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Formulation and Evaluation of Polyherbal Hair Oil

Mr. Bade Vikas Vinayak[1], Miss. Kalyankar P. P.[2], Dr. Hingane L. D.[3]
[1, 2, 3]*Aditya Pharmacy College, Beed 431122*

Abstract: ***In the present study herbal Hair oils were formulated. Hair is one of the vital parts of the body and a protective appendage on the body and considered accessory structure of integument along with sebaceous glands, sweat glands and nails. Hair oils are widely used by the consumer of the cosmetic industries. The hair oil samples comply for the requirements of color, odour, PH, Viscosity, Density, acid value. Present investigation was undertaken to standardize the selected herbal hair oils on physicochemical parameters and some standard. Excellent results were seen in formulation prepared by boiling method of oils preparation technique.***

Keyword: Herbal preparation, Hair oil, Acid value, Saponification value

AIM: To Formulate & Evaluate Polyherbal Hair Oil.

Objectives:

- ***To collect information about Marketed herbal hair oils.***
- ***To prepare polyherbal hair oil.***
- ***To explore the use of Neem, Banyan tree of Arial root & Amla***
- ***To study evaluation of hair oil such as PH, Viscosity, Density, Refractive index, Acid value, Saponification value.***
- ***To achieve best formula for the hair oil using herbal ingredients.***

I. INTRODUCTION

Hair oils are the hair care preparations used for the prevention and treatment of baldness or other ailments, aggression of hair. They also promote the luxurious growth of hairs. Hair oil containing herbal drugs are used as hair tonic. Hair care products are categorized into two main category, hair tonics and hair grooming aids. These are basically the extracts of medicinal plants in an oil base. A plethora of herbs have been employed for hair treatments.

A few of these herbs are amla, henna, neem, methi, lemon, tulsi, brahmi, shikakai, reetha, liquorice root, musk root, mahabhringraj, jantamasi, chitraka, marigold, hibiscus, nutmeg. Amla is rich in vitamin C, tannins and minerals such as phosphorus, iron and calcium which provides nutrition to hair and also causes darkening of hair.

Hibiscus consists of calcium, phosphorus, iron, vitamin B1, riboflavin, niacin and vitamin C, used to stimulate thicker hair growth and prevents premature graying of hair. Brahmi contains alkaloids which enhance protein kinase activity. Methi contains high protein fodder which supply required protein nutrition to hair.

Hair is an epidermal derivative which is one of the vital parts increasing the overall elegance of the body. Hair fall, dandruff, lice, spilt ends, grey hair are few problems involved with hair faced by human. To overcome these, human takes many measures by applying many cosmetics for each. Hair oil is one among them used to solve almost all of these problems.

Herbal cosmetics are in high demand due to the increasing interest of mankind towards them because they are more effective with nil or less side effects, easily available ingredients etc. Hair care cosmetics are now added with herbs and they are well recognized compared with synthetic ones.

Herbal hair oil is more preferred and is used in many ailments of hair. They promote hair growth, improve elegance of hair and prevent hair fall. Hair oil not only promotes hair growth they also provide necessary moisture to the scalp rendering in beautifulair.

The key to hair oil is am emollient that penetrates into the hair and not sits on the surface. Hair oil makes you hair feel wonderful, while it improves the texture and cosmetic appearance of your hair.

Hair Oil will help detangle your hair. Detangling is important to be sure you are not physically adding damage to the hair when you come out of the shower and comb or pick through your hair (please don't brush through your hair particularly when it is wet and tangled see How to Protect Your Hair). Just like on the stove hair oil can "smoke" so the hair oils need a "smoking temperature" above that of your flat iron or curling iron.

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II. ROLE OF HAIR OIL

A. Removes Hair Lice

For hair lice, hair oil is the best and effective remedy. Just apply the hair oil and all the dirt and lice in your hair will go away.

B. Helps in Hair Growth

Hair oil applies on your scalp. It has been said that this helps in the growth of the hair.

