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Antiacne Herbal Cream

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Abstract: ***Objective- To formulate and evaluate herbal cream using Aloe Vera gel, Sandalwood Powder , extracts of Neem (Azadirachta indica) and Tulsi (Ocimumtenuiflorum) to give antiacne effect.***
Method: A cream with an oil-in-water (O/W) emulsion base (semisolid formulation) was created. The oil phase (Part A) was heated to 75° C while the emulsifier (bees wax) and other oil soluble components (liquid paraffin, rose oil) were dissolved in it. The water soluble additives and preservatives components (aloe vera ethanol extract, vitamin C, borax, methyl paraben, sandalwood, and Neem and Tulsi were dissolved and heated to 75° C in the aqueous phase (Part B). Once heated,parts of the aqueous phase were introduced to the oil phase while stirring continuously till cooling of Emulsifier was used.
Results: The formulation showed good appearance, pH, viscosity, phase separation.
Conclusion: All four herbal components demonstrated noticeably distinct behaviours. Based on the findings, we may infer that all of the formulations were stable and safe to apply to the skin, with acceptable viscosity and no evidence of phase separation. Additionally, the formulation had no redness, Itching and erythrema .When conducting the irritancy testing, they were simple to clean. The formula read at room temperature, stable.
Keywords: Aloe barbadensis (gel), Azadirachta Indica (Neem), Ocimumtenuiflorum / Ocimum sanctum (Tulsi), Herbal cosmetic, cream.

I. INTRODUCTION

Cream is defined as a sort of semisolid emulsion that is either an oil in water (o/w) or a water in oil (w/o) emulsion and is used externally. Cream is categorised as an emulsion of water and oil. It is applied to the skin's surface or uppermost layer and its primary capability is the capacity to stay longer at the application site. The purpose of a skin cream is to shield the skin from various weather and environmental factors and has a calming effect on skin.(3) An explanation of herbal cosmetic cream Greek word "cosmetics" (which means to decorate) is where the term "cosmetic" originates (5).

Herbal cream is defined as, are the preparation used to enhance the human appearance. More herbal ingredient are used to provide define cosmetic benefits only is called as “herbal cosmetic: “The demand of herbal medicines is increasing rapidly due their lack of side effect(8).Herbal cosmetics are described as cosmetics with favourable physiological effects, such as regenerating, smoothing, improving, and moulding qualities, brought on by natural fixes. A polyherbal formula called Herbal Cream contains Aloe vera concentrates. Azadirachta indica, Ocimum sanctum, Curcuma longa, Cedro oil, and Myristica barbadensis Fragrans, Daucus carota, Prunus dulcis, Orange Oil, Olium rosae (Rose Oil), and Ocimum sanctum. Aloe vera leaf, turmeric, banana, neem, papaya, cucumber, and other plants are among the herbs that are employed cosmetics with plants. Our primary goal is to create a herbal cream that can provide a moisturizer's multipurpose action can help to lessen skin conditions including acne and skin rashes giving radiance to the face, eczema, psoriasis, dry skin, wrinkles, rashes, etc.(16).

The polyherbal face cream in the current research article is prepared using the following ingredients: concentrated aloe vera gel, neem, tulsi, and sandalwood. Additionally, other compounds including methyl paraben, liquid paraffin, bees wax, and rose oil are employed.Uses for aloe vera gel include moisturiser, used to treat burn wounds and lessen acne and pimples (16). Aloe Creams have been demonstrated to help reduce skin issues and have a soothing impact on the skin irritation. Neem is used to treat scarring, as well as being anti-inflammatory and antifungal. Skin redness, discoloration, and itching. There have been reports of pharmacological effects has anti-bacterial, anti-inflammatory, anti-fungal, anti-arthritic, anti-pyretic, and anti-gastric properties anti-tumor, anti-ulcer, and hypoglycemic actions. (17).

