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Review on Preparation and Evaluation of Hair Tonic

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Abstract: ***The current study focuses on creating and testing a herbal hair tonic with natural elements that are known to nourish and stimulate hair development. Herbal extracts from Amla (Emblica officinalis), Bhringraj (Eclipta alba), Hibiscus (Hibiscus rosa-sinensis), and Neem (Azadirachta indica) were combined with an appropriate hydroalcoholic basis to create the hair tonic. Under carefully monitored laboratory conditions, the formulation process comprised extraction, filtration, mixing, and preservation phases. Numerous physicochemical parameters, such as pH, viscosity, stability, and microbiological load, were assessed for the produced tonic. Its effectiveness in decreasing hair loss, encouraging hair growth, and enhancing scalp health was also evaluated through in-vitro and in-vivo experiments. The developed hair tonic is stable, safe, and effective, according to the results, offering a natural and affordable substitute for hair care. Further studies can optimize the formulation and support commercialization. The formulation may be enhanced and commercialization is facilitated through further studies.***
Keywords: Hair tonic, Herbal Formulation, Hair Growth, Natural ingredients, Scalp Health.

I. INTRODUCTION OF HAIR TONICS

Several hair preparation therapies are commonly referred to as "Hair Tonic beverages." A hair tonic is a type of substance that repairs and retexturizes hair. There are two distinct product types: a) Hair care items that target certain issues. as dandruff or oily hair. b) Treatments used to preserve, repair, or increase the health of hair.(1) Hair is an accessory structure of the integument and one of the body's essential components, along with sebaceous glands, sweat glands, and nails. It serves as a protective appendage and is made of the skin's ectoderm.

They are commonly referred to simply as epidermal derivatives because these substances start in the epidermis during the development of an embryo..(2) Alopecia is the medical word for hair loss. Neither temporary or permanent alopecia were likely. Called as "androgenetic alopecia," the most frequent kind of hair loss develops gradually and is brought on with a combination of hormones (androgens are male hormones) and heredity (genetics). Given their good activity and highly few or no side effects as compared with synthetic drugs, medicinal products have continuously received much of passion. Herbal cosmetics, frequently called "natural cosmetics," are products that originate with a range of legal ingredients to develop a the foundation, after which one or more herbal materials are used to provide unique cosmetic benefits. secondary metabolites, which may be utilized for producing medications and clinically significant essential oils, are prevalent in medicinal plants. These natural products, including carrier oils as jojoba oil and essential oils such teatree oil, are still in use today. The aim of hair tonic, like other "tonics," is to make hair healthier.

Herbal oils perform by offering nutritional support for the human body's internal wellness and hair-growth processes. Amla, Aloe, Neem, Henna, Tulsi, and Jojoba oils were the key ingredients in the hair oils. Tulsi is regarded as one of the key elements in herbal remedies for hair loss and is used as a successful therapy for hair loss. It is extensively employed to stop early graying and the loss of hair. Hair lice can be safely eradicated with tulsi seed or castor oil. Also, it improves the hair root, that decreases baldness. Ursol, apigenin, and luteolin can be observed in tulsi leaves. Oleanolic acid, the compound rosmarinic acid, eugenol, carvarol, as well as linalool are some of the other significant chemical compounds of tulsi.(3) The main function of human hair is for bettering someone's appearance. In all sorts of beings, hair provides a utilitarian purpose. Around its peak and other sensitive regions, it produces a defending cushion. It comprises mainly out keratinocytes, that have lots of cells the fact that have been coated in keratin. (4) Nowadays, organic herbs are utilized to formulate hair care and cosmetics and they have gained favor in terms of artificial ones.A larger percentage of hair care during those years includes employing hair oil, mostly owing to its efficacy in curing hair disorders. Several natural and synthetic substances are used in the manufacturing of hair oils. Artificial hair oils are hair treatments that might be prepared employing synthetic or organic components. In addition to offering shine and significant conditioning, they also help in eliminating frizz..(5)

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II. OBJECTIVES

1. Herbal goodness of hair. 2. To identify the best combination of herbs that allows you to deliver maximum effect. 3. To save you the dandruff, split ends and dull hair. 4. Manage frizzy hair. 5. Fight towards hair fall. 6. Enjoyable rubdown for healthful scalp.(5)

