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Formulation and Evaluation of Herbal Facewash Preventing Dermatological Problem

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Abstract: ***Facewash is one type of cosmeceuticals as well as semisolid dosage forms used for external purposes. It is applied on the skin surface to protect the skin from various microbial attacks. This type of cosmeceutical is also used to clean different types of skin problems like skin acne, skin pimples, skin rashes, dark circles, black spot, oily skin, skin discolored, etc. In this study, we have formulated one herbal face wash containing different extraction of herbal materials like fresh aloevera gel, leaves of neem, turmeric, lemon juice, Fresh leaves of Tulsi, fresh pudina leaves, Chandan, liquorice, Honey, Coffee, Multani mati, rose water as well as various types of excipients like sodium CMC, sodium lauryl sulphate, sodium benzoate, glycerol and distilled water. After formulation study we focused the evaluation cum validation of the formulated new herbal facewash like testing of pH ,Spreadability test, foam forming test, etc.***

Keywords: Face Wash, Acne, Pimples, Rashes, Cosmetics

I. INTRODUCTION

Natural product are having thereown importance as they contain various kinds of actives cum rich pharmaceutical ingredients like Alkaloids, Glycosides, Tannins, Fibers, Resins, Flavonoids etc. Natural ingredients are showing important chemical properties like Antimicrobial, Antifungal, Antibacterial as well as another properties. Those ingredients are used for different types of solid as well as liquid dosages forms like Gel, Ointment, Paste, Tablets, Capsule, Syrup, Tincture, Suspension, Emulsion, Suppository etc. Different types of problems of skin as well as full system are 2faced by human. Sometimes microbes can attack the human body. The body needs more immunity to heal it. Some of medication improve the immunity along with other issues. Skin one of the most important and sensible part of human body. Semisolid preparation like Gels are used to protect the skin from harmful UV rays. Different types of skin problems like acne, pimples, rashes are occurred now a days due to abnormal lifestyle. Different semisolid dosage forms improve these situation[1,2,3].

A. Different Types of Skin Problem

TABLE- 1: TYPES OF SKIN PROBLEM

Sl . no	Types of skin problems	Image
1.	Acne:- Acne vulgaris is a skin condition where oil and the dead skin cells clog hair follicles. This is one of the most common skin problem in adults. Acne mainly observe in the face. The main cause of this problem is uncontrol sebum production from sebaceous gland. Another reason is clogging of hair follicles by oil and dead skin cells also some bacterial infection and inflammation cause acne[4].	

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2.	Wrinkles :- Sun-exposed skin such as face ,neck and hands are the most effected by the wrinkles . With out sun exposure pollutants and smoking are also cause wrinkles. Broad-spectrum sunscreen is help by blocking UVA and UVB[5].	
3.	Skin rashes:- Rashes are often itchy , painful and irritated skin on the body. Some variety of causes of skin rashes are bites , chicken pox, drug allergies etc. There are some important type of skin rashes like fleabites, fifth disease, rosacea, impetigo etc[6].	
4.	Dark circles :- Possible causes of dark circles under the eye are little sleep , aging, allergies; Fatigue are the well known cause[7].	
5.	Black spot:- Hyperpigmentation is a skin condition occurred by producing more melanin as usual. There is no need any treatment but people choose treatment for cosmetic reasons[8].	
6.	Oily skin: - Producing too much oily substance known as sebum by sebaceous glands in your skin makes the skin oily . Fluctuating hormones are the health problems of oily skin , environmental factors are humidity[9].	

B. Gel

Gel is very important colloidal preparation,When a liquid medium has become viscous enough to behave more or less as solid. Gel formation process is called gelation. Gel is a solid and semi-solid state of colloidal solution. some examples are jelly, curd, silica.

Types of gel

1) *Elastic Gel:* Gel with elasticity property are known as elastic gel. In words they will return their previous state, by adding water. Elastic gels may be prepared by various substances like starch, gelatine etc.
2) *Non elastic Gel:* These like silica gel and prepared by proper chemical process. These are also reversible like elastic gel[10].

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II. MATERIAL AND METHODOLOGY:

A. Collection of Herbal Components

Neem , aloe vera ,Tulsi, pudina leaf were collected from the local place , and the other components like turmeric , lemon , Chandan , liquorice , honey , coffee , Multanimati ,Rose water were collected from local market .

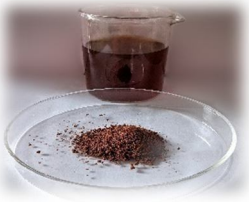
B. Collection of Chemical Components

Sodium CMC, Glycerol, Sodium benzoate, Sodium lauryl sulphate were collected from chemical market .

TABLE- 2: HERBAL AND CHEMICAL COMPONENT DETAILS

Sl. No.	Plant Name	Chemical Constituent	Activity	Plant parts with extractive
1.	Neem *(Azadirachta indica)* Family:Meliaceae Plant part :- leaf	Ninbin, azadirachtin ($C_{35}H_{44}O_{16}$)	Antibacterial property , treats acne, and protects the skin from external aggregates[11].	
2.	Turmeric *(Curcuma longa)* Family :-Ginger Plant part :- Root and rhizomes	Curcumin($C_{21}H_{20}O_6$), Zingiberene ($C_{15}H_{24}$)	Anti-inflammatory agent ,reduce scarring, lightning anti wrinkle , wound Heald[12].	
3.	Aloevera *(Aloe barbadensis Miller)* Family :- Asphodelaceae Plant part :-leaf	Aloin($C_{21}H_{22}O_{9)}$, aloe emodin	Antibacterial and anti-inflammatory properties, cooling effect on rashes and sunburns[13].	
4.	Lemon *(Citrus limon)* Family :-Rutaceae Plant part :- juice	Limonene($C_{10}H_{16}$) ,linalool($C_{10}H_{18}O$)	Containing vitamin C an antioxidant, reduce skin damage and premature aging for high PH level can reduce oil from the skin[14].	
5.	Tulsi *(Ocimumteuiflorum)* Family :- Lamiaceae Plant part :- leaf	Eugenol($C_{10}H_{12}O_2$),Estragole($C_{10}H_{12}O$)	Antifungal, anti-inflammatory, anti bacterial properties facilitates to purify blood and remove toxins, prevents appearance of acne and pimples[15].	

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6.	Pudina *(Mentha)* Family :- Menthaceae Plant part :- leaf	Menthol($C_{10}H_{20}O$), Eucalyptol ($C_{10}H_{18}O$)	Gives soothing effect, hydrates the skin, treats acne, prevent wrinkles and fine lines[16].	
7.	Chandan (*Santalum album*) Family :-Santalaceae Plant part :- Wood powder	Alpha- santalol, beta-santalol	Helps to nourish the skin , improve the elasticity of skin cells, reduce scars, anti-tanning and anti-aging property, pimple and acne treatment[17].	
8.	Liquorice *(Glycyrrhiza glabra)* Family :- Leguomes Plant part :- Root and rhizomes	Glycyrrhizin, Liquiritin	Have a soothing effect,and ease inflammation[18].	
9.	Honey *(Apis mellifera)* Family :-Apidae	Glucose($C_6H_{12}O_6$), Fructose($C_6H_{12}O_6$)	Containing anti-bacterial, anti-inflammatory and humectant properties, prevent acne and inflammation[19].	
10.	Coffee *(Coffea)* Family :- Rubiaceae Plant part :- Seed powder	Caffeine($C_8H_{10}N_4O_2$), Chlorogenic acid($C_{16}H_{18}O_9$)	Clear away dead skin cells, unclog the pores, chologenic acid reduce inflammation, anti-aging benefits, acne treatment and dark circle[20].	
11.	Multani mati *(Bentonite clay)*	Hydrated aluminium silicates , Magnesium chloride	It is a natural cleanser, acne-fighter , sebum controller and skin rejuvenating agent[21].	
12.	Rose water *(Rosa damascena mill L)*	Geraniol($C_{10}H_{18}O$), Citronellol ($C_{10}H_{20}O$)	Removes excess oil and impurities, reduce black heads , acne scars and black spots[22].	

13.	Sodium carboxymethyl cellulose	--------	As gelling agent	
14.	Sodium benzoate	-------	As preservative	
15.	Glycerol	--------	As humectants	
16.	Sodium lauryl sulphate	----------	As foaming agent	

C. Extraction of Different Herbal Drugs or Components

At first the plant parts are collected and cleaned with fresh water to remove dust

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Then the raw plant were placed in hot water(40-50^{0}C) to free from any bacteria which may be present on the surface

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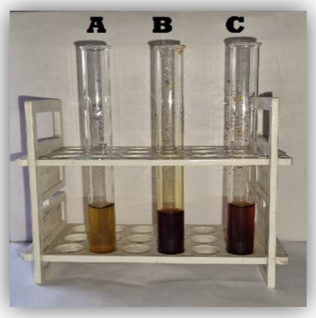
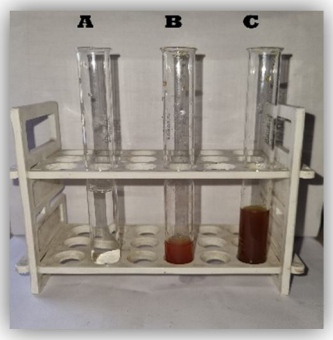
After dying weighed properly and extracted by the maceration method by using distilled water as a solvent

↓

Then The acquired extracts were filtered using filter paper.

D. Screening of Plant Extract

TABLE NO. 3:- LIST OF SCREENING OF EXTRACTED COMPONENTS

Sr.no.	Ingredients	Reactions	Observation	Image
1.	Neem	0.5g ofthe extract was added in HCL. After dissolving it was filtered using filter paper and 2 ml of the filtrated was treated with dragendroff'sreagent (a solution of potassium bismuth iodide)	Red precipitate was formed and indicated the presence of alkaloid. A= Plant extract B= reagent C= Observed result	
2.	Turmeric	1 or 2 ml of extract was added with wagner's reagent (dissolving 2 gm of iodine and 6 gm of potassium iodide in 100 ml of distilled water).	Reddish brown precipitate shows the presence of alkaloids. A= Plant extract B= reagent C= Observed result	
3.	Aloe vera	2 ml of acetic anhydride + 2 ml of H_2SO_4 were added to 5 ml of extract	The colour was changed from blue to violet and indicated the presence of steroids. A= Plant extract B= reagent C= Observed result	
4.	Lemon	5 ml of lemon juice was dissolved in distilled water at 100^0C and add 6% of ferric chloride solution .	A green precipitate was observed and shows the presence of tannins. A= Plant extract B= reagent C= Observed result	

5.	Tulsi	5mg extract added with 0.5 ml of ferric chloride solution	Formation of blackish precipitate shows the presence of tannins. A= Plant extract B= reagent C= Observed result	
6.	Pudina	2 ml of chloroform and concentrated H_2SO_4 were added with the extract.	Formation of a red colour shows the directed the presence of steroids. A= Plant extract B= reagent C= Observed result	
7.	Liquorice	80% H_2SO_4 treated with powder of the drug.	Orange yellow is observed for transformation of flavoneglycoside liquiritin tochalcone glycoside isoliquiritin. A= Plant extract B= reagent C= Observed result	
8.	Honey	Few drops of honey put into a solution of vinegar-water.	The mixture is not foaming and shows that the honey is real. A= Plant extract B= reagent C= Observed result	
9.	Coffee	1 ml of extract added with 5% of ferric chloride solution.	A bluish black colour directed the presence of phenolics. A= Plant extract B= reagent C= Observed result	

E. Formulation Study

We have formulated the face wash gel where the extract of Neem, aloevera, Tulsi, pudina, turmeric gives anti-bacterial and anti-inflammatory property. Sodium CMC was used as gelling agent. Glycerol was used as humectant. Sodium benzoate was used as preservative and sodium lauryl sulphate