Owing to its healing, antibacterial, antifungal and anti-inflammatory properties, tulsi benefits the skin by preventing blackheads, acne and relieves skin infections, to name a few. Rich in vitamin K and antioxidants, tulsi benefits hair by stimulating blood circulation and promoting hair growth amongst others.(4). Tulsi is frequently used as a hand sanitizer, mouthwash, and water purifier as well as in the conservation of foodstuffs, animal raising, and wound healing due to its broad-spectrum antibacterial action, which includes activity against a number of human and animal infections. It aids in combat with swelling. Uses for leaves include stimulants, aromatherapy, anti-spasmodic, and diaphoretic.

Leaf juice and tea are used as stomachics, and both provide relief for stomach issues, bronchitis, a cold, and fever.(12). Antioxidants can be found in sandalwood oil that support the skin cells' structure and buoyancy. Moreover, it lessens dryness and increases skin suppleness by replenishing its hydration.Considering the abundance of antioxidants, Sandalwood can reduce the appearance of wrinkles by scavenging free radicals. Bhanote says.creation of a cream.

Formulation of cream was performed by following methods 1) Phase 1: Melt the solid ingredients by indirect heat then add all the oils in it and stir well. Phase 2: Dissolve the borax in water with the help of heat. (17).

II. ANATOMY OF SKIN

The skin is the largest organ of the body, with a total area of about 20 square feet. The skin protects us from microbes and the elements, helps regulate body temperature, and permits the sensations oftouch, heat, and cold. Skin is a complex organ composed of multiple layers (i.e.,epidermis,dermis and hypodermis)[8].

Human skin is made of 3 different layers: epidermis, dermis and hypodermis.

1) The epidermis, the outermost layer of skin, provides a waterproof barrier and creates our skin tone.
2) The dermis, beneath the epidermis, contains tough connective tissue, hair follicles, and sweat glands.(16)
3) The deeper subcutaneous tissue (hypodermis) is made of fat an connective tissue[8].

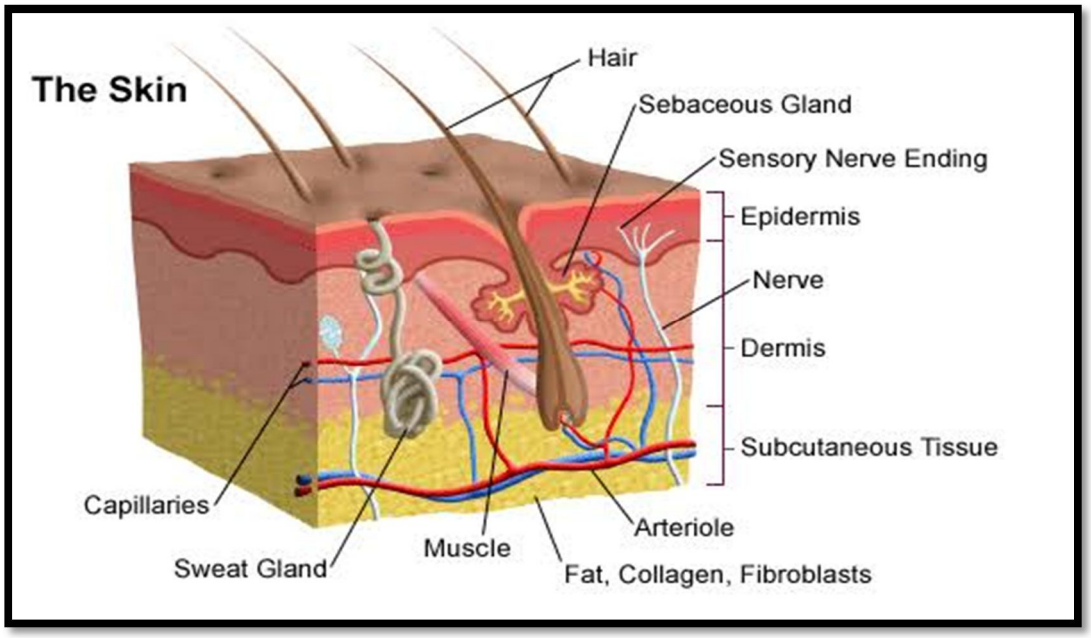

Fig No (1) :- Anatomy of Skin

Two main possible skin Penetration pathways are illustrated.

