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A REVIEW ON FORMULATION AND ASSESSMENT OF FACE POWDER FROM *MANIHOT ESCULENTA*

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Abstract:

Herbal cosmetics are products used to enhance an individual's appearance. Cassava powder, derived from the root of the cassava plant (Manihot esculenta) has gained popularity as a natural alternative to traditional talc based face powder. It hydrates the skin, help it maintain moisture and soften the skin. Cassava powder is often considered suitable for sensitive skin type due to its gentle and non-irritating nature. Oil absorbing property is one of the key advantage of cassava face powder. Cassava face powder offers a natural and safer alternatives. It is free from harmful chemicals and typically does not contain additives or synthetic ingredients.

Keywords: Cosmetics, Face powder, Cassava, Skin, Flour.

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INTRODUCTION:

Powders are the solid dosage forms. They are considered as the oldest and simplest dosage forms since supplied either in the bulk or as an individual doses in the fine state of subdivision of drugs or drugs are with or without the diluents. Usually bulk powders are supplied for externally used purposes and individual doses for internally used purposes. The pharmacist view for powders as a dosage form should be important for their state of sub-division, homogeneous mixing if contain more than one drug, their dispensing procedure depending on physical and chemical properties of the drugs and diluents, their packing and labelling[(1)].

Powders are still very commonly used dosage forms in many of the dispensaries, simply because of their simple formulation and packaging techniques. Sometimes few of the drugs for internal use are not dispensed in fine state of sub-division but rendered to a granular form using some processes. These forms of medicaments is called granules. They are usually supplied in bulk form. Granules are formulated in such a way that they should evolve carbon-di-oxide gas when added to water before taking the dosage orally. Such forms of powders are called effervescent granules. Now a days, powders for internal use are very conveniently replaced by tablets and capsules while powders for external use with sprays and insufflations[(2)].

Figure No: 1 Powder

ADVANTAGES OF POWDERS

- Powders are used both internally and externally
- They are more stable than liquid dosage forms.
- Powders are convenient to handle, store and carry than liquid dosage forms.
- Paediatrics and geriatrics and cannot swallow solid dosage form such as tablets and capsules but they can take the powdered drugs easily as such or dispersed in water or any other liquid.
- Some products are administered by mixing with food.
- Bulky and large dose.

DISADVANTAGES OF POWDERS

- Not suitable for oral administration of bitter drugs.
- Dispensing of powder is the time-consuming process.
- Powders are inconvenient to handle and administer as compared to tablets and capsules.
- Less dose accuracy than that can be achieved with tablets or capsules.
- Coarse powders are friable or undergoes size reduction to further fines.
- The inter-particular friction among the fine powders may lead to formation to lumps[(3)].

TYPES OF POWDER PRODUCTS

1) Face powder
2) Compact face powder
3) Body powder

FACE POWDER

Face powder is an indispensable article of a lady's cosmetic range. From the mask-like covering in ancient time to the natural look which is the choice of the present day. Face powders have been and still remain one of the basics of the cosmetic industry. A great deal of the changes have taken place in face powder fashion during the couple of decades. Tinted shiny, enhanced by our modern cosmetic, the women of today is able, will only space modest effort to be more attractive than she has ever been in the past. A face powder is basically a cosmetic product which has as its prime function the ability to complement skin colour by imparting a velvet finish to it. A good face powder should produce a smooth finish to facial skin, masking visible imperfection of the face and shine due to moisture or grease from perspiration or secretion of spacious and sweat gland of form preparation used on the skin. The powders must produce the lasting effect so that frequent applicant is unnecessary. The preparation should make the face pleasant to look and touch. The degree of opacity can vary from opaque, in case of clown makeup to almost transparent[(4)].

