International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Comparative Analysis of Herbal Potato Compact Powder and Marketed Compact Powder

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Abstract

The creation Of Compact Powder from potatoes. In light of the increasing demand for natural and skin-friendly cosmetics, this study intends to use potatoes' (Solanum tuberosum) advantageous qualities to produce a compact powder that is safe, efficient, and reasonably priced. Because of their high antioxidant, vitamin, and mineral content as well as their skin-soothing, anti-inflammatory, and brightening qualities, potatoes are perfect for cosmetic applications. Potato starch is used as the main base element in this formulation because of its absorbent properties, which give the skin a matte, smooth finish. Potato extracts are also added to the lotion to improve its moisturising and anti-aging properties. Additionally, natural ingredients like kaolin clay, arrowroot powder, and essential oils are added to improve texture, increase skin compatibility, and create a subtle scent. These components support skin hydration, oil regulation, and moderate antibacterial properties when paired with other herbal additives like turmeric and aloe vera.

Assuring the compact powder's suitability for various skin types, stability over time, and sufficient coverage without blocking pores is a major goal of the development process. A number of quality control tests are performed on the formulation, including evaluations for microbiological safety, texture homogeneity, pH balance, and particle size.

The created product is safe for everyday use and provides a chemical-free, environmentally friendly substitute for traditional cosmetics. In addition to supporting sustainable and herbal-based cosmetic solutions, the potato compact powder is well-positioned to satisfy customer preferences for natural, skin-beneficial goods.

Keywords: potato starch, natural cosmetics, eco-friendly ingredients, sustainable beauty, antioxidant properties, solanum tuberosum

Introduction

A notable trend in the cosmetics sector in recent years has been the creation of sustainable and natural products. Due to their perceived safety, positive effects on the environment, and possible health benefits, consumers are increasingly choosing herbal-based cosmetics over synthetic ones. A mainstay of facial cosmetics, compact powders give the skin a beautiful, matte appearance while controlling oil. However, a lot of traditional compact powders contain a lot of artificial substances, which might irritate skin or have other negative consequences.

In recent years, there has been a notable increase in the demand for sustainable and natural cosmetic products. A popular and nutrient-dense tuber, potatoes (Solanum tuberosum) have potential for use in cosmetic formulations because of their anti-inflammatory, antioxidant, and skin-soothing qualities.

Compact powders and other skin care and cosmetic products benefit greatly from the absorbent, mattifying, and softening properties of potato starch.

Potato starch is the main foundation in this product, offering a natural substitute for the synthetic powders frequently found in cosmetics. It is mixed with other skin-friendly components to make a compact powder that protects and nourishes the skin in addition to providing good coverage and a flawless finish. The creation of this compact powder made from potatoes demonstrates how eco-friendly and herbal ingredients may be included into contemporary cosmetic formulas, catering to the growing demand for green beauty products.

The potential of potatoes (Solanum tuberosum) as a crucial component in the creation of a compact powder is investigated in this study. Because of their abundance, affordability, and natural starch content, potatoes make the perfect foundation for a mattifying agent. Furthermore, potato extracts include vitamins (particularly vitamin C), antioxidants, and anti- inflammatory substances, providing further skincare advantages including calming inflamed skin and preventing oxidative damage.

The objective of this research is to create and refine a compact powder formulation based on potatoes, with an emphasis on its marketability, skin friendliness, and functional qualities. This study also aims to provide a new solution that blends skin health and beauty in order to meet the growing consumer demand for multipurpose, environmentally friendly cosmetics. We hope that our study will help enhance herbal cosmetic formulations and encourage the beauty sector to use sustainable raw ingredients.

Materials And Method:

Name

1. Potato starch

Synonyms: Solanum tuberosum, murphy, spud

Family: Solanaceace

Chemical constituents: Carbohydrates starch (polysaccharide), proteins, lipids, phospholipids (lecithin), vitamins (vitamin c), minerals (potassium, magnesium).

Uses: 1] Brightening skin 2] Anti-aging properties 3] Soothing skin irritation 4] Moisturizing 5] Acne treatment.