The nanomaterial (i) enters via hair follicles (the follicular penetration pathway) and (ii) diffuses through the gaps between corneocytes (the intercellular penetration pathway). (b) Schematic of the structure of human skin.(10).

III. ACNE VULGARIS

A. Signs And Symptoms

It consists of papules, big papule-like nodules, seborrhea (excessive oil-sebum discharge), comedones, pustules, and scarring (1). Acne might appear differently depending on the colour of the skin, and it's also linked to social and psychological issues (12).

IV. ETIOLOGY

Acne develops due to blockage of follicles, hyperkeratinization and keratin plug formation and sebum (microcomedo). Sebaceous glands swell and sebum production rises in response to increasing androgen production. A closed comedo or an open comedo (blackhead) may develop from a micro comedone. Comedones develop when sebaceous glands become clogged with Dead skin cells, sebum, and organic oils.

Fig No (2) :- Acne Vulgaris

V. PATHOGENESIS

Bacterial proliferation and inflammation in the pilosebaceous units cause acne to form. Acne is brought on by the body's hormone levels altering the function of the pilosebaceous gland. aberrant differentiation of follicular epithelial cells results in stronger intracellular adhesions and decreased shedding. That results in the formation of hyperkeratotic plugs or microcomedones that expand to become non-inflammatory comedones that are open or closed [41]. Androgens, which cause sebum production, are the main causes of acne. production that results in the development of comedones [42] (Figure 4).modifications to the skin's natural Flora is connected to the generation of androgen-related

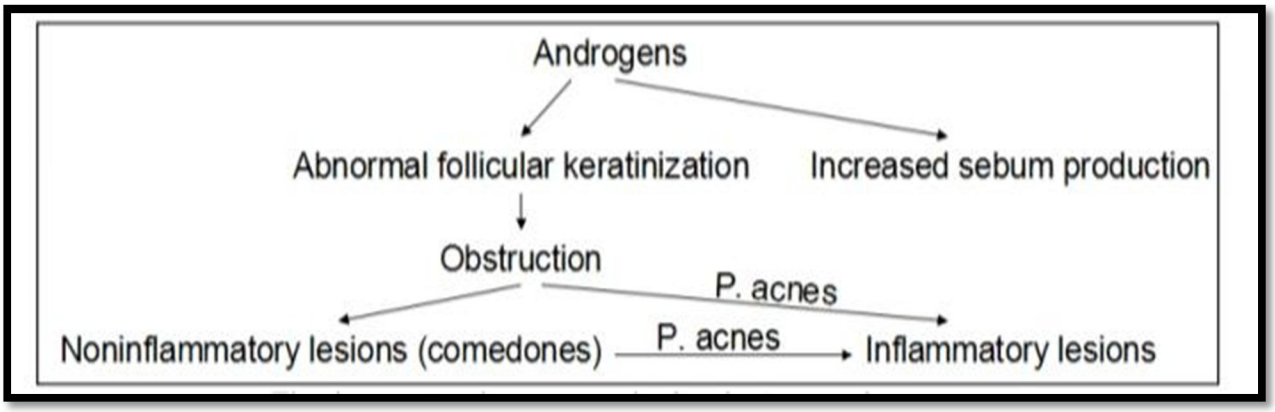

Fig No (3) :- Pathogenesis of Acne Vulgaris

The acne spreading depends on pilosebaceous gland density and morphology and it is common in the face, chest, neck and back. Non-inflammatory acne is characterized by the formation of closed or open comedones.

VI. FACTORS CAUSING ACNE

A. Environmental Factors

It includes various factors like High-humidity, Prolonged sweating, Increase in skin hydration,
Exposure to dirt or vaporized cooking oil or certain chemicals like petroleum derivatives (14).