Figure No: 2 Face powder

CHARACTERISTICS OF FACE POWDER

a) **Covering power:** A ability to mask skin imperfection such as skin shine, enlarged pores, minor blemishers.
b) **Slip:** The character of spreading over the skin without the dragging, and give the characteristic of smooth feeling.
c) **Adhesiveness:** The ability to cling to the face.
d) **Absorbency:** The ability to absorb skin perspiration and oily secretion without showing the effect of such absorption.
e) **Bloom:** The ability to impart a velvety, peach like finish to the face skin.
f) **Colouring:** To impart a colour effect according to the need.
g) **Perfuming:** To produce a pleasant odour, the proportion of various ingredients used can be altered to have slight variation[5].

CLASSIFICATION OF FACE POWDER

I. Depending on the nature of the skin:

a) Light type
b) Medium type
c) Heavy type

Light type: Dry skin requires light powder, a powder of slight covering power as dry skin secretes virtually no oil and little moisture.

Medium type: Medium powders having comparatively higher covering power, are applied to normal or moderately oily skins, which are shiner due to skin secretions.

Heavy type: Heavy powders have more covering power and are used for extremely oily skins which have a great deal of shine and thus require great covering power.

II. Depending on the texture:

a) Loose powder
b) Pressed powder
c) Setting powder
d) Finishing powder

Loose powder:

Leaves the skin with a refined texture and soft glow. Loose powder is the original type of face powder. It has light and soft texture. Loose powder is suitable for oily skin. Typically, loose powder is packaged in a jar equipped with a puff. It also helps to prevent makeup transfer or runoff. Loose powder seals the moist consistency of foundation and makes it last longer.

Pressed powder:

Compact powder or pressed powder is a loose powder that was compacted. Pressed powders are pressed into a compact, loose powder are often packaged in jars or tubs. Typically, Compact powder has been formulated with a moisturizer and oil. It makes the texture heavier than loose powder. Compact powder is recommended for dry skin. Beside brighten the face, it also moisturizes the skin.

Setting powder:

Setting powders prevent base makeup from rubbing off and reduce shine for a long-lasting, flawless complexion. Setting powder can be translucent or slightly tinted to match skin tone. Setting powder serves to eliminate oil and keeping makeup to be more durable. Typically, setting powder comes with the type of transparent powder.

Finishing powder:

It is used to lock the finished makeup. It can be used maximize the bright makeup that looks uneven, and fading the fine lines or pores in the face. Typically, finishing powder is the white powder. The fine line between finishing powder and setting powder is frustratingly blurry.

IDEAL CHARACTERISTICS OF FACE POWDER:

- It should produce a smooth finish to the facial skin.
- Masking small visible imperfection of the face and shine due to moisture or grease from perspiration or secretion of sebaceous and sweat gland.
- Must produce a lasting effect, so that frequent application is unnecessary.
- Should make face pleasant to look and touch.
- Must adhere to skin.
- Degree of opacity can vary from opaque to almost transparent[6].

STRUCTURE OF SKIN

The skin or cutaneous membrane is the outermost layer which covers and protects the surface of the body from external environment. It is the complex and

largest organ of the body in terms of both surface area and weight which unites with mucosal lining of the respiratory, digestive and urogenital tract to form a capsule which separate internal body surface 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
- Hypodermis

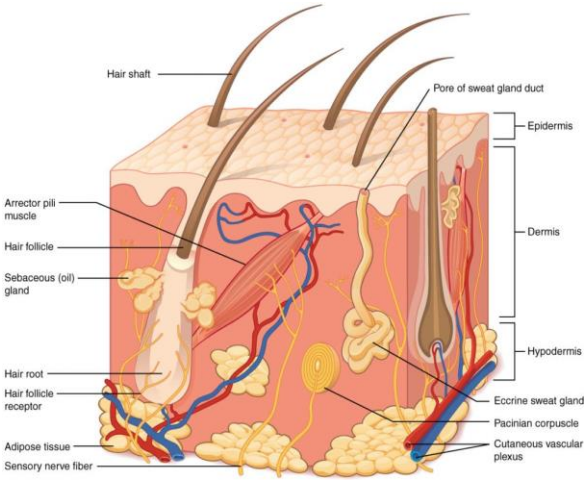

Figure No: 3 Structure of skin

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 sub layers 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.