1) *Hair Growth:* The hair coat, which maintains most nicely developed creatures heat, dry and protected from unfavourable additives, calls for a constant stock of recent hairs at some point of the lifetime of the creater. To deliver new hairs, current follicles level in pattern improvement ,relapse and rest. Follicles synthesize the whole hair shaft from tip to root at every anagen degree. In exactly the fashion that travel improves proliferation, cell type the choice, and sepration in a regenerative grownup epithelial tissue, the hair cycle represents an important framework for studies of the general principle of elementary microorganism peace and enactment.(3) The three stages of the cyclical nature 1. Anagen (growth phase): This stage can occur anywhere to two to eight years in length. Generally, roughly 80 percent of hair is in its anagen phase. 2. Catagen (Involution): The involution phase, generally extends 10–14 days, signifies that hair begins to decrease and switches to next wave. 3. Telogen (Resting phase): The hairs approach the telogen phase, which is an indicator or rest.(3)
2) *Hair Follicles:* Hair develops to grow and becomes fixed in place by the follicle. It commences in the epidermis as simulates stocking.It reaches the dermis. The follicles are surrounded by an outer and inner sheath that ends very soon before the sebaceous gland starts, protecting and structuring the growing hair.(6) 1. Infundibulum: stretches from the follicle's surface orifice to the sebaceous gland aperture. 2. Isthmus: Fold outwards from the infundibulum to where it meets where the arrector pilli muscle inserts. 3. Inferior segment: The dermal papilla, a tuff of vascularized loose connective tissue, infiltrates the base of the bulb. Several arteries and enzymes can be observed in the hair's papilla, which encourages the growth of hair. (3)
3) *Hair Shaft:* The region of hair that contains the three keratin layers referred to as the hair shaft. The medulla is a different name for the inner layer. The meulla could or could may not be present depending on the type of hair. 2. The cortex, that composes composed the majority of the hair shaft, is the middle layer. 3. The outer layer: Also termed the cuticle, it is constructed up of tightly spaced scales that overlap like roof shingles..(6)
4) *The Cross Section Of Hair:* Depending on what phase of the cycle it's presently in, hair usually features the arrival of a highly pigmented shaft with a diameter ranging from 70mm. With respect to the sort of hair, its cross segments seem to be circular. Europeans have versatile hair with an oval move phase and a diameter of between 70 and 90 mm, though curly African hair has a move phase that looks approximately kidney-like in form. Asian persons normally have tight hair with a spherical pass phase and a diameter that extends to 100mm. Hair's cross section contains essential details about its constituents and attributes. (3)
5) *Hair Loss (Alopecia):* Alopecia, a dermatological ailment that has been diagnosed for greater than 2000years is a common trouble in beauty as well as number one fitness care practices. It is a not unusual at some point of the world and has been anticipated to affect between 0.2% and a couple of the sector populace. Numerous artificial drug treatments are avilable for hair loss which does not deal with completely and additionally suggests intense aspect consequence. These trouble might be solved by using the use of herbal drugs.(3)

III. TYPES OF HAIR LOSS

1) Alopecia Areata(prime stage)
2) Temporary Alopecia Areata
3) Ophiasis Alopecia Areata
4) Alopecia Universalis
5) Diffuse Alopecia Symptoms of hair loss :

a) Acute illness
b) Immune system disorders disruption
c) Chemicals (dyes on hair)
d) Agents that act as chemotherupti
e) Diabetes 6. Loss to hair (3)

A. *Hair Problems*

1) Dry Hair: The main cause of dry hair is shampooing. A great deal of hair washing can leave the hair shaft and scalp seeming dehydrated and brittle.
2) Dandruff: The other half of the world's population struggles with this widespread condition. Dead skin cells peeling is a common symptom of the illness. Dandruff comes in two different forms: dry dandruff Pityriasis simplex capillitti, a different

acronym for dry dandruff, is a common scalp problem carried on by the shedding of very small, dry skin flakes. b) Oily Dandruff: Occasionally referred to as seborrheic dermatitis, oily dandruff is a condition related to the scalp produced through a high amount of sebum production.