B. Drug Use

Acne can be brought on by medications such as phenytoin, isoniazid, phenobarbital, lithium, ethionamide, steroids, azathioprine, quinine, and rifampin (15).

C. Psychological

Increased stress has been linked to worsening acne, according to studies [26].According to the National Institutes of Health (USA), stress can make acne worse.(8).

D. Diet

Although a high glycemic diet is linked to acne getting worse [32–34], the connection between food and acne is still unclear.Milk consumption and an increase in acne prevalence are positively correlated [33, 35, 36]. According to reports, eating salt and chocolate are not linked to the emergence of acne [33].A significant amount of sugar is present in chocolate high glycemic load may result. It's probable that fat and acne are related metabolism of insulin (7).

VII. EXPERIMENTAL WORK

Material and method:

A. Material

Chemicals:-Bees wax ,Borax , Liquid Paraffin, Methyl Paraben, Rose oil (P .P.C.O.P . Shrirampur, Wadala Mahadev)(18).

Plant Profile:

1) Aloe vera

Drug's name :- Aloe vera

Lameaceae, the family

Source biological: Ocimum species, including Ocimum, provide the fresh and dried leaves used to make tulsi. Ocimum basilicum L., sanctum L., etc. Ocimum tenuiflorum is known scientifically as. (11)

Fig No (4) :- Aloe Vera

Benefits of Aloe vera for skin

It gives you a natural glow and keeps your face healthy.

Aloe vera has a lot of moisturising qualities and removes dead skin cells.

Aloe vera also aids in wrinkle avoidance or reduction.

It offers defence against the sun's strong ultraviolet rays.(13)

2) Neem

Name of drug: - Neem

Family:-Meliaceae.

Azadirachta indica seed oil and fresh or dried leaves are the biological source.

Name in the botanical world: Azadirachta indica. utilised chemical components :-Beta-sitosterol (15).

Fig No (5) :- Neem

Benefits of Neem powder :

Neem has the power to control oil production, heal injuries, promote collagen production, lessen acne scarring, and minimise skin inflammation. It functions as a natural option to treat skin tissue from the inside out while also minimising scarring and hyperpigmentation.(15) .

3) Tulsi

Drug brand: -Tulsi

Family:-Lamiaceae

Ocimum tenuiflorum is its scientific name.

Biological source: Ocimum species, such as Ocimum sanctum L. and their fresh and dried leaves.

Basil (Ocimum) L., etc.

utilised chemical component: eugenol (17)

Fig No (6) :- Tulsi

Benefits of tulsi :

The antimicrobial qualities of tulsi may be helpful for acne. When skin's hair follicles get clogged and infected with germs, acne develops (8).

4) Sandalwood

Drug's name: Sandalwood

The SantalaAlbu family

Name in nature: Santalum Album

Fig No (7) :- Sandalwood

Biological source: the stem and roots of the tiny, evergreen tree Santalum album Linn. the Santalaceae family.

Benefits of Sandalwood :

Antioxidants found in sandalwood oil aid in maintaining the structure and buoyancy of skin cells. Additionally, it improves skin's suppleness by replenishing moisture and reducing dryness.Sandalwood's abundant antioxidant component can aid in preventing wrinkles by preventing the development of free radicals," Bhanote claims (10).

Extraction process of drug :

a) Aloe vera

Take ripe and new aloe vera leaves off the plant. used distilled water to clean it. It was dried in a hot air oven. Using a sterile knife, a leaf is dissected longitudinally. Aloe vera that is semi-solid is then gathered. Take out the fibres and contaminants. Extract from aloe vera is obtained (12).

b) Neem

Neem oil quality varies depending on the method of extraction. Neem oil is made by selecting the best extraction process and gathering the necessary raw components. Neem oil is made from neem leaves and requires seeds (14) to produce.Neem oil is extracted using a lot of neem seed. Neem leaf should not be processed in place of the seeds since the oil content of the leaves is higher.Mechanical pressing, steam pressure extraction, and solvent extraction are used to extract neem oil. extraction. Grade-wise seed separation is the first step in the extraction of neem oil. Grading of seeds is done using sizes as well as the amount of oil content in the seeds well(7).

