

FORMULATION AND ASSESSMENT OF POLYHERBAL MULTIPURPOSE HAIR MASKManjima Santhosh^{1*}, Neeraja S. A.², Nanthana Unni R. P.³, Aparna P.⁴ and Dr. Prasobh G. R.⁵^{1,2,3}Student, Eight Semester B Pharm, Sree Krishna College of pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India -695502.⁴Associate Professor, Department of Pharmaceutics, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India -695502.⁵Principal, Sree Krishna College of Pharmacy and Research Centre, Parassala, Thiruvananthapuram, Kerala, India - 695502.***Corresponding Author: Manjima Santhosh**

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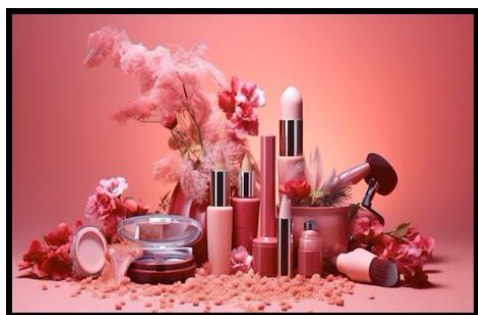
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ABSTRACT

This study focuses on developing and testing a polyherbal hair mask made from natural substances such as strawberry, amla, brahmi, fenugreek, neem, and avocado. The mask intends to give a multi-purpose hair care solution by encouraging hair growth, strengthening hair follicles, and treating dandruff, dryness, and hair loss. The herbal components were ground and blended into a fine powder before being evaluated for organoleptic and physicochemical qualities such as pH, moisture retention, and microbiological stability. According to the study, the hair mask is an effective, non-toxic alternative to chemical hair products that provides considerable benefits for scalp nourishing, hair conditioning, and overall hair health. The mask also displayed outstanding washability and stability, making it a practical and beneficial choice for regular use.

KEYWORDS: Hair mask, Amla, Neem, Hair growth.**INTRODUCTION**

Cosmetics are the words derived from the Greek word 'kosmestikos' which meaning to embellish. Cosmetics are products that are used to the human body to cleanse, beautify, promote attractiveness, or change appearance without harming the body's structure or functions. However, most cosmetics, hygiene, and personal care items are today utilized by customers without regard for the likelihood of undesirable skin effects, such as skin allergy and irritation. Components in those products, such as surfactants and parabens, can pose a harm to skin components.^[1]

**Figure 1: Cosmetics.****HAIR**

Hair is a complex structure that plays a crucial role in both protection and sensory functions in mammals. Hair is made of keratin and serves both protective and sensory roles. It has two main parts: the visible hair shaft and the follicle beneath the skin. The shaft consists of three layers: the outer cuticle, which shields the hair, the cortex, which provides strength and color, and sometimes the medulla at the core. The cuticle's layered structure varies by hair type and helps prevent damage. Beneath it, the cortex holds melanin, determining hair color. The follicle controls hair growth through cycles of growth, rest, and shedding.^[2]

Hair Growth Cycle

Hair development is a continuous cyclic process and all mature follicles go through a growth cycle consisting of growth (anagen), regression (catagen), rest (telogen) and shedding (exogen) phases. The duration of the phase's changes based on the location of the hair and also personal nutritional and hormonal status and age.^[3]

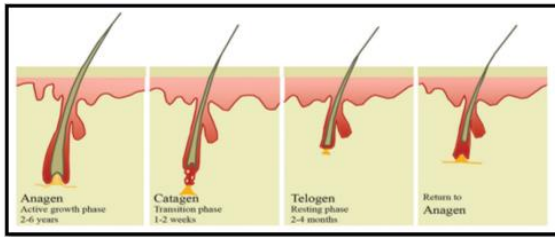


Figure 2: The hair cycle.