3) Split Ends: The frequently received hair concern occurs when brought on from the fraying or splitting of hair strands, which damages the cuticle, the outermost section of hair.
4) Frizz - Frizzy hair exhibits a difficult unmanageable texture brought on by the lifting of the hair cuticle, which enables moisture in.
5) Oily Scalp: This illness gets brought forth by an excess of sebum, a natural oil. These sweat glands, which occasionally create an excess of oil, produce sebum.
6) Thinning Hair: The term "thinning hair" describes an impairment in the width or density of hair strands, that results in an impairment in hair volume.
7) Hair Breakage -Hair breakage of the usual problems than several individuals confront is hair breakage. Some causes of hair departing from is excessive heat styling,chemical tratment such as hair coloring, bleaching.
8) Scalp Irritation: This disorder is represented of redness or inflammation in combination with a sensation of discomfort, itching, or sensitivity on the scalp.
9) Color-damaged Hair: Color-damaged hair may originate either the coloring, bleaching, or using hair styling products that have pesticides.(4)

B. Herbal Hair Tonics

Hair tonics are compositions developed for solving numerous hair-related problems simultaneously hydrating and nourishing the scalp and hair follicles. It is a vital element in hair care. There are nearly countless benefits to employing a hair tonic. Hair tonics boost the long-term health of hair by nourishing the scalp and roots, which encourages the growth of new hair and enhances hair volume.Though hair tonics
treat a variety of hair problems, their primary benefit is an upsurge in hair growth. This liquid formulation stimulates the developing of thick hair and prevents blading.It is thin and easy to use to add shine, construction, volume, and prevent frizz to hair. (3)
Benefits

1) It brings out the inbuilt sweetness of hair.
2) Herbal oil provides vitamins and micronutrients help maintain hair.
3) Applying hair oil may regulate frizzy hair and avoid hair loss.
4) Herbal oil offers hair ends the necessary vitamins and concern they require. Role of ingredients which are used in herbal hair tonics

Ingredients Name	Scientific Classification	Chemical Constituents	Uses
Amla	Emblica Officinalis	Ellagic acid, chebulinic acid	Reduce hair fall, treats dandruff and scalp infection
Aloe vera	Aloe barbadensis	Vitamins, enzymes	Promote hair growth, reduce dandruff
Hibiscus	Hibiscus rosa sinesis linn	Flavonoids, Anthocyanins	Prevent hair fall, soften hair
Henna	Lawsonia Inermis	Phenol, glycosides	Conditions hair naturally, balance oil production

a) Amla: Also called the Indian gooseberry, amla is a small, green fruit that is high in minerals, antioxidants, and vitamin C.It is an essential part of herbal formulations that are traditional medicines, and perfumes. The Phyllanthus emblica tree is the beginning of it. Amongst the substances found in amla include tannins, polyphenols, flavonoids, minerals, carotenoids, and fiber.
b) Aloe vera: Aloe vera is part of the Liliaceae family and grows from the leaves of succulent plants.Aloe vera's soothing properties are widely known.Aloit has a cooling effect on the scalp, that minimizes irritation and inflammation.
c) Hibiscus: Part in the Malvaceae family, hibiscus is a flowering plant.Because of its amazing array of wellness benefits, hibiscus is frequently used in herbal hair tonics.It's rich in antioxidants and vitamins.

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d) Henna: The leaves of the lawsonia inermis plant are utilized to make henna. The most common elements found in henna are tannins and lawsone. Whereas commercially promoted henna products can contain chemical.(4)

IV. HOME REMEDIES FOR HAIR LOSS

1) Egg Mask: Rich in sulfate the mineral phosphorus iodine, zinc, and protein, eggs assist in the stimulation of growth in hair.
2) Liquorice root: This herb protects hair against getting damaged or coming away.
3) Coconut Milk: The vital lipids and protein assist with avoiding hair loss while encouraging development of hair.
4) Green Tea: Filled contains antioxidants, this tea encourages growth of hair and suppresses hair loss.
5) Aloevera: Aloevera is a powerful herbal remedy for hair loss and for promoting hair development.It functions as effectively for minimizing problems with the head which includes flaking and discomfort.(3)

V. MATERIAL AND METHODS

Preparation of extracts – * Osmium sanctum fresh leaves were washed in tap water and permitted to dry for a total of 36 hours.Upon drying, the leaves are then cut into moment fragments; 10 grams of these pieces are weighted and put into the 150 milliliters of methanol in a stirred batch reactor.The extracted sample was collected at specified times while the agitation speed was held at 500, 700.