c) Tulsi

Ocimum Sanctum Linn. (Tulsi) leaves were obtained from a nearby Alandi, Pune, Maharashtra location, and solvent was methanol (AR grade). A batch extraction technique was utilised to extract eugenol (Figure 1). It has a 500 ml reactor where When extraction is needed, a motor-driven agitator with four turbine-style blades will be used (REMI, maximum speed of 1200 rpm) was used (15).

d) Sandalwood

Refiners in Kupang have long used steam distillation to produce sandalwood oil. Usually, it takes 40 to 70 hours. When it is anticipated that the distilled oil will run out or become economically unfeasible or inefficient, the distillation process is often stopped(13).

e) Vitamin C

Using a sharp knife, cut the zest only – i.e. the colored part – of the skin from the orange. Break it into small coin-sized pieces, and set them in a single layer on a large baking sheet. Place the baking sheet in the oven at 150F for about 3 to 5 hours. The peel should be very dry and crisp.

Formulation Table:-

Sr.No	Ingredients	Quantity Taken	Role of Ingredients
1	Aloe Vera gel	0.1 ml	Anti-ageing, anti-inflammatory, moisturizer, reduce acne and pimples.
2	Tulsi	2 ml	Antibacterial, adds glow to the face.
3	Neem oil	6 ml	Promote wound healing, relieves skin dryness, itching and redness.
4	Sandalwood	0.24gm	Antiacne
5	Bees wax	1 gm	Emulsifying agent, stabilizer and gives thickness to the cream
6	Liquid Paraffin	2.04 ml	Lubricating agent
7	Borax	0.2 gm	Alkaline agent which reacts with emulsifying agent to form soap
8	Methyl Paraben	0.1 gm	Preservative
9	Rose oil	0.05 ml	Fragrance
10	Vitamin C	4 gm	helps for glow & skin youthfulness
11	Water	q.s	Vehicle

B. Formulation Method

A cream with an oil-in-water (O/W) emulsion base (semisolid formulation) was created.The oil phase (Part A) was heated to 75° C while the emulsifier (bees wax) and other oil soluble components (liquid paraffin, rose oil) were dissolved in it. The water soluble additives and preservatives components (aloe vera ethanol extract, vitamin C, borax, methyl paraben, sandalwood, and Neem and Tulsi were dissolved and heated to 75° C in the aqueous phase (Part B). Once heated,parts of the aqueous phase were introduced to the oil phase while stirring continuously till cooling of Emulsifier was used.

Evaluation test:

1) Physical test

In this test, the cream was observed for color, odor, texture, state.(16)

2) Irritancy

Make the area on the left dorsal surface (1 cm2 capability [8]). After that, the cream was administered there, and the duration was recorded. Then, for a period of up to 24 hours, it is examined for irritancy, erythema, and edoema, if any, and reported (6).

3) Wash ability

A small amount of cream was applied on the hand and it is then washed with tap water(16).

4) pH

In order to calibrate the pH metre, standard buffer solution was used. The pH (17) of 0.5g of cream that had been weighed, dissolved in 50.0ml of distilled water, was determined. The pH of the cream base was discovered to be in the healthy range of 6.2–6.9 for skin pH.

5) Homogeneity

The formulations were tested for the homogeneity by visual appearance and by touch(14).