Fig 1 Potato Starch

2. Sandalwood Powder

Synonym: - Santalum album, True sandalwood

Biological source: - Consist of the heartwood stems and roots of Santalum album Linn

Geographical source: - Widely distributed in India and is cultivated in Southern India

Family: -Santalaceae

Chemical constituent: - More tham 90% of sesquiterpenic alcohols [i.e alpha- santalol and Beta- santalol]

Uses: - a] Improve elasticity of the skin, b] Even out the skin tone, c] lightning of skin, d] Act as anti-imflammatory which helps in
reducing blemishes and treating acne.

Fig 2 Sandalwood Powder

3. Starch Maize

.**Synonyms :-** Corn starch, Maize Starch or cornflour

Biological source :-conisit of polysaccharides granules obtained from Corn

Chemical Constituent :- Contains two types of polymers amylase (linear molecule) and Amylopects(branched Form)

Uses :-a] Provides a unique powdery dry and smooth skin, b] Helps to controls immediate and residual shine, c] helps to reduce oiliness on skin, d] Also reduce perceivable tackiness or stickness

Fig 3 Maize Starch

4. Nutmeg Powder

Synonym :- Myristica, NuxMoschata

Biological source :- Nutmeg consist of Dried kernels of the seeds of Myristica fragrans houtt

Geopraphicalsource :- It is Indigenous to Malacaa Islands and cultivated in Indonesia. Caribbean islands and other tropical countries. In India, it is cultivated in Kerela and Tamil Nadu

Family :- Myristicacease

Chemical Constituent:- 5-15 % volatile oil, ligin, stearin,gum. Major compounds are sabinene, 4-Terpinol and myristicin

5. MATERIALS AND METHODS:

5.1 List of materials:

Sr. No.	Ingredient	Quantity	Uses
1.	Potato powder	3gm	Adhesive agents
2.	Sandalwood powder	2gm	Anti-Oxident
3.	Nutmeg powder	0.5gm	Adhesive agent
4.	Magnesium stearate	2gm	Lubricating agent
5.	glycerol	1ml	Binding agent
6.	Almond oil	0.5ml	Flavouring agent
7.	Sunset yellow	0.2gm	Colouring agent
8.	Formaldehyde	0.5ml	Preservative
9.	Rose water	q.s	Vehicle

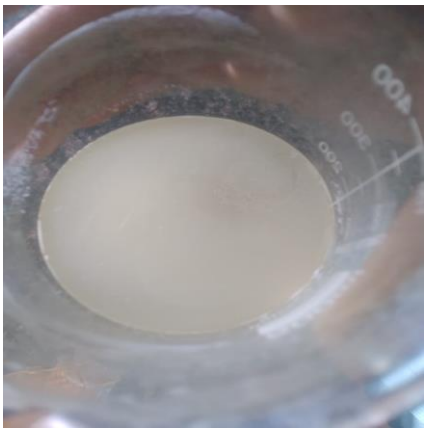
Chemicals: potato powder, sandalwood powder, nutmug powder, magnesium stearate, maize starch, glycerol, almond oil, sunset yellow, formaldehyde ,rose water.

Glassware's and instruments: beaker, mortar pestle, stirrer, weighing balance.

Materials of Method -Starch extraction

Procedure :

1. peal raw potato and cut into small pieces, and record the initial weight
2. Grind them in a motor and pestle with sufficient water.
3. Collect the potato homogenate into a beaker and add enough water.
4. Then filter the homogenate through a muslin cloth to remove the particles.
5. Allow the filtrate to settle. Starch rapidly settles at the bottom. Decant the starch free supernatant carefully.
6. Wash 3-4 times and decant the supernatant. Collect the compact mass of starch and allow it to dry.
7. Record the final weight of isolated starch and calculate the yield.




Steps

1. Take a clean and dried mortar and pestle
2. Add Bananapowder,SandalwoodPowder,kaolin, talc, maize starch. Zinc stearate to the mortar and pestle and titurate well
3. To this mixture add required quantity of glycerol and water and continue the trituration.
4. Then properly mix all the above ingredients.
5. Dried the above mixture temperature at 1000c (hot air oven)

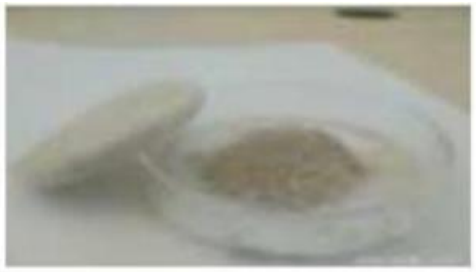
Evaluation test

1. Shade Test

In this test, the variations of color shade are determined and controlled. It is carried out by spreading the powder sample on a white paper and appearance is observed which is compared with the standard one.