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.

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.

TYPES OF SKIN

There are five types of healthy skin.

- Normal skin
- Oily skin
- Dry skin
- Combination skin
- Sensitive skin

Normal skin

This skin is neither too dry nor too oily. It has regular texture, no imperfections and a clean, soft appearance and does not need special care. Face powder is suitable for normal skin.

Oily skin

Oily skin has a porous, humid and bright appearance. It is caused by excessive fat production by sebaceous glands and usually determined by genetic or hormonal causes. Face powder suitable for oily skin.

Dry skin

Dry skin is caused by external factors such as the weather, low air humidity, immersion in hot water and it usually temporary. Mineral based face powder for suitable for dry skin.

Combination skin

Based on its location, it presents characteristics of both dry and oily skin. Since distribution of sebaceous and sweat gland is not homogeneous. Both mineral based face powder and normal face powder are suitable for combination skin.

Sensitive skin

Sensitive skin is more prone to react to stimuli to which normal skin has no reaction. It is a fragile skin, usually accompanied by feelings of discomfort such as heat, tightness, redness or itching. It is a delicate skin that needs more care to fight dryness, roughness and usual appearance. Face powder are suitable for sensitive skin[7].

CASSAVA POWDER

Manihot esculenta, commonly called cassava, manioc, yuca, or tapioca is a woody shrub of the spurge family, Euphorbiaceae, native to south America, from Brazil, Paraguay and parts of the Andes. Although a perennial plant, cassava is extensively cultivated as an annual crop in tropical and subtropical regions for its edible starchy root tuber, a major source of carbohydrates. Cassava is predominantly consumed in boiled form, but substantial qualities are used to extract cassava starch, called tapioca, which is used for food, animal feed, and industrial purposes. The Brazilian farinha, and related garri of west Africa, is an edible coarse flour obtained by grating cassava roots, pressing moisture off the obtained grated pulp, and finally drying it.

Cassava is the third-largest source of food carbohydrates in the tropics, after rice and maize. Cassava is a major staple food in the developing world, providing a basic diet for over half a billion people. It is one of the most drought-tolerant crops, capable of growing on marginal soils. Nigeria is the world's largest producer of cassava, while Thailand is the largest exporter of cassava starch. Cassava is classified as either sweet or bitter. Like other roots and tubers, both bitter and sweet varieties of cassava contain anti-nutritional factors and toxins, with the bitter varieties containing much larger amounts. It must be properly prepared before consumption; as improper preparation of cassava can leave enough residual cyanide to cause acute cyanide intoxication, goiter, ataxia, partial paralysis, or death. The more toxic varieties of cassava have been used in some places as famine food during times of food insecurity. Cassava is a valuable food crop in fighting hunger and poverty in developing countries.

The cassava root tuber is usually elongated, has depressions and crevices along its length and tapers to one end. In most cases, the middle part has a fairly constant diameter. Whereas the head end has a relatively larger diameter, the tail end has a considerably smaller diameter when compared with the middle part. The head and tail ends are generally referred to as the proximal and distal ends, respectively. At its proximal end, the tuber is joined to the rest of the plant by a short woody 'neck'[8].

Figure No: 4 Cassava powder

BENEFITS OF CASSAVA FOR THE SKIN

- It hydrates the skin, help it maintain moisture and soften the skin.
- It helps to remove blemishes and scars.
- The skin complexion will smoothed and brightened.
- Cassava flour with heat effect, detoxification is very high, will quickly push the toxins accumulate in the body, reducing acne and return the skin to its original smooth.
- Cassava flour promotes the anti-aging property of skin.

APPLICATIONS OF CASSAVA STARCH IN COSMETICS AND PERSONAL CARE

Fig No: 5 Flow chart of cassava starch applications

Powers and Loose face powders:

Cassava starch is a common ingredient in face powders. Helping to create a smooth and silky texture while absorbing excess oil on the skin.