HAIR MASK

A hair mask is a treatment that hydrates, strengthens, and restores hair to health. A hair mask, also known as a deep conditioning treatment, is a form of hair conditioner that moisturizes and improves overall hair health. Natural oils, butters, and plant extracts are used in hair masks to moisturize the hair and nourish the hair follicles.^[4]



Figure 3: Hair Mask Powder.

ROLE OF INGREDIENTS

Table 1: Role of ingredients.

| SL. NO | CONSTITUENTS NAME | BIOLOGICAL SOURCE/ FAMILY | USE |
|--------|------------------------|--------------------------------------|---|
| 1 | Strawberry Powder | Fragaria ananassa (Rosaceae) | Removes Excess Oil, Prevent Hair Loss |
| 2 | Amla powder | Phyllanthus emblica (Phyllanthaceae) | Antioxidant, Promote Hair Growth |
| 3 | Brahmi Leaves Powder | Bacopa monneri (Plantaginaceae) | Cleanser, Strengthen Colour, Hair Growth |
| 4 | Fuller's Earth Powder | Calcium Bentonite | Conditioning, Remove Excess Oil & Dirt |
| 5 | Fenugreek Seeds Powder | Trigonella foenumgraecum (Fabaceae) | Antifungal, Fight Scalp Problem |
| 6 | Neem leaves powder | Azadirachta indica (Meliaceae) | Promote Hair Growth, Relief from Dandruff |
| 7 | Avocado Powder | Persea americana (Lauraceae) | Boost Shine, Nourishing |

1. STRAWBERRY

Botanical name: *Fragaria ananassa*

Family: Rosaceae

It is currently farmed commercially in numerous nations throughout the world, with the United States, Spain, and Mexico being the top producers. Other notable manufacturers are Turkey, Egypt, South Korea, and China. Strawberries include a variety of beneficial chemical components for hair, including:

1. Vitamin C: Strawberries contain vitamin C, which strengthens and promotes hair development.

ADVANTAGES OF HAIR MASK

- ❖ Benefits include increased hair moisture
- ❖ Improved luster
- ❖ Minimized breakage and damage
- ❖ Improves hair softness and smoothness
- ❖ Protects against environmental factors

DISADVANTAGES OF HAIR MASK

- ❖ Over-moisturizing can create greasiness.
- ❖ It may cause allergic reactions or irritation.
- ❖ It may weigh down fine hair.
- ❖ It can produce buildup of residue.
- ❖ It may not be suitable for all hair types.

OBJECTIVES

- ❖ Prepare the herbal hair mask using natural powdered materials.
- ❖ Create a non-toxic, natural herbal hair mask that promotes hair growth, conditioning, and nourishment.
- ❖ To assess the effectiveness of a designed herbal hair mask.
- ❖ Create an easy hair mask.
- ❖ To address safety concerns with synthetic hair care products.
- ❖ It nourishes both the skin and the hair on the scalp.

2. Antioxidants: Strawberry antioxidants, including ellagic acid and anthocyanins, protect hair follicles from oxidative stress and free radical damage.

3. Biotin: Strawberries contain biotin, a B-vitamin essential for healthy hair. Biotin deficiency can cause hair loss and brittle hair.

4. Silica: Strawberries are a natural source of silica, a mineral that helps to strengthen and elasticity hair.



Figure 4: Strawberry.

2. BRAHMI

Botanical name: Bacopa monnieri

Family: Scrophulariaceae

Brahmi grows along the banks of streams. Brahmi is located in the rainy, soggy, and damp regions of northern India. Brahmi contains basic oils, sterols, flavanols, glycosides, and triterpenoid saponins. It is also known as Brahmi powder Ras Ayana in Ayurveda, and as such, it has the potential to prevent physical ageing symptoms such as hair loss.

1. Bacosides: They are thought to contain antioxidant qualities, which could help protect hair follicles from damage caused by free radicals and oxidative stress.

