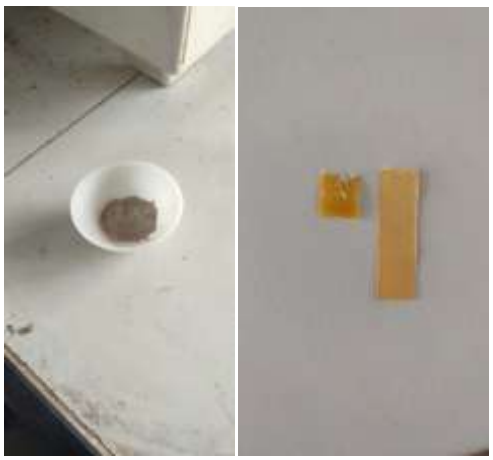

Fig e) Ash value Fig f) pH

**Table no.5: Evaluation of Final Preparation**

| Sr.no | Evaluation Test | Observation |
|---|---|---|
| 1. | Shade Test | Passed |
| 2. | Pay Off Test | Passed |
| 3. | Waterproof Test | Passed |

Fig g) Dry part represents the waterproof quality of compact powder.

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**Table no.6: Irritancy Test**

| Sr.no | Evaluation Test | Observation |
|---|---|---|
| 1. | Irritation | nil |
| 2. | Swelling | nil |
| 3. | Redness | nil |

## IV. CONCLUSION

A semi-herbal anti-acne compact face powder with reduced side effects that incorporates the goodness of nutmeg powder and ginger oil is a smart idea in this age of rising cosmetics demand.

We discovered from this investigation that our product is long-lasting, provides even coverage, waterproof, non-irritating, and no animals were harmed in the making of it.

Additional optimization research is needed to determine the practical advantages of compact powder for people.

## V. ACKNOWLEDGEMENT

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