Pressed powders:

Cassava starch can be used as a binding and texturizing agent, ensuring that the powder adheres well to the skin.

Setting powders:

Cassava starch helps to set makeup, control shine, and extend makeup wear.

Baby powders:

Cassava starch contributes to a soft and gentle texture that is suitable for delicate body skin[9].

REVIEW OF LITERATURE

1) **Abdul Kader Mohiuddin *et al.,*** There is a legitimate reason to use face powder, and the pharmacopoeias prescribe them in the treatment of many skin infection. Face powder comes in different shades to match varying skin tones, and it is a good idea to choose the skin tone that most closely matches the natural skin. Powders give a good lasting effect to foundation makeup and possess oil-absorbing property that are very useful for oily-skin types.

2) **Garima Laddhad *et al.,*** Some powders with sunscreen help lesser skin damage from the sun and other environment stresses in addition to toning the face. Some pigmented face powder designed to be used on their own, without a base foundation. As per IS standards the powder passed all the tests and hence the products are of standard grade. In this modern era, face powders are really products that add very materially to personal attractiveness.

3) **Chandini Nair *et al.,*** Arrow root face powder derived from the root of arrow root plant has gained popularity as a natural alternative to traditional talc based face powder. Arrow root face powder is known for its absorbent qualities, making it effective in reducing excess oil and shine on the skin. It has a lightweight texture, which allows for smooth application and blending, resulting in a natural-looking finish. This study focuses on formulating and evaluating a herbal face powder utilizing Arrowroot as a key ingredients.

4) **Nagib Ali Elimarzugi *et al.,*** During the use of face powder of different sources on what the participants response, and due to the relative large incidence of problems mentioned, the need of system able to report, evaluate, withdraw of harmful cosmetics partially or totally cannot be ignored.

5) **Suhartiningsih *et al.,*** The *Manihot esculenta* which belongs to the family Euphorbiaceae. Cassava face mask are able soften and brighten and remove acne scars. Another benefit of the starch is as prickly heat drugs because the tapioca may give cold sensation when applied to the skin. Cassava is water-soluble so it is used as a thickening agent. Cassava has many names several parts of world, such as manioca, boba and yuca. Cassava is used to hydrate the skin and helps it maintain moisture. Cassava starch water to cure wounds and scars.

6) **Said Moshawih *et al.,*** The *Manihot esculenta* is considered one of the essential tuber crops, serving as a dietary staple food for various populations. This systematic review provides a comprehensive summary of the nutritional and therapeutic properties of cassava, which is an important dietary staple and traditional medicine. The review aims to evaluate and summarize the phytochemical components of cassava and their association with pharmacological activities, traditional uses, and nutritional importance in global food crisis. Cassava has demonstrated multiple pharmacological activities including its effect as an anti-oxidant which provides hepatoprotective and nephroprotective effects.

7) **Geremew Bultosa *et al.,*** Cassava flours and starches have elicited great use in the food and non-food industry. This review showed that screening criteria of cassava cultivars end-user properties include proximate contents, amylose content, structural, swelling, gelatinization and pasting characteristics, including freeze-thaw stability

property of cassava derived flours and starches. Application of cassava flour and starch and food formulations is guided by their end use properties such as composition, phytochemical and functional properties.

8) **Khaled Ali Al Awam *et al.*,** They concluded that Talc powder is widely used for different purpose worldwide. Effects of talc on the human health is a concern as it has many chemical components. Talc belongs to the general mineral family of the layered silicates which are present in nature and are composed of crystalline hydrous magnesium sulphate. It is not specifically deemed dangerous and is classified as an irritant dust in powder. Cosmetic talc powder, used regularly by women.

9) **T. G. G. Uthpala *et al.*,** Cassava is a major staple food in the developing world, which ranks fourth as a food crop. It is a perennial crop, originated in Brazil with central America and introduced to Sri Lanka. Cassava stands out in the country as the most important source of energy for the calorie deficient low-income population. It is one of the most drought-tolerant crops, capable of growing on marginal soils and it can be seen in every climatic zones in our country Cassava varieties are basically classified as either sweet or bitter. Cassava flours has potentials in many developing countries, particularly in Africa where there is an extended consumption of bread made from 100% imported wheat.