2. Alkaloids: Brahmi includes alkaloids like brahmin and herpestine. These alkaloids may improve hair development by activating hair follicles and encouraging hair regeneration.

3. Saponins: Brahmi includes saponins such as bacosides and bacopa sides. Saponins cleanse and promote scalp health by eliminating excess oil, grime, and debris.

4. Flavonoids: Brahmi contains flavonoids, such as apigenin and luteolin, which have antioxidant and anti-inflammatory properties. They may minimize scalp irritation and provide a healthy scalp environment, leading to better hair development.

5. Essential oils: Brahmi includes essential oils such as monoterpenoids and sesquiterpenoids. Brahmi's aromatic components contribute to its unique scent and may have a relaxing and calming impact on the scalp.



Figure 5: Brahmi.

3. CALCIUM BENTONITE (FULLER'S EARTH)

It is also called Fuller's earth powder does not come from a single plant. It is a clay mineral, more precisely a sedimentary clay known as montmorillonite. Fuller's earth contains several essential elements that may help hair.

1. Aluminum silicates: Fuller's earth is mostly made up of hydrated aluminium silicates, which give it absorbent and cleaning characteristics. It can assist to eliminate excess oil, debris, and pollutants from the hair and scalp.

2. Minerals: Fuller's earth contains minerals such as magnesium, calcium, and iron. These minerals can nourish and strengthen the hair, improving overall hair health.

3. Silica: Fuller's earth contains silica, a mineral that has been shown to increase hair texture and luster. It can help your hair look smoother and glossier.

4. Absorbent characteristics: Fuller's earth has good absorbent capabilities, which can aid in removing excess oil from the scalp. This can be useful for people who have oily hair or scalp issues.

5. Scalp balancing: Fuller's earth may assist to balance the pH of the scalp, reducing inflammation. It can soothe and relieve itching or irritation.



Figure 6: Calcium bentonite.

4. FENUGREEK

Botanical name: Trigonella frenum-graecum

Family: Fabaceae

Fenugreek, a plant native to southern Europe and the Mediterranean region, is grown throughout central and southeastern Europe, western Asia, India, and northern Africa.

Here are several major chemical elements identified in fenugreek, along with their potential advantages for hair

1. Saponins: Fenugreek seeds contain saponins, such as diosgenin. These substances have been claimed to have anti-inflammatory and scalp-soothing characteristics, which could help reduce scalp irritation and itching.

2. Proteins: Fenugreek seeds are high in proteins, which may help nourish and strengthen hair strands, boosting overall hair health.

3. Nicotinic acid: Fenugreek seeds contain nicotinic acid (niacin), which is thought to boost blood circulation in the scalp. Increased blood flow can deliver important nutrients to the hair follicles, potentially fostering healthy hair growth.

4. Steroids: Fenugreek seeds contain steroidal substances such as trigonelline and diosgenin. These chemicals have been suggested to have hair growth-promoting effects.

5. Minerals and vitamins: Fenugreek seeds include a variety of minerals and vitamins. For maintaining the scalp and hair.^[5]



Figure 7: Fenugreek.

5. AMLA

Botanical name: *Phyllanthus emblica*

Family: Phyllanthaceae

Amla, or Indian gooseberry, has been cultivated in India from 3000 BCE and is mentioned in ancient books such as the Ayurveda and the Charaka Samhita (400 CE).

1. Vitamin C: It is a potent antioxidant that improves collagen formation, strengthens hair follicles, and stimulates hair growth.

2. Tannins: These substances prevent hair loss and improve hair texture, making it shinier and smoother.

3. Polyphenols: It has anti-inflammatory compounds that soothe the scalp, reducing dandruff and inflammation.

4. Iron: Helps to improve blood circulation in the scalp, which promotes healthy hair development.

5. Fatty acids: It nourish and hydrate the hair, reducing dryness and brittleness.^[6]



Figure 6: Amla.