2. Pay-off Test:

This test is carried out to check the adhesive property of powders with the puff. This test is mainly carried out on compact powders.



3. Pressure Test:

Compaction Purpose in Compact powder, Pressure required. Uniform Pressure should be applied to avoid formulation of air pockets, which will lead to either breaking or cracking of compact powder. This is because Low Pressure will make the Compact powder soft, whereas high pressure will lead to formuation of hard cake.

4. Particle Size Determination:

With the help of microscope, sieve analysis or by utilizing other technique and instrument, particle size of powder is determined

5. Abrasive Character:

Abrasive Character of Powder can be determined by, rubbing the powder on a smooth surface of the skin. Then with the Help of a microscope, the effect of powder is studied.

6. Moisture content:

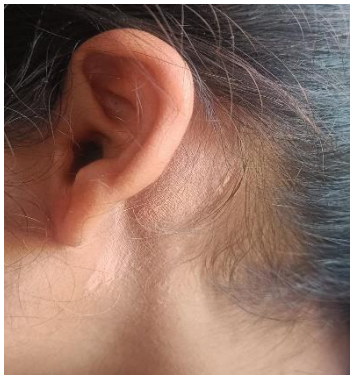
Moisture content present in the powder can be determined by the following formula Moisure content % = Weight of the water in sample x 5 Weight of dry sample Moisure contain % = 11.5 x 5
Moisture content % = 5.87%

7. Water Resistance Test

To determine the powder's resistance to water. Apply the compact powder to a glass slide or human skin.Sprinkle water or immerse the sample for a specific time.Observe if the powder remains intact or gets washed off.Compare with a standard compact powder.

8. Oil Absorption Test To measure the oil absorption capacity. Weigh a known quantity of powder.Add a measured amount of oil (paraffin or oil).Allow it to absorb for 10 minutes.Wipe off excess oil and reweigh.Calculate the oil absorption capacity.

9. Skin Irritation Test



To check for irritation or allergic reactions on the skin Apply a small amount of compact powder on a patch of skin (forearm or behind the ear). Observe for any redness, itching, or inflammation over 24–48 hours. Compare results with a standard cosmetic formulation.

10. Spreadability Test

To evaluate how easily the powder spreads on the skin. Apply a fixed amount of powder on a smooth glass plate or skin.Spread it using a standard applicator.Measure the spread diameter.Compare with the spreadability of a standard powder.

11. Adhesion Test

To determine how well the powder adheres to the skin. Apply the powder to the skin.Rub lightly with a dry cotton pad.Check the amount of powder remaining on the skin.Compare with a commercial compact powder.

Advantages of Potato-Based Compact Powder

1. Natural and Biodegradable Potato starch is a natural, plant-derived material, making the product eco-friendly and biodegradable, which appeals to consumers seeking sustainable beauty options.
2. Oil Absorption Properties Potato starch has excellent absorbent properties, making it effective in controlling excess oil and sebum on the skin, thus providing a matte finish.
3. Non-Toxic and Hypoallergenic Being derived from a food-grade source, potato starch is generally considered safe, non-toxic, and hypoallergenic for most skin types.
4. Anti-inflammatory Benefits Raw potato contains compounds like catecholase and antioxidants that may exhibit mild anti-inflammatory and soothing effects, beneficial for sensitive or irritated skin.
5. Cost-Effective
   Potatoes are widely available and inexpensive, reducing raw material costs and making the formulation economically viable for large-scale production.
6. Skin-Brightening Effect Traditional knowledge supports the use of potato extracts in reducing dark spots and promoting skin brightness, which may add functional value to the cosmetic product.