10) **L Phetcharat *et al.*,** the apparent stabilizing effect of herbal powered product on cell membranes of study may contribute to improve the cell longevity and obstructing skin aging and improve aging induced skin condition.

AIM AND OBJECTIVES

AIM

To formulate and assess cassava face powder.

OBJECTIVES

- Collection and preparation of cassava powder using various methodologies such as sedimentation, drying and sieving.
- To evaluate safety, efficacy and quality of cassava face powder
- They are non-irritant when applied on the skin.
- To find the useful benefits of cassava face powder on human use as cosmetic product.

MATERIALS REQUIRED

The material required for formulation and assessment of face powder from *Manihot esculenta* are enlisted in tables no 1& 2.

HERBS REQUIRED

Table No 1: List of herb used and their roles

SL.NO	HERB	USES
1.	Cassava (*Manihot esculenta*)	Antioxidant, Anti-wrinkle Activity, hydrating the skin, moisturizing.
2.	Corn starch	Silkiness and soothe the skin, Control excess oil production on the skin.
3.	Rose oil	Natural humectant, Fragrance.

CHEMICALS REQUIRED

Table No 2: List of chemicals used and their roles

SL.NO	LIST OF CHEMICALS	USES

1.	Kaolin powder	Unclogging of the skin pores, Absorbent, Make the skin surface smooth, Prevents acne.
2.	Benzoic acid	Anti-aging, Antioxidant, Fragrance, Moisturizer.

CASSAVA

Family: - Euphorbiaceae.

Biological source: - Cassava starch is obtained from the roots of the cassava plant, that mostly grows underground, traditionally *Manihot esculenta*.

Biological name: - *Manihot esculenta*.

Therapeutic uses: - Cassava starch is highly absorbent, because it can help to hydrate the skin. Cassava starch is also used as a thickener, binder, and stabilizer in different formulations. It can typically be found in dry shampoos, facial masks, lotions.

MEDICINAL USES

Cassava is often used in traditional medicine and has a number of applications. The plant is antifungal, antiviral, mutagenic and antibacterial. The roots of bitter varieties can be used to treat scabies, diarrhoea and dysentery. The juice of the grated tubers is used to treat constipation and indigestion. A flour made from the roots can be used as a dusting powder on the skin in order to help dry weeping skin. Soaked with carapa oil, it is used as a poultice on scattered muscles. It is mixed with rum and rubbed onto children's as a treatment for abscesses and skin eruptions. It can be made into an ointment to treat fungal dermatitis[10,11].

Figure No: 6 Cassava root rhizome

KAOLIN

- Natural clays have been used to heal skin infections. Kaolin is used in the cosmetic and skincare industry due to its beneficial properties for the skin.
- By adsorbing and absorbing moisture and impurities from the skin, the clays also serve to cleanse and refresh the skin surface and to aid in the healing of topical blemishes.
- Kaolin is useful for people with oily or acne-prone skin as it helps to control shine and reduce the appearance of pores.
- It often used in products designed for sensitive or irritated skin types, including facemasks, creams and lotions. Hence, it can act as a mild exfoliate when used in a powdered form.
- Kaolin clay is white and has a very soft texture. The whiter the clay, the purer and better it is, suited for people with dry, sensitive, and mature skin.

Figure No: 7 Kaolin

BENZOIC ACID

- Benzoic acid is a naturally occurring and synthetically produced compound used in cosmetics for its preservative properties.
- It is commonly found in a variety for personal care and cosmetic products, such as skincare, shampoos and makeup.

- Benzoic acid acts as an antimicrobial agent, preventing the growth of bacteria and fungi, which helps extend the shelf life of these products and maintains their safety and quality.
- Benzoic acid is used in skincare products for its preservative properties, ensuring the safety and longevity of creams, lotions, and serums.
- Benzoic acid provide anti-aging, soothing and moisturizing properties[12].