6. NEEM

Biological Source: *Azadirachta indica*

Family: Meliaceae

1. Azadirachtin: This compound has antibacterial and antifungal properties, making it effective against dandruff and scalp infections.

2. Nimbidin: Nimbidin promotes hair growth and strengthens hair follicles, reducing hair fall.

3. Nimbin: It helps soothe irritated scalp conditions and reduces inflammation.

4. Vitamin E: An antioxidant that promotes healthy hair growth and protects against damage.

5. Essential Fatty Acids: Nourish hair and scalp, improving overall health and texture.

6. Flavonoids: Help in reducing oxidative stress on hair, supporting a healthy growth environment.^[7]



Figure 7: Neem.

7. AVOCADO

Biological Source: *Persea americana*

Family: Lauraceae

It is indigenous to the Americas and was initially cultivated by Mesoamerican people around 5,000 years ago.

Avocado includes a number of helpful chemical components for hair, including

1. Fatty Acids: Avocado contains monounsaturated fatty acids, such as oleic acid, which moisturizes and nourishes the hair, leaving it silky and lustrous.

2. Vitamins: Avocado is high in vitamins, particularly vitamin E, which aids in hair restoration and protects against free radical damage. It also contains vitamin B, which stimulates hair development and strengthens the strands.

3. Minerals: Avocado includes minerals such as copper and magnesium, which are necessary for keeping healthy hair and avoiding hair loss.

4. Antioxidants: Avocado includes antioxidants such as polyphenols, which help minimize oxidative stress on the hair, protecting it from damage and improving general health.



Figure 8: Avocado.

METHOD OF PREPARATION

1. Preparation of Herbal Powder: Grind all the dried herbal ingredients into a fine powder.

2. Weighing: Use a digital balance to accurately weigh each herbal powder for the hair pack.

3. Mixing: Combine all the fine powders thoroughly using a mixer until they are well-blended.

4. Sieving: Pass the mixture through a sieve (sieve no. 80) to obtain a uniform fine powder.

5. Collection and Storage: Store the final powder in a clean glass container for further use.^[8]

DIRECTION OF USE

1. Preparation of the Hair Mask

○ Take 1-2 tablespoons of the "Herbal Hair Mask" powder and put it into a clean bowl.

FORMULATION OF HERBAL HAIR PACK

Table 2: Formulation of herbal hair pack.

| SL. NO | INGREDIENTS | HM1 | HM2 | HM3 |
|--------|------------------------|-------|-------|-------|
| 1 | Strawberry Powder | 10gm | 10 gm | 10 gm |
| 2 | Amla powder | 25gm | 15 gm | 10 gm |
| 3 | Brahmi Leaves Powder | 15 gm | 25 gm | 10 gm |
| 4 | Calcium Bentonite | 10 gm | 10 gm | 10 gm |
| 5 | Fenugreek Seeds Powder | 15 gm | 15 gm | 15 gm |
| 6 | Neem leaves powder | 15 gm | 10 gm | 20 gm |
| 7 | Avocado Powder | 10 gm | 10 gm | 10 gm |

○ Gradually add water to the powder, ensuring that the amount is just enough to make a smooth paste.

○ Mix the powder and water thoroughly using a spoon or whisk to avoid forming any lumps.

○ The resulting mixture should be of a moderately thin consistency, making it easy to apply.

2. Application to Hair

○ Section your hair into parts for easier application.

○ Using your hands or a brush, apply the prepared paste evenly onto your hair, starting from the scalp and working your way down to the ends.

○ Make sure all areas, including the roots and tips, are well-covered for maximum benefits.

3. Waiting Period

○ Leave the mask on your hair for 30-40 minutes, allowing the natural ingredients to nourish and strengthen your hair.

○ You can wrap your hair in a towel or use a shower cap during this time to avoid any mess.

4. Rinsing and Washing

○ Rinse off the mask thoroughly with water to remove all traces of the powder.