Disadvantages of Potato-Based Compact Powder

1. Limited Shelf Life Natural starches are more prone to microbial contamination and degradation over time, requiring preservatives or special packaging to maintain stability.
2. Moisture Sensitivity Potato starch is hygroscopic (absorbs moisture), which may affect the powder's texture and consistency, especially in humid environments.
3. Lack of UV Protection Unlike some mineral-based powders, potato-based formulations generally do not offer sun protection unless fortified with additional UV-blocking agents.
4. Color Matching Challenges Natural starches are white or off-white, which may require the addition of synthetic or natural pigments to match various skin tones effectively.
5. Potential Allergenicity in Rare Cases Although rare, some individuals may have allergic reactions to potato-based ingredients, especially those with nightshade sensitivities.
6. Texture and Binding Limitations On its own, potato starch may not provide the same smooth texture or binding properties as conventional talc or silica, requiring blending with other excipients.

5. RESULT AND DISCUSSION:

The result was found in compact powder PH was 5.0-7.0 and appearance was brownish, homogeneity was good and spread ability was smooth in compact powder

Observation table:

Parameter	Observation
pH	5.0 to 7.0
Appearance	Brownish
Homogeneity	Good
Spreadability	Smooth

Identification Test

Identification test of Powder

Sr. No.	Physical properties & test	Description
1.	Physical State	Dry Solid Powder
2.	Color	Natural nude
3.	Odor	Mind and earthy
4.	Solubility	Insoluble
5.	Melting Point	Not specific

Comparative Test Result:

Test Name	Potato Compact Powder	Marketed Compact Powder
Water Resistance Test	Moderate resistance (partially removed after water exposure)	High resistance (minimal removal)
Skin Irritation Test	No irritation observed (mild and soothing)	No irritation in most cases (may cause slight dryness)
Oil Absorption Test	High oil absorption	Moderate oil absorption

	(controls shine for 5-6 hours)	(controls shine for 3-4 hours)
Adhesion Test	Good adhesion (lasts ~6 hours)	Very good adhesion (lasts ~8 hours)
Spreadability Test	Smooth and even application	Very smooth application with finer texture

Result and Discussion:

1. **Physical and Sensory Evaluation:** The formulated compact powder had a smooth, fine texture and good compressibility. It provided a matte finish with even skin coverage upon application.
2. **Oil Absorption Capacity:** The formulation demonstrated effective oil absorption, reducing skin shine and maintaining a non-greasy appearance for up to 6-8 hours.
3. **pH Compatibility:** The pH of the compact powder was within the skin-friendly range (4.5 to 6.5), ensuring compatibility with various skin types.
4. **Stability Studies:** The product remained stable under different environmental conditions (high humidity, temperature variations). No significant changes in texture, color, or performance were observed during accelerated stability testing.
6. **Microbial Load:** The compact powder complied with acceptable microbial limits, ensuring product safety.
7. **Consumer Feedback (Optional if conducted):** Positive responses were recorded regarding the product's texture, oil control, and ease of application in preliminary trials.

Conclusion

The study effectively illustrates potato starch's potential as a main component in the creation of compact powder. There are numerous advantages of using potato starch, including:

1. Outstanding Absorbent Capabilities: It efficiently removes extra moisture and oil, leaving a matte finish that works well for oily and mixed skin types.

2. Smooth Texture: The compact powder's sensory appeal is enhanced by the smooth and silky texture created by the fine potato starch granules.
3. Natural Origin: Potato starch is a natural, plant-based component that is hypoallergenic and suitable for sensitive skin, which satisfies the growing need for cosmetics that are both environmentally and skin-friendly.
   4. Cost-Effectiveness: Potato starch lowers production costs overall without sacrificing product quality because it is readily available and reasonably priced.
4. Compressibility and Binding: Its compacting qualities contribute to its long-term stability and user-friendliness.

The developed compact powder is a good substitute for traditional talc-based formulations since it satisfies key requirements like texture, oil control, spreadability, and stability. Other natural ingredients could be investigated in future research to improve the product's aesthetic and functional qualities.