Figure No: 8 Benzoic acid

CORN STRACH

- Corn starch is a flour derived from corn, a wonder ingredient, corn starch is a natural moisture-absorbing powder, which is often used as an alternate to chemically formulated talcum powders.
- Corn starch is beneficial for acne-prone skin because it absorbs excess oil from the skin, which cause acne and pimples.
- Corn starch is used for instant lightening, and whitening the entire body and face.
- Corn starch contain vitamin A and minerals such as iron and calcium, which help erase dark black spots and pigmentation and brighten skin tone.
- It stimulates cell regeneration and promotes overall skin health[13].

Figure No: 9 Corn starch

ROSE OIL

- Rose oil is used to improve skin tone and brightens the skin complexion.
- Rose oil helps to reduce blemishes, acne scars and dark spots. It is capable of both nourishing and disinfecting the skin.
- Rose oil, moisturizes and purifies skin by pulling toxins out of its outer layers.
- Rose oil has antiseptic, bactericidal and anti-inflammatory properties. It also increases skin's permeability.
- Rose oil can help to control skin texture and many keratinocytes differentiation-related skin diseases[14].

Figure No: 10 Rose oil

METHODS OF PREPARATIONS

A) METHODS OF PREPARATION OF CASSAVA FLOUR

Step-1: Selecting roots

- Harvest or buy healthy, mature, firm, freshly harvested cassava roots. These should have no bruises.
- The flesh of the roots should be white with no cracking and few fibrous roots.

Step-2: Peeling

- Peel the roots and remove the stalk, woody tips and any fibrous roots using a sharp knife.
- Failure to peel properly will result in off-colour in the final product.
- Cassava peel (after drying) can be used for animal feed or composting.

Step-3: Washing

- Wash peeled cassava roots with clean water to remove any dirt, including sand, soil, leaves or other impurities.

Step-4: Grating

- The rhizomes chopped into approximately 1cm cubes and then ground in a fine grater or a food processor for 5 minutes.

Step-5: Filtering

- The grated cassava mash is filtered by using a muslin cloth.

Step-6: Settling

- The filtrate was allowed to stand for 2 hour for the starch to settle and the top liquid was decanted and discarded.
- Water was added to the sediment and the mixture was stirring again for 5 minutes.
- Filtration was repeated as before and the starch from filtrate was allowed to settle.

Step-7: Drying

- After decanting the top liquid, the sediment (starch) was dried in hot air oven at 55ºC for one hour.
- Cassava mash is also dried by spreading it in a clean black plastic sheet placed on a gentle slope in full sun.

Step-8: Milling

- Once the starch is completely dry, transfer it to a mortar and pestle, grinder, or a food processor. Mill the dried cassava mash to produce flour.

Step-9: Sifting

- Using a simple home-made sieve, sift the milled flour to remove fibrous materials and any lumps. This is important to obtain high-quality free-flowing flour, free of fibre with a good particle size.

Step-10: Packaging and storing

- Pack sifted cassava flour in airtight moisture-proof black plastic bags.
- Seal the bag using a burning candle and label with date of manufacture and expiry date (after six months).
- Pack bags in a carton to protect them from light.
- Store the cartons in a well-ventilated, cool, dry place.
- The packaged flour will keep for about six months.