○ Use a mild, sulfate-free hair cleanser or shampoo to wash your hair gently.

○ Avoid using hot water, as lukewarm or cool water helps to retain moisture and shine in your hair.

5. Drying and Repeating

○ After washing, allow your hair to air dry naturally instead of using heat-based drying tools.

○ Repeat this process 1-2 times a week for best results, and experience the transformation to healthier, stronger, and more lustrous hair.

Regular use of this mask will help in revitalizing the hair and promoting better texture and shine.

EVALUTION OF HERBL HAIR MASK

1. Organoleptic Evaluation

- Color
- Odour
- Appearance.

2. Physiochemical Evaluation:

❖ pH

The pH of a hair mask is crucial since hair has a slightly acidic pH, usually between 4.5 and 5.5. Maintaining a pH within this range protects the hair cuticle and promotes healthy appearance.^[9]

- Dip the pH strip
- Wait for the reading
- Record the Ph.

❖ Loss on Drying

Measure 1.5 gm of the supercharged medication into a flat, thin porcelain plate. Dry in an oven at 100°C or 105°C until two successive weighing differ by no more than 0.5 gm. Cool in desiccators and weight. Moisture is commonly used to record weight loss.

❖ Ash Content

Place 2-4gm of ground air-dried material, carefully weighed, in a previously lit and tared crucible. To burn the substance, spread it evenly and progressively raise the temperature to 500-6000°C till it turns white, showing the absence of carbon. Cool in a desiccator and weigh. To achieve carbon-free ash, cool the crucible and add 2ml of water or a saturated ammonium nitrate solution to the residue. Dry in a water bath, then ignite on a hot plate to maintain a steady weight. Allow the residue to cool in a desiccator for 30 minutes before weighing immediately. Calculate the total ash content in mg per gram of air-dried material.

3. Rheological Evaluation

❖ Tapped Density

Tapped density refers to the higher bulk density achieved by mechanically tapping a container containing powder samples. After noting the initial powder volume or mass, tap the measuring cylinder or vessel for 1 minute and take readings until little change is detected. The measurement was represented as grams per millilitre.

$$\text{Tapped Density} = \text{Mass} / \text{Tapped Volume.}$$

❖ Bulk Density

Bulk density is the ratio between a powder's mass and bulk volume. The required amount of powder is dried and poured into a 50 ml measuring cylinder up to the 50 ml mark. The cylinder is dropped onto a hard wood surface from a height of 1 inch at 2-second intervals. The volume of powder is measured. Finally, the powder is weighed. This is performed to obtain the average values.

$$\text{Bulk density} = \text{Mass} / \text{Bulk Volume.}$$

❖ Angle of repose

It is defined as the maximum angle possible in between the surface of pile of powder to the horizontal flow.

Place the needed amount of dried powder in a cylinder tube with open ends and place it on a flat surface. The funnel should be lifted to create a heap. The height and radius of the heap are measured and documented. To determine the angle of repose using the above method, use the following formula.

$$\theta = \tan^{-1} (h/r).$$

Where,

θ - angle of repose
h- height of the heap
r - radius of the base.

❖ Hausner's Ratio

Hausner's Ratio = Tapped Density / Bulk Density.

❖ Carr's Index

Carr's Index = [Tapped Density – Bulk Density / Tapped Density] × 100.

4. Phytochemical evaluation

1. Detection of carbohydrates

❖ Molisch's Test

To 2-3 ml of aqueous extract, add a few drops of alpha-naphthol solution in alcohol, agitate, and concentrate. A violet ring forms when H₂SO₄ from the walls of the test tube combines with two liquids.

❖ Fehling's Test

Combine 1ml fehling A and 1ml fehling B solutions and boil for 1 minute. Add an equivalent volume of test solution. Heat in a boiling water bath for 5-10 minutes. A yellow and then brick red is precipitate is observed.