C. Smoothness Frizzy Hair

Hair oil is act on hair scalp & Improve smoothness of hair.

D. Control The Split Ends

The hair splits are extremely irritating and make the hair look unhealthy. The hair oil can help control the formation of splits.

E. Deep Miniaturization

The hair oil, along with its great benefits, helps to moisturize your hair. It is a great moisturizer, which also helps us from the harmful UV rays.

F. Boost Blood Flow

Hair oil on your hair and gently massaging it into your scalp helps promote blood circulation, in your scalp region, which improves your hair health considerably.

G. Fights Hair Fall

Regular hair oiling is a good hair loss treatment. It not only helps in preventing and fighting against hair fall but, if done regularly can completely stop hair loss.

H. Ward off Grays:

Hair Oil on your tresses every alternate day will also prevent premature greying.

I. Power to Your Hair

Regular oiling of your hair with essential oil strengthens your hair, makes them stronger at the roots, and prevents breakage.

J. Nourishes Hair

If hair oil is a regular basis it reduces split ends, lubricates and nourishes damaged hair and provides elasticity to the hair strands giving your locks extra shine.

III. ADVANTAGES OF POLY HERBAL HAIR OIL

A. Prevents Greying and acts as a Protective Sheath

Premature-greying of hair is common in youngsters and adults. It occurs due to lack of vitamins and protein in the food digested. However, there may be reasons genetically that leads to graying of hair. Melanin present in the skin gives hair its color, as it does to skin. Melanin is a skin pigment that decides color of hair. High amount of melanin present in scalp gives dark color to hair while its lack causes graying. It is the deficiency of Vitamin B 12 that results in graying. Regularly oiling and massaging thus helps to retain the color of your hair, and thus giving you black and shining hair. Also, hairs are prevented from harmful rays of sunlight by forming a protective sheath around the hair protein. UV rays are blocked by the oil that nourishes hair. Nourished hairs are more resistant to harmful rays.

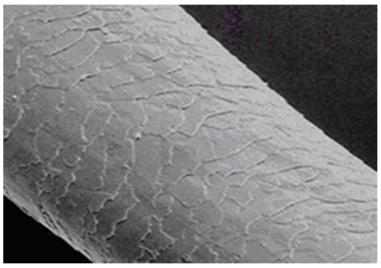
B. Prevent Dandruff

Dandruff is the result of dry scalp. Dry scalp stretches and breaks causing dandruff. Dandruff cause itching on the scalp and at hair roots, thus resulting in hair breakage and hair fall. Dandruff is thus the major cause of hair fall. Environment pollution also plays a role in worsening the situation. Also, lice are likely to grow in such situation. Dandruff leaves scalp and can be found highlighting on dark clothes. These are dead cells that make one embarrassed about one's personality. Continuous irritation and scratching may give you bad hair volume. People with dry scalp usually suffer dandruff and should thus massage hair and scalp with good amount of hair oil. Oil secreting glands present at the epidermal cells of scalp produces no or low natural oil in presence of dandruff.

C. Shine and Luster

Who doesn't want shining hair? Shine is the most attractive feature of healthy hair. Hairs shine when they are healthy. By Healthy, we means hygiene and nourishment. Hair when destroyed due to heat causes split ends and becomes brittle. The thickness of the hair is lost and is unevenly distributed. Untreated split ends grow giving rough look to hair. Aloe vera along with cold juices and curd helps in obtaining better shine than before. It can be applied with oil or as a hair mask. Regular oiling keeps hair well stranded in a single thread than like lint of thread. Oil keeps the split hair together and nourishes it from outside thus giving luster and shine to your hair.