B) METHODS OF PREPARATION OF CASSAVA FACE POWDER

- Gather the ingredients needed cassava powder, kaolin, corn starch, benzoic acid and rose oil.
- In a clean bowl, combine equal parts cassava powder, kaolin clay and corn starch. These ingredients will form the base of the powder and provide a smooth and matte finish.
- Adding benzoic acid as preservative to the mixture. Benzoic acid has preservatives and adds subtle antimicrobial properties to the face powder.
- Mix well to ensure even distribution by using motor and pestle for obtaining adequate particle size, put the mixture in fine mesh sieve and sieve it. Add a few drops of rose oil to the mixture. Rose oil provide a pleasant fragrance and can enhance the sensory experience of using the face powder. Start with small amounts of each and adjust according to your desired fragrance.
- Hence small amount and adjust based on our preference. Mix thoroughly to distribute the fragrance evenly.
- Again, mix well to ensure even distribution by using motor and pestle for obtaining adequate particle size. Put the mixture in fine mesh sieve using 8,12,25,60,85.
- Before finalizing the mixture, test the face powder on a small area of your skin to ensure it matches your complexion and does not cause any adverse reactions. Adjust the colour or scent if needed. Transfer the prepared face powder into a clean, airtight container for storage.
- Use a jar with a sifter lid or any container for storage or any container that keeps the powder dry and allows for easy application. To apply the cassava face powder, use a clean makeup brush or a powder puff. Dip the brush or puff into the powder and tap off any excess[15,16].

Table No 3: Formulation table

SL.NO	INGREDIENTS	FORMULATION CODE		
		F1CFP	F2CFP	F3CFP
1.	Cassava powder	10gm	10gm	10gm
2.	Kaolin	3.5gm	4.4gm	5gm
3.	Corn-starch	5.4gm	4.5gm	3.9gm
4.	Benzoic acid	0.1gm	0.1gm	0.1gm
5.	Rose oil	1ml	1ml	1ml

EVALUATION TEST FOR CASSAVA FACE POWDER

I. ORGANOLEPTIC EVALUTION

PHYSICAL PROPERTIES

The physical properties such as appearance, odour, colour and texture were checked visually.

II. PHYSICOCHEMICAL EVALUATION

pH

A Calibrated digital pH meter at constant pH was used to calculate the pH of 1% of the aqueous solution in the formulation.

MOISTURE CONTENT

Weigh around 1.5 gm of the powder in to a thin film flat weighted porcelain dish. Dry at 100°C in the oven until two consecutive weights do not vary by more than 0.5mg. Cool in the desiccators and weight loss is naturally reported as moisture[17,18].

III. PHYSICAL EVALUATION

PARTICLE SIZE DETERMINATION

The particle size of cassava powder affects its texture; feel and application powder affects its texture, feel and application on the skin. The powder is typically milled to achieve a fine particle size, ensuring smooth and even coverage. The particle size is an aspect that influences different properties such as spreading ability, grittiness, etc. The particle size was calculated by the method of optical microscopy.

ANGLE OF REPOSE

The maximum possible angle between the surface of the pile of powder and the horizontal flow is known as angle of repose. It states and records the height and radius of the heap. The angle of repose can be determined for the above method by using the formula.

$$\boldsymbol{\theta = \tan^{-1}(\frac{h}{r})}$$

Where

$\boldsymbol{\theta}$- Angle of repose

h - Height of the heap

r - Radius of the base

BULK DENSITY

The bulk density is the ratio of powders given mass to its bulk volume. The appropriate quantity of powder is dried and filled into a 50ml measuring cylinder with maximum of 50ml then, from a height of 1 inch at 2 second internals; the cylinder is lowered into a hardwood surface. Measuring the volume of the powder is then measured. To get average values, this repeated. The bulk density is determined using the formula given below[19].

Bulk Density = Mass/Volume

IV. ABRASIVE CHARACTER

It is possible to determine the abrasive quality of the powder by rubbing powder on the smooth surface of the skin.

V. IRRITANCY TEST

The subject was selected for the skin irritancy test and redness, swelling was checked for regular intervals for 23 hrs[20].

CONCLUSION:

Cassava face powder is a promising cosmetic product that offers several benefits for individuals seeking a natural and mattifying solution for their skin. The demand for herbs is rising on the global market. The current study discovered beneficial qualities for face powder used by humans as cosmetics. Cassava flour with heat effect, detoxification is very high, will quickly push the toxins accumulate in the body, reducing acne and return the skin to its original smooth. Cassava with its high concentration of antioxidant, dietary fiber, vitamins and minerals, is essential for maintaining good skin.

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