Type of emulsion under dye test:

The cream is combined with the scarlet crimson colour. On a microscopic slide, a drop of the cream was placed, covered with a cover slip, and inspected under a microscope. The cream is O/W type if the dispersed globules have a crimson appearance and the ground is colourless. The converse situation happens in W/O type cream, where the dispersed globules look colourless on the red background(11).

a) *Viscosity:* Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no 7. The spreadability index and the viscosity of the gel formulations were between the range of 2.63 ± 0.12–3.50 ± 0.08 and 5013.66 ± 1.69–5077.66 ± 2.05, respectively.(16).

b) *After feel:* Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream was checked.(15).

c) *Type of smear:* After application of cream, the type of film or smear formed on the skin were checked.(13).

d) *Removal:* The ease of removal of the cream applied was examined by washing the applied part tap water.(9).

e) *Accelerated stability testing:* The produced compound underwent accelerated stability testing for seven days at room temperature. The formulation was then tested at 40°C plus or minus 1°C for 20 days. The formulations were stored at both room temperature and a higher temperature, and all-day measurements were taken on days 0, 5, 10, 15, and 20 parameters for evaluation (16).

f) *Spread ability test:* Sample was applied between two glass slides and was compressed to uniform thickness by placing 100gm weight for 5minutes. Weight was added to the pan. The time required to separate the two slides, i.e. the time in which the upper glass slide moved over the lower slide was taken as measure of spread ability. (14)

Spread ability =m*l/t

m = Weight tide to upper slide

l = length moved on the glass slide

t = time taken.(11).

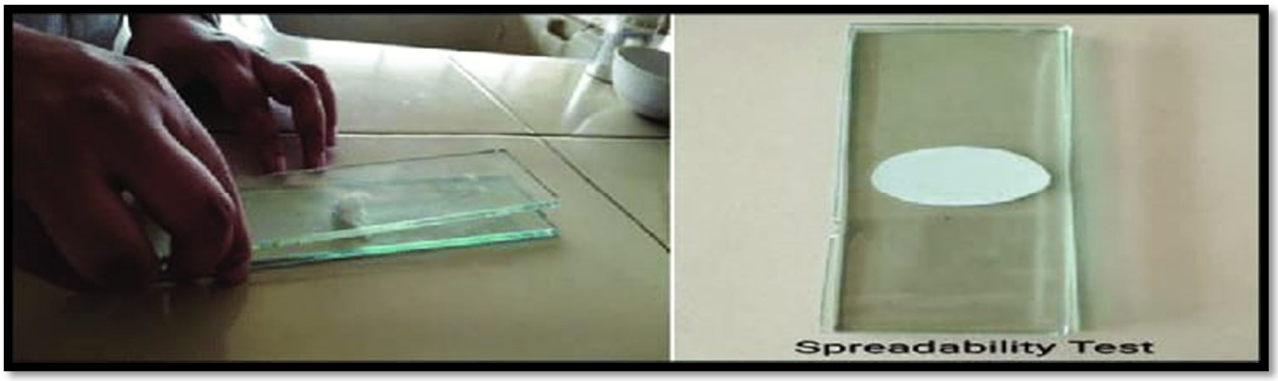

Fig No (8) :- Spreadiability testMicrobial growth test:

By using the streak plate approach, the created cream was inoculated into the plates of Muller Hinton agar media, and a control was created by leaving out the cream. The plates were put in the incubator, where they were left there for 24 hours at 37°C. Following incubation, plates were removed and examined compare it to the control to determine the microbial growth (4).

VIII. RESULTS AND DISCUSSION

A. Physical Evaluation

1) *Appearance:* The appearance of cream was found as viscous .

2) *Colour:* The colour of cream was shiny brown in nature .

3) *Odor:* The odor of cream was mugent and tea accented by sandalwood and musk .

4) *Texture:* The texture of cream was smooth in nature .

B. Viscosity Test

The viscosity of cream was performed and the cream show result 3.21 ns/^{m2}

C. Spreadiability Test

The spreadiability of cream was found to be 3.01

D. Homogeneity

The formulated cream was homogeneous in nature .

E. pH

The pH of formulated cream was found to be 6.4.

IX. CONCLUSION

All four herbal components demonstrated noticeably distinct behaviours. Based on the findings, we may infer that all of the formulations were stable and safe to apply to the skin, with acceptable viscosity and no evidence of phase separation. Additionally, the formulation had no redness, Itching and erythrema .When conducting the irritancy testing, they were simple to clean. The formula read at room temperature, stable.

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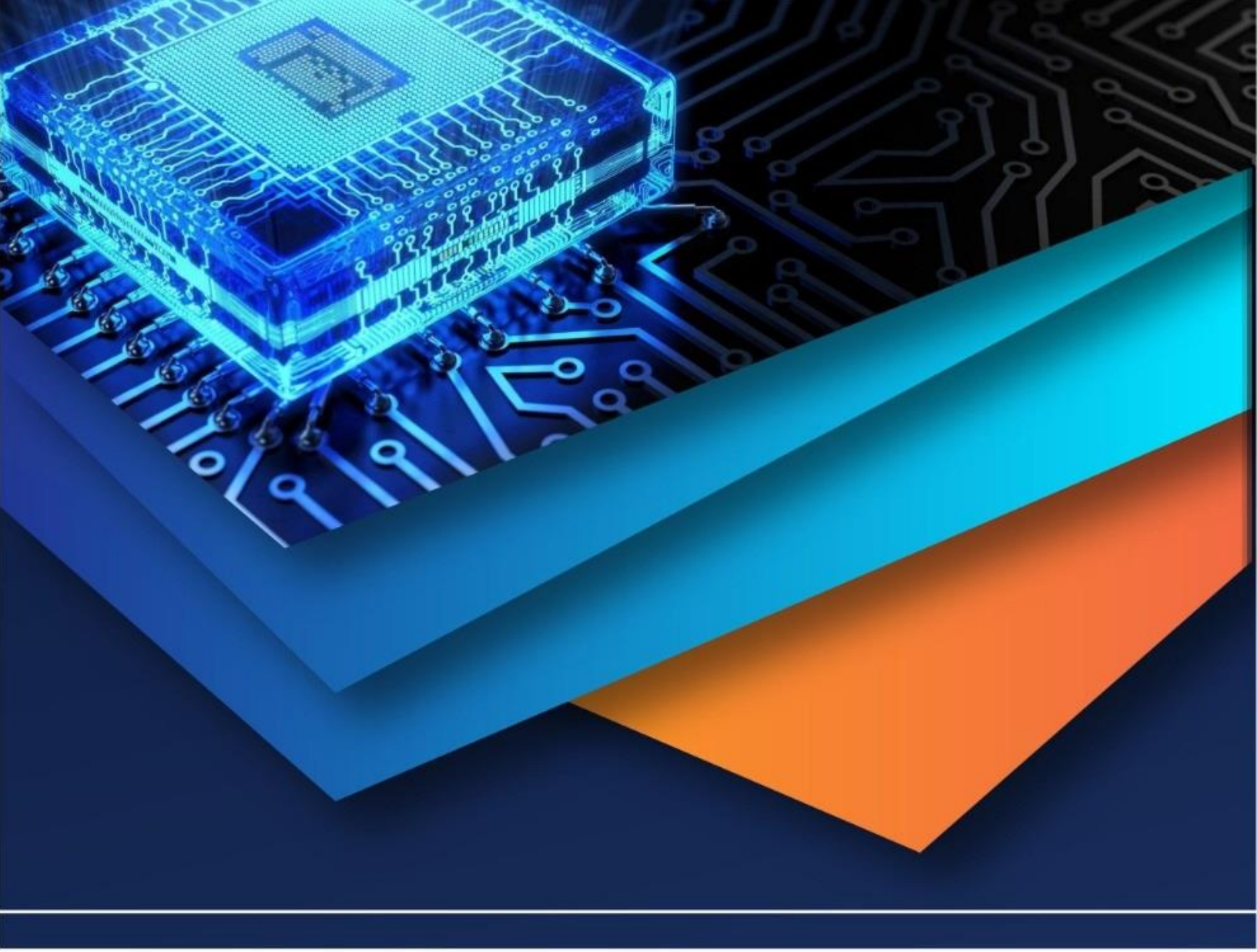

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