Because the recipe was maintained moderate, the compact powder was created with the idea that it would work for all skin types. Compact powder is a cosmetic product that can be used to give the skin a unique touch, manage oil and minimize shine, or give the skin a matte appearance. It is packaged as either a loose powder or a compact powder. In the consumer market for cosmetics, oil-based foundation products are growing in popularity. The tiny powder was made in a way that made it suitable for everyday use. Numerous experiments were carried out to demonstrate the product's effectiveness and stability. The study's objective was to create an effective compact powder that people of all ages may use on a daily basis. The compact powder is highly effective when applied topically. In terms of appearance, color, spread ability, and smoothness property, we can infer from this study that oil-based compact powder has superior evaluation parameters. This formulation, which contains potato starch, talc (2gm), kaolin (1gm), magnesium stearate (2gm), maize starch (1gm), glycerol (1ml), almond oil 0.5ml, sunset yellow 0.2gm, formaldehyde 0.5ml, and rose water q.s. It didn't cause skin irritation or roughn

Detarmination of fitness:

Approximately 10 grams of each sample material were put into a typical 150 micron sieve. In order to get as much material through the sieve as possible, it was first cleaned with a slow stream of running tap water and then with a fine stream from a wash bottle. A gentle stream of filtered denaturated spirit should be used to begin the washing process if the material proved difficult to wet with water. The water was dried on a stream bath once it had been fully drained from the sieve.

After that, the residue was cautiously moved to a tarred watch glass and dried for constant mass at 105°C.

CALCULATION:

The following formula was used to determine each sample's fineness. Material retained on the designated sieve, as a percentage by=M1/M, where M1 is the mass in grams of the residue retained on the designated sieve and M is the mass in grams of the test material
Report: Material kept on the designated sieve,
as a percentage by = M1/M = 0.8/2 = 0.4%

Referance

1. Gaurav Kumar Sharma, JG, MD. A text book of cosmetic formulation, Jayesh Gadiya: 08 may 2018: 29-36
2. Kabara JJ, Orth Ds, eds. Preservation- free and self – preserving cosmetics and drug: principles and practice. New York: Marcel Dekker
3. Kitson N. Drugs used for skin diseases. In: Roberts MS, WKA, Dermatologic. Cosmeceutic and cosmetic development Therapeutic and Novel approaches. New York: Informa Healthcare, 2008: 11-20
4. Abdul Kadar M. An extensive review of face powder: functional uses and formulations.
5. International journal of pharmacy and pharmaceutical science 1(1), Bangladesh: Nov 19 2019: 112.
6. Wilkinson, J.B. and Moore, R.J. (eds) (1982) Harry's Cosmeticology 7th edn, George Godwin.
7. Allen, T., 2003. Powder Sampling and Particle Size Determination. Elsevier. 151–164. Asgharian, G., Ménache, M.G.,Miller, F.J., 2004. Modeling age related particle deposition in humans. J Aerosol Medic. 17 (3), 213–224.
8. Bennett, J., 2017. Cosmetics and Skin: Loose Face Powders. Boundy, M., Leith, D., Polton, T., 2006. Method to evaluate the dustiness of pharmaceutical powders. Ann. Occup. Hyg. 50 (5), 453–458.
9. Braunagel, 2002. Powders for face and eye. SOFW Journal 128 (December (12)), 48
10. M.L. Schlossman, A.J. Feldman. Trends in pressed powder technology J. Soc.Cosmet. Chem., 22 (1971), pp. 599-614
11. Max Wichtl . Herbal drugs and phytopharmaceuticals: 2004 of skin irritation. 1994; 31:281–287.
12. Pamela J Secreast, Deanna Mudie . Particle, powder, and compact characterization. 163-186, 2009
13. Hans Leuenberger, Bhagwan Dass Rohera. Fundamentals of powder compression 3, 12-22, 1986
14. Sarfaraz K Niazi, CRC press. Handbook of Pharmaceutical Manufacturing Formulations: 2019
15. Dr.Asih Juanita & Putu Udayana antari Blush On Compact powder With natural Dyes From ethanol Extract of Dragon Fruit Peel. 2023
16. Ms. Ashwini Ramesh Rahane & Ms. Khandre. Formulation and Evaluation of Compact Powder By groundnut Shell Powder 2024
17. Amal M hamza & Marma M Dlim Face Powder Preparation Survey 2013
18. Sudipta Roy STM Journals, Preparation and Evaluation of Herbal Cosmetic 2, 2024
19. Gerhard J No Hynek, Eric Antigenic, Thomas Re, Herve Toutain Safety assessment of personal care products/cosmetics and their ingredients, Toxicology and applied pharmacology 243 (2), 239-259, 2010
20. Gerhard J Nohynek, Eric Antignac, Safety assessment of personal care products/cosmetics and their ingredient. 239-259, 2010