2. Detection of alkaloids

❖ Hager's Test

A yellow ppt is produced by combining 2-3 ml of filtrate with hagers reagent.

❖ Mayer's Test

Creamy ppt is produced by adding a few drops of Mayers reagent to 2-3 ml of filtrate.

❖ Detection of volatile Oil

When 2 to 4 grams of hair mask are treated with an alcoholic sudan III solution, the hair mask turns red when volatile oils are present.

❖ Identification of Protein

- **Biuret Test:** Add 4% NaOH and a few drops of 1% CuSO₄ solution to 3 millilitres of T.S. The color turns pink or violet.

- **Foam test:** The cylinder shaking method was used to evaluate the hair mask's foaming capacity. A 250 mL

graduated cylinder containing 50 mL of a 1% hair mask solution was shaken ten times while being held steady by a hand. The total volume of foam produced was calculated after a minute of shaking. Shaking and measuring the foam volume at one-minute intervals for a total of five minutes was how the foam volume was estimated.^[10]

5. Solid Content (%)

A clean, dry evaporating dish was weighed, and 4 grams of hair mask was added. After evaporating the liquid portion, the dish with the remaining solid content was dried, and the final weight of the solid content was measured precisely.^[11]

6. Dispersion of Dirt

Half a test tube was filled with purified water and two drops of hair mask. One drop of India ink was added, then the tube was sealed with a stopper and shaken ten times. The presence of ink in the foam was then classified as None, Light, Moderate, or Heavy.^[12]

7. Spreadability

The Spreadability of the hair mask was tested using a wooden block and glass slide setup. A 5 g sample of the hair mask was placed beneath the block, and a movable slide was positioned on top. The time taken for the slide to move 5 cm was measured.

$$S = (m \times l) / t$$

S= Spreadability.

m = is the weight attached to the upper slide,

l = is the distance travelled by the upper slide,

t = is the time it takes to separate the slides.

8. Washability

The washability of the formulated hair mask was evaluated by applying a small amount of the product onto a designated area of the skin, such as the forearm. After allowing the hair mask to sit for a few minutes, the area was rinsed thoroughly with water. The assessment focused on how easily the mask could be removed without leaving behind any residue or sticky feeling. Observations included the amount of water needed for complete removal and the time taken to achieve a clean surface. A hair mask with good washability would rinse off easily, leaving the skin feeling clean without any oily or sticky residue.^[13]

9. Stability Studies

The optimized formulations & thermal stability was investigated by putting them in a glass container and keeping them in a humidity chamber at a temperature of 40±2°C and a relative humidity of 75±5%. For three months, their physical stability and appearance were examined at one-month intervals.^[14]

10. Microbial Assay

1. To prepare and sterilize nutrient broth

Materials

- Beef extract: 2.5 g
- Peptone: 2.5 g
- Sodium chloride: 1.25 g
- Distilled water: 250 ml
- Nutrient agar (optional, for solid medium): 1-2 g.

2. Procedure

❖ Preparation of the Nutrient Broth

- Measure 2.5 g of beef extract, 2.5 g of peptone, and 1.25 g of sodium chloride.
- Dissolve these ingredients in 250 ml of distilled water in a clean beaker or flask.
- Stir the solution thoroughly until all the components are completely dissolved.

❖ Incorporating Agar (if a solid medium is required)

- If a solid medium is needed for plating, add 1-2 g of nutrient agar to the solution.
- Mix well until the agar is evenly distributed.

❖ Adjusting pH

- Check the pH of the mixture using a pH meter. The pH should be around 7.0.
- If necessary, adjust the pH by adding a few drops of 1 M HCl to lower it or 1M NaOH to raise it.

❖ Dispensing into Containers:

- Pour the nutrient broth solution into glass bottles or flasks, leaving some space at the top for expansion during sterilization.
- Seal the containers with cotton plugs or lids.