VI. HERBAL HAIR TONIC FORMULATION

Jojoba and tulsi oily substances have been used as active ingredients in the formulation of the herbal hair tonic, with coconut oil provides as the formulation's basis in fact. Although jojoba while tulsi oils mix quickly, these first come together in an additional beaker, and then coconut oil goes in in an additional beaker. Perfume and coloring are added in order to make the formulation look more visually appealing. Lastly, a mechanical shaker is used for making sure whether the formulation is correctly mixed and continuous..(1)

Formulations Table:

Ingredients	F1	F2	F3	F4	F5	F6
Tulsi oil %v/v	0.1	0.2	0.3	0.4	0.4	0.6
Jojoba oil %v/v	0.4	0.5	0.6	0.7	0.8	0.9
Coconut oil q.s.(ml)	10	10	10	10	10	10
Coloring agent	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
Perfume	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.

VII. EVALUATION OF HAIR TONICS

1) Formulation pH: In a test tube, one milliliter of the oil was tested. Water was added in 9 milliliters in Applying a pH meter, the mixture's pH was established.
2) Viscosity: A Brookfield digital viscometer was utilized to measure viscosity at 100 rpm.
3) Homogeneity: Physical touch and visual appearance have been employed to assess the formulations for homogeneity.
4) Appearance: The formulation's people of color, consistency, and taste were evaluated as well.
5) Removal: By washing the region that was treated with tap water, the formulation's ease of removal was evaluated.
6) Specific Gravity: The herbal oil's specific gravity was 0.916, coming within the BIS-recommended range. It is thin and lighter than water.
7) Spredability: A modified wooden block and glass slide apparatus was applied to determine spredability. It was formed up of a pulley, a fixed glass slide, and a wooden block.Apan was secured with a string to another glass slide. To test the spreading, an excess of the cream was applied on the fixed glass slide, whose included a pan linked. The pan was then set over the fixed glass slide, and a 1 kg weight was placed on it for five seconds. After applying fifty pounds of weight to a pan, the amount of time it required for the slide to separate from it was noted.

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S= W× L/T
Where, S=Spredability
W=Weight tide to upper side L=Length of slide
Acid Value: Take 10g of a measured substance and dissolve it in 50ml of an equal volume mixture of alcohol and solvent ether. The flask was afterwards connected to a reflux condenser and heated over time until the sample was completely dissolved. 1ml of phenolphthalein was next added, and the mixture was titrated with 0.1N NaoH until a slight pink hue surfaced after 30 seconds of shaking.
Acid Value=n×5.61/w
Where, n= the number of ml NaoH required
w=the weight of substance(1)
The saponification value is the number of potassium hydroxide milligrams necessary to saponify a grams of fat under the conditions specified. The average molecular weight (or chain length) of all the fatty acids in the mixture is calculated.
Saponification value=b-a Where, b= blank reading a=sample reading
Specific Gravity: Having being flushed with distilled water and dried in a hot air oven for 15 minutes, the
specific gravity bottle was cooled, capped, measured and the weight stored (A).The sample was now inserted into the same specific gravity bottle, preserved, and counted yet again (B). Once more, the bottle has been entirely drained, cleaned, rinsed with distilled water, dried in the oven for fifteen minutes until it has cooled, then filled with distilled water until being weighted (C).
Specific gravity=B-A/C-A
Where, A=weight of specific gravity bottle B=weight of specific gravity bottle with oil
C=weight of specific gravity bottle with water
Formulation and Evaluation of different batches of herbal tonic:

A. Evaluation Parameter of all Formulation

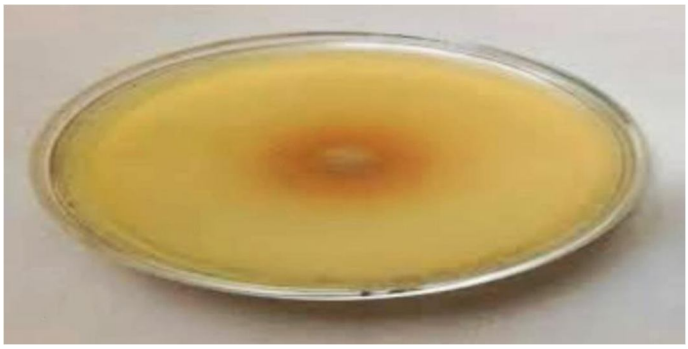
Formulation	Consistency	Texture	Washability	Skin irritation	pH	Viscosity	Spredability
F1	Good	Smooth	Poor	No	5.1	2.6477	Good
F2	Poor	Smooth	Good	No	5.1	2.6678	Good
F3	Good	Smooth	Good	No	5.2	2.7842	Good
F4	Good	Smooth	Poor	No	5.2	2.7941	Good
F5	Good	Smooth	Good	No	5.2	2.8376	Good
F6	Excellent	Smooth	Good	No	5.3	2.8376	Good

The F6 formulation had been selected for further antimicrobial and antifungal testing after it turned out that it had superior consistency, ph, viscosity, and spredability when compared to the other formulations.
Evaluation of antifungal efficacy: 1) Aspergillus niger and Candida albicans were the fungus utilized in this study to assess the herbal oil's antifungal effectiveness employing the agar diffusion method; Grisofulvin is the standard used. 2) Nutrient agar for antifungal activity was utilized as culture media in the agar diffusion method, and a borer was used to establish an aseptic cavity over the culture plates. 3) Formulation F6 standard and control was employed to fill the gaps that existed. For a full 24 hours, the plates were incubated at 37°C. 4) The zone's diameter in millimetres was used to calculate the activities. 5) To guarantee reproducible result the experiment took place again.

B. Evaluation of Antibacterial Efficacy

1) The present research utilized the agar diffusion method to assess the antibacterial activity of the herbal oil utilizing bacteria Escherichia coli, while penicillin functioning was the standard.2)In the agar diffusion method, nutrient agar for antibacterial activity were used as culture media and cavity were aseptically made over the culture plates using borer. 3)The cavities were filled with formulation F6 standard and control. The plates were incubated at 37°for 24hrs. 4)The activities were determined by measuring the diameter of the zone in mm. 5)The experiment was replicated two times to confirm the reproducible results.(2)

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VIII. MEDICINAL PROPERTIES OF HERBAL HAIR TONICS

1) Strength of hair activities: Tulsi assists keep moisture in your scalp, increases the flow of blood, decreases dryness and swollen and builds up hair follicles, and encourages healthy roots.
2) Amongst these plant chemicals three showed different levels of antifungal steps against both species. It was found with Tulsi essential oil (TEO) were the best.
3) Antibacterial activity: At a concentration of 4–5% and a few 0.25%, tulsi oil completely prevented the establishment of S. aureus, MRSA, and E. coli, yet at the same time, it just slightly reduced the formation of P. aeruginosa.(2)
4) Result and Discussion: The aim of the present investigation was to produce a herbal hair tonic topical formulation. Several study groups have already shown the antibacterial and antifungal qualities of tulsi oil and the hair growth-stimulating properties of jojoba oil being put on hair. With the goal to deliver these medicinal properties for topical application, formulation development was therefore undertaken. Because all of the components in these preparations are based on oil, phase separation will not be a concern, or the final product is homogenous or has good consistency. As the outcome, the formulation passed pharmaceutical elegance guidelines. Therefore, the overall activity of the formulation was comparable or even better depending on the outcomes of antifungal and antimicrobial investigations.

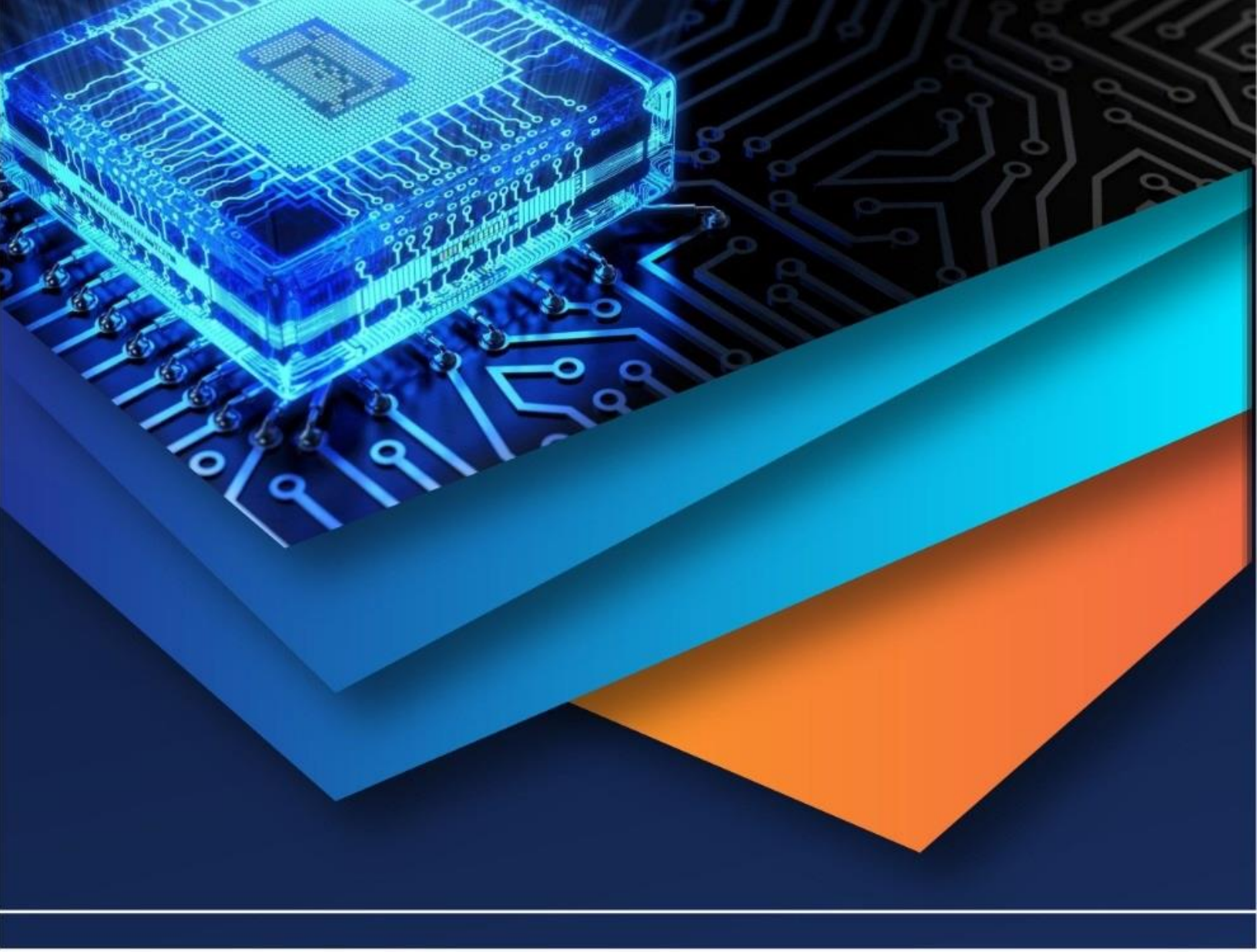
IX. CONCLUSION

A herbal-based hair tonic has been produced; consistent application of this product contributes to the scalp and hair getting more moisturized and the pH stability of the scalp becoming restored. A herbal hair tonic giving hair a slight gloss and suppleness. The antimicrobial, antifungal, and antibacterial effects of herbal-based skincare items are beneficial. To be able meet the demands of the increasing worldwide market, herbal formulations are heavily searched for. Tonics provide a sense of glossier hair, which some individuals take as a sign of strong hair. They offer easier grooming simply retaining the hair in a single position. A significant quantity of hair tonic ingested may trigger liver failure. This was a dark green, pleasant-smelling, non-greasy, and light-looking herbal hair tonic. fluid, free-flowing, and constantly constant. It produces a film when applied to the hair and is quickly absorbed into the scalp in less amount of time. It assists in decreasing stress and has a cooling consequences..

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