D. Strengthen Hair Protein

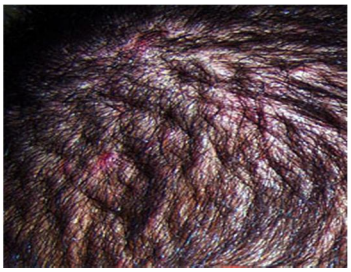


Hair is a protein strand that has its roots beneath the epidermal cells. The hair follicle is nourished by oiling regularly. Hair become brittle and leads to baby hair due to weak hair protein. Hair oil such as castor oil, almond oil and olive oil help to regain the old strength of the protein. The airshaft is prevented from harm and is nourished. The frizz and brittle nature of hair is reduced with the help of vitamin E which is the major component of the oils used to massage scalp. Strengthened hair falls less with their bulbs and are less vulnerable to heat destruction. Split ends, being the major hair problem is reduced when the hair protein is helped to grow from root to the tip.

E. Relaxes Mind and Body

Massaging scalp and hair with lukewarm oil helps rejuvenate the loss due to chemical treatments. It also relaxes nerves in brain, thus facilitating blood circulation in head area. Regularly oiling hair before washing, and keeping hot towel wrapped around the head for 20-30 minutes will help better absorption by strengthening the roots. Our brain is the origin of all our activities, and oiling help to soothe capillaries and nerves in brain. Relaxation of mind and body is done through massaging, and scalp massage is one of them. You can use thick oil or lure oil for this. The rapid increase in hair growth in around two months can make you never leave the habit of massaging scalp regularly.

F. Prevent Bacterial and Fungal Infections



Clogging of pores on scalp can have minor to major problems when they get contaminated with bacteria or fungi. These bacteria and fungi provide nourishment and gives suitable environment for hair lice growth and dandruff. And can be the major cause of hair loss or hair fall. If the scalp is getting tender and there are some red spots you must visit a dermatologist. Along with the scalp, hair can get red. Although, bacteria is present all the time but the one mentioned is scalp-friendly. Irritation on scalp and redness can be the result of some harmful bacteria replacing normal one. Regularly oiling hair with honey gives you anti bacterial treatment and provides scalp the necessary elements to stay healthy and well hydrate.

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G. Hair Growth

Hair grows when they are given enough nourishment to sustain. Although, hair is just a protein strand, it also requires regular feed of vitamins and other essentials. Massaging twice a week will regain whatever hair loses in the process of curling, ironing and chemical treatments. Oil acts as a replenishing agent. Massaging helps in opening of pores and better absorption of oil. It also facilitates blood circulation and thus soothes and relaxes you. Oiling strengthens roots and leading to healthy hair growth.

IV. HAIR OILS

A. Avocado Oil

Avocado oil is particularly great for natural hair. It's loaded with nutrients, amino acids, essential fatty acids, as well as vitamins A, B, D, and E. And it's excellent for moisturizing, deep conditioning, improving hair strength, strengthening hair, and boosting shine.

B. Castor Oil

Castor oil thickens hair, promotes hair growth, prevents thinning, moisturizes, helps reduce split ends, helps to tame frizz, and prevents scalp infections.

C. Coconut Oil

Coconut oil is great for preventing dandruff, promoting hair growth, moisturizing, strengthening hair, thickening hair, and preventing damage.

D. Olive Oil (Extra Virgin Olive Oil)

I LOVE using olive oil. And olive oil, which is also referred to as the "godmother of hair oil," is great for moisturizing, deep conditioning, improving hair strength, eliminating dandruff, and also has powerful antioxidants that can help fight hair loss.

E. Rosemary Oil

Rosemary oil is great for stimulating hair follicles for hair growth, preventing hair loss and greying, preventing dandruff, strengthening hair, and boosting shine.

F. Safflower Oil

Safflower oil protects hair, nourishes hair follicles, moisturizes, and stimulates blood circulation to promote hair growth and thickness. And it is extremely beneficial for natural as well as dry chemically treated hair.

G. Sweet Almond Oil

Sweet almond oil works great as a "sealant." This means that it "locks-in" moisture. Sweet almond oil also nourishes hair, smoothes hair cuticles to control shedding, promote hair growth and thickness, prevents hair loss, and boosts shine.

V. EXPERIMENTAL WORK

Formula of hair oil:-

Ingredients.	Formulation Qty.
1) Neem	35 mg.
2) Banyan Tree	30 mg.
3) Amla	10 mg
4) Coconut oil	100 ml

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Procedure:-

1) Weigh accurately all ingredient in beaker.
2) After add 75 ml. Coconut oil.
3) Add 25 ml. Distil water
4) All ingredients are added in beaker and evapourate water
5) Heating on water bath with contineous stirring for 30 min.
6) Take out the beaker from water bath & cool it and filter the oil.
7) These hair oil packed & submitted.

A. *Amla (Emblica Officinalis)*

1) *Description:* Amla is highly valued by nutritionists and Ayurvedic practitioners alike. For those of you who haven't heard about Ayurveda, it's a 5000 year old natural healing system of medicine that is indigenous to India. In India, it is common to eat the Amla or Indian gooseberries in the pickle format. It is probably the most important natural source of vitamin C, which is easily absorbed by the digestive system. The Indian gooseberry or Amla ripens in autumn, around October till December and is commonly harvested by hand after climbing to the branches bearing the fruits.
2) *Synonyme:* Emblica, Indian goose berry, amlaki,
3) *Biological Source:* It consist of dried as well as fresh fruits of plant Emblica officinalis gaerth.
4) *Family:* "Euphorbiaceae"
5) *Chemical Constituent*

It also mainly contains vitamin-c. also present tannins.
It contains Pectin & 75% Moisture, fat & phyllemblin.
Also present phosphorus, iron & calcium.

6) *Uses of Amla*

a) Amla is used to revitalising potency and the digestive system, rejuvenating longevity, treat constipation.
b) reduce fever, purify the blood, reduce cough, alleviate asthma, strengthen the heart, benefit the eyes, stimulate hair growth, enliven the body.
c) Amla is considered an effective remedy for heart disease.
d) Amla is helpful in tuberculosis of lungs, asthma, and bronchitis.
e) Amla prevents ageing and maintains strength in old age.
f) Amla helps enriching hair growth and hair pigmentation.
g) Amla improves immunity and protects from common cough and cold

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B. Neem oil (Azadirachta Indica)

1) *Description:* Neem oil varies in color; it can be golden yellow, yellowish brown, reddish brown, dark brown, greenish brown, or bright red. It has a rather strong odor that is said to combine the odours of peanut and garlic. It is composed mainly of triglycerides and contains many triterpenoid compounds, which are responsible for the bitter taste. It is hydrophobic in nature; in order to emulsify it in water Azadirachtin is the most well known and studied triterpenoid in neem oil.
2) *Synonyme:* Margosa.
3) *Biological Source:* It consist of all arial parts of plant Azadirachta Indica.
4) *Family:* " Meliaceae"
5) *Chemical Constituent*

It also contains Azadirachtin, salanin, meliantriol.
It contains Nimbin, Nimbidin, Nimbosterol & Myricitin.
It also contains Nikmbinin, M argolone, Margolonone & Margosine.

6) *Uses*

a) The most frequently reported indications in ancient Ayurvedic writings are skin diseases, inflammations and fevers, and more recently rheumatic disorders, insect repellent and insecticide effects.
b) Traditional Ayurvedic uses of neem include the treatment of acne, fever, leprosy, malaria, ophthalmia and tuberculosis.
c) It use as an anthelmintic, antifeedant, antiseptic, diuretic, emmenagogue, contraceptive, febrifuge, parasiticide, pediculocide and insecticide.
d) It has been used in traditional medicine for the treatment of tetanus, urticaria, eczema, scrofula and erysipelas.
e) It is also used as insect repellent, antifeedant.

C. Banyan Tree (Ficus Benghalensis)

1) *Description:* Banyan tree is a huge tree with very extensive branches. It is said that at one time more than 10, 000 people can sit under its shade at one time. It is a evergreen tree. It branches spread out and send trunk like roots to the ground in order to support itself. It grows to a height of more than 21 meters and lives for many years. The leaves are 10 -20 cm long and has many aerial roots. The leaves are broad, oval and glossy. White milky fluid oozes out of leaves, if broken. It can grow in to the gaint tree covering several hectares.
2) *Synonyme:* Bargad, Bor, Ber, Ala and Pedda mari
3) *Biological Source:* It consist of all arial parts of plant **Ficus Benghalensis**
4) *Family:* Moraceae
5) *Chemical Constituent:* Some of the active chemical constituents found in the plant include phytosterolin, ketones, flavonoids, flavonols, sterols, It contains oentacylic triterpenes, triterpenoids, furocoumarin, tiglic acid ester and other esters Active chemical composition, there are various medicinal uses of the banyan tree.
6) ***Uses***

a) Extract of the roots and the leaves are useful for curing various skin related problems.
b) For healthy hair, crushed prop roots paste is applied to hair.
c) The same formulation is also used as a skin conditioner
d) Skin ulcers are treated with a paste made from mixing water with ground plant material from the aerial roots of the tree.
e) The milk juice obtained from tree bark is also used as a natural remedy to get rid of skin moles.
f) The bark and seeds are used as a tonic to maintain body temperature.
g) Diabetic patients are also treated by the tonic made from banyan tree.
h) The bark of banyan is useful in controlling cholesterol
i) It decreases LDL or bad cholesterol while HDL or good cholesterol levels are maintained.

VI. EVALUTOIN TEST OF HAIR OIL

The marketed herbal hair oils, Himani Navratna oil, Dabur Super Thanda oil, Shanti Maha Thanda tail (SMT), Himgold oil and Amla oil were purchased from local medical shop from Nasik, Maharashtra, India. Chemicals of analytical grade purity and distilled water were used in the preparation of reagents.
washed with detergent solution and rinsed with distilled water before drying in the oven. The reagents required were purchased from the Lobachem laboratories, Pune. The Abbes
refractometer was used for refractive index determination. The digital pH meter was used for pH determination. All the experiments were performed in triplicate
and the average values were reported.

A. Physical Evaluation

1) *Viscosity:* Viscosity is a measure of the resistance of a fluid which is being deformed by either stress or tensional stress. It can be determined by following:-

Procedure

a) Thoroughly clean the viscometer.
b) Mount the viscometer in vertical position on a suitable stand.
c) Fill dry viscometer upto g mark.
d) Count the time required in seconds for hair oil sample to flow from mark A to B.
e) Repeat three times.
f) Determine the densities of the liquids.

2) *Density:* Density of material is defined as its mass per unit volume. It is determined by following formula, Density= mass of oil / volume of oil in specific gravity bottle
3) *Refractive Index:* The refractive index n, of a medium is defined as the ratio of the velocity c of a wave phenomenopn such as light or sound in a reference medium to the phase velocity, Vp in the medium itself.

Formula

$$n = \frac{c}{v_{\mathrm{p}}}.$$

B. Chemical Evaluation

1) *Acid value:* Acid value is the mass of potassium hydroxide in milligrams that is required to neutralize one gram of chemical substance. The acid number is a measure of the amount of carboxylic acid groups in a chemical compound, such as fatty acid, or in a mixture of compounds. The acid number is used to quantify the amount of acid present, in a oil sample. It is the quantity of base, mexpressed in milligrams of potassium hydroxide that is required to neutralize the acidic constituents in 1 gm of sample.

Procedure:-

a) Weigh accurately 0.5 gm of acid sample; add it to a mixture of 10 ml of alcohol and 10 ml of ether. If acid does not dissolve in a solvent mixture, warm it on water bath until it dissolves**.**

b) Titrate solution of acid against 0.1 N sodium hydroxide and phenolphthalein as the indicator.

c) Carry out blank titration by omitting the substance.

d) Take readings and calculate acid value using formula.

Acid value= 5.61*n/w.

Where,

n= no. of ml of 0.1 N NaOH required.

W= weight of substance in gm.

2) *Saponification Value:* Saponification value represents the number of milligrams of potassium hydroxide or sodium hydroxide required to saponify 1g of fat under the condition specified. It is a measure of the average molecular weight of all the fatty acid present. The long chain fatty acids found in fats have low saponification value because they have a relatively fewer no. of carboxylic functional groups per unit mass of the fat as compared to short chain fatty acids. If more base are required to saponify N grams of fat then there are more Moles of the fat the chain lengths are relatively small.

Procedure:-

a) Weigh accurately 0.5 gm of fatty acid ester and transfer in to round bottom flask add 15 ml of alcoholic potassium hydroxide to it and reflux for about an hour.

b) Reflux separately 15 ml of alcoholic potassium hydroxide on boiling water bath for about an hour as blank reading.

c) Cool bath and titrate separately against 0.5 N Hydrochloric acid using phenolphthalein as indicator.

d) Carry out blank titration omitting substance.

e) Take reading and calculate Saponification value.

Saponification value= 28.05(b-a)*w

Where,

a= ml of KOH required to neutralize the substance

b= ml of KOH required for blank.

W= weight of substance in gm.

C. Biological Evaluation

1) *Primary Skin Irritation Test:* The prepared formulations were assessed for primary skin irritation test. Six healthy rats were selected for the study. Each rat was caged individually food and water given during the test period 24 hrs prior to the test. The hair from the back of each rat of 1cm2 was shaved on the side of the spine to expose sufficiently large test areas, which could accommodate three test sites were cleaned with surgical sprit. Measured quantity (1ml) (5% w/w) of the formulations OD1, OD2 and OD3 were applied over the respective test sites on one side of the spine and observed for erythema and edema for 48hrs after application.

2) *Hair Growth Initiation Test:* Quantitative model by Uno was used with slight modification for the study of hair growth initiation. The rabbits were divided in 4 groups of 1 rabbit each and 2 cm2 areas were shaved to remove hairs. Eleven patches were developed on each rabbit. Rabbit of group A. was treated with amla oil of 1-10% concentration on individual patches keeping first patch as control. Similarly rabbits of other three groups were subjected to brahmi, methi and hibiscus oils respectively with different concentrations in same pattern. This treatment was continued for 15 days and during the course the hair growth initiation pattern was observed and reported.

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3) *Hair Growth Activity:* The rats were divided into 5 groups of 5 rats each and 2 cm2 area of the dorsal portion of each of the rats was shaved. Group 1 was kept as control, where there was no drug treatment and in Group 2 the standard 2% minoxidil ethanolic solution was applied. In the remaining groups 3, 4, 5 the three different concentrations; 2.5% (OD1), 5% (OD2) and 7.5% (OD3) of the herbal oil formulations were applied once a day respectively. The treatment was continued for 30 days and during this course the hair growth pattern was observed qualitatively and recorded.

VII. RESULT & DISCUSSION

Herbal hair oil is one of the most well recognized hair treatments. Herbal hair oil not only moisturizes scalp but also reverses dry scalp and dry hair condition. It provides numerous essential nutrients required to maintain normal function of sebaceous glands & promotes natural hair growth. The herbal hair oil was prepared from various herbs and their importance in the formulation. The various parameters like sensitivity test, viscosity, pH,acid value of herbal hair oil was evaluated. Hence, from the present investigation it was found that the formulated herbal hair oil has optimum standards and further standardization and biological screening establishes the efficacy of formulated herbal hair oil.

Parameter	Formulation
Color	Light greenish
Odor	Pleasant
pH	6.5
Density	0.92 g/cm3
Viscosity	37 Min 17 sec.
Acid Value	5.61 v N/W

VIII. CONCLUSION

All the parameters showed that they are within the limits and since all the ingredients added have many advantages, this oil will help in maintaining good growth of hair, turning grey hair to black, protects from dandruff and results in lustrous looking hair. The samples complies the requirements for acid value, Saponification value, Viscosity, Density, Refractive Index. The various constituents of the herbal extracts such as Murraya koenigii, ficus benghalensis, Eclipta alba, Patchouli, Aloe vera, Amla, Kapoor Kachri may be significant hair growth activity.

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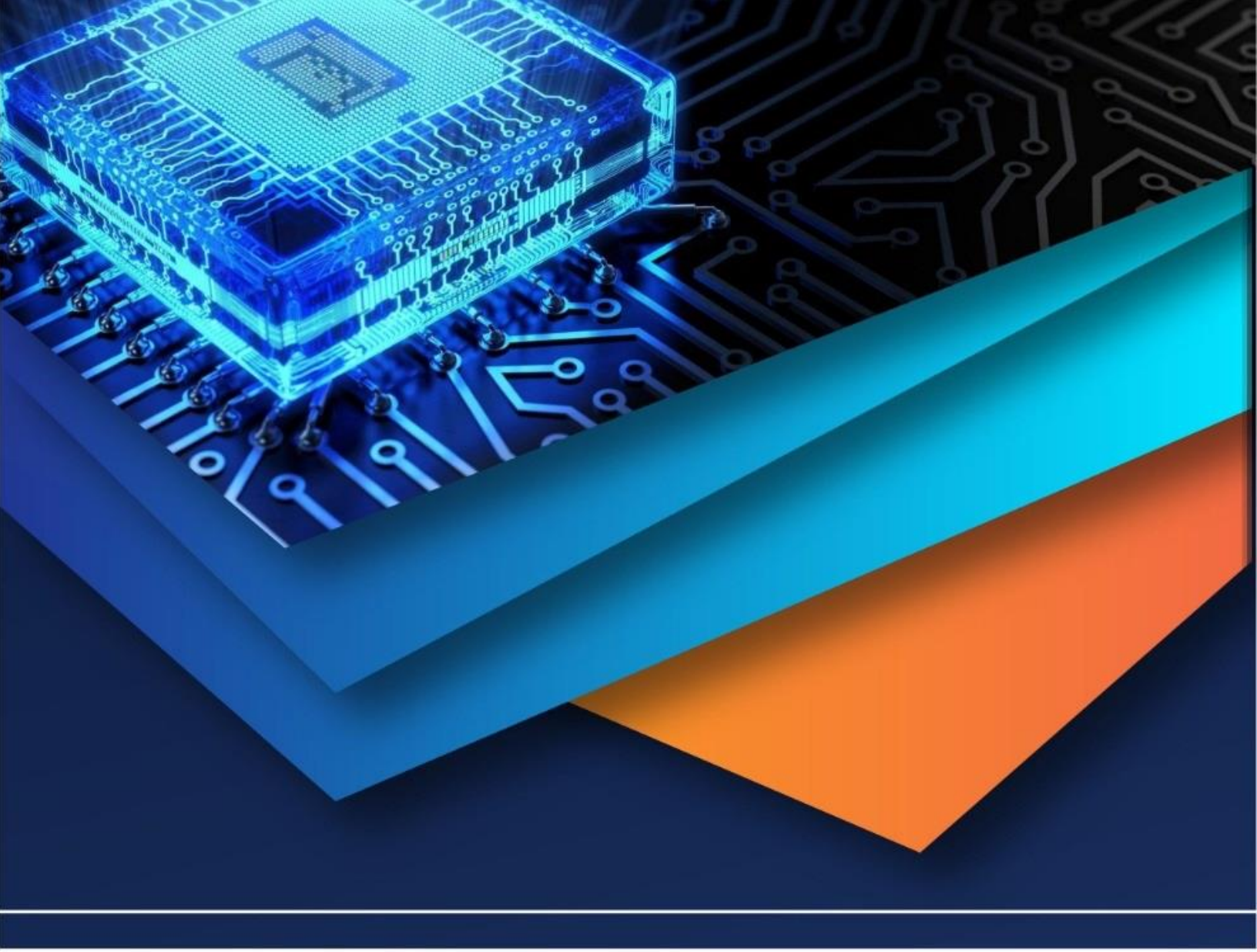

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