❖ Sterilization

- Place the containers in an autoclave.
- Sterilize at 121°C (15 psi pressure) for 15-20 minutes to ensure all microorganisms are destroyed.
- After autoclaving, allow the broth to cool to room temperature.

❖ Using the Nutrient Broth:

- If the medium contains agar, pour it into sterile petri dishes while still warm (around 45-50°C) to create solid plates.
- If using as a liquid medium, use the sterilized nutrient broth directly for inoculating microorganisms.

❖ Storage

- Store the prepared nutrient broth in a cool, dry place or refrigerate if not using immediately. Ensure the containers remain tightly sealed to prevent contamination.

3. Aseptic Transfer of Liquid Culture Media to Petri Dish

- Materials Needed

- Sterilized nutrient broth with agar (cooled to around 45-50°C)
- Sterile petri dishes
- Bunsen burner or spirit lamp
- Sterile gloves
- Alcohol (70% ethanol)
- Sterile pipette or pouring flask Procedure

❖ Preparation of Work Area

- Disinfect with 70% ethanol
- Work in a sterile environment
- Light Bunsen burner.

❖ Transfer of Media

- Wear sterile gloves, sanitize
- Open petri dish carefully
- Pour 15-20 ml nutrient agar
- Close lid immediately.

❖ Cooling and Solidification

- Let agar solidify (15-20 mins)
- Ensure smooth surface.

❖ Storing Prepared Petri Dishes

- Store upside down
- Label with date and medium

4. Preparation of bacterial colonies

❖ Preparing the Work Area

- Clean and disinfect the with 70% ethanol.
- Light a Bunsen burner.
- Wear sterile gloves and sanitize them.

❖ Inoculation

- Flame the inoculating loop
- Allow the loop to cool for a few seconds to prevent killing the bacteria.
- Dip the cooled loop into the bacterial culture or touch it to the sample being tested.

❖ Streaking on Agar Plate

- Carefully lift the lid of the petri dish.
- Gently streak the inoculating loop back and forth in a small section of the agar surface.
- Rotate the plate slightly and continue streaking in a new area, ensuring you do not overlap too much with previous streaks.
- Repeat this process for 3-4 quadrants of the plate, flaming the loop between each quadrant if necessary.

❖ Incubation

- Close the lid of the petri dish securely.
- Place the plate upside down in an incubator set at an appropriate temperature (usually around 37°C for bacteria).
- Incubate for 18-24 hours or until visible colonies appear.

❖ Observation and Identification

- After incubation, examine the agar plate for the presence of distinct colonies.
- Isolated colonies can be picked for further analysis or sub-culturing.

5. Measuring zone size

- ✓ After incubation, use a ruler or calliper to measure the zone diameter in millimetres, including the disk& diameter.
- ✓ Always round measurements up to the next millimetre.
- ✓ Make measurements with the unaided eye while holding the petri dish above a dark, non-reflective surface under good lighting.
- ✓ Ensure you view the plate directly from above to avoid errors from angles.
- ✓ Record each measurement on the data sheet.
- ✓ If the zone is difficult to measure directly, measure from the centre of the disk to the edge (radius) and multiply by 2 for the diameter.
- ✓ If growth reaches the disk& edge, record the zone as 0 mm.

CONCLUSION

The study on the herbal hair mask aimed to create a natural, non-toxic solution for hair care, focusing on nourishing, conditioning, and promoting healthy hair growth. By using plant-based ingredients like strawberry, amla, fenugreek, and neem, known for their nourishing properties, hydration and shine enhancement to scalp health improvement. The formulation targets common hair issues such as dryness, dandruff, and hair loss by leveraging the ingredient's antioxidant, anti-inflammatory, and moisturizing effects. Evaluations of the mask showed it effectively improves scalp health, strengthens hair, and enhances shine without harmful side effects. The study highlights that herbal hair masks can be a natural and safe alternative to chemical hair products. They offer a gentle but effective way to care for hair, which is ideal for people looking for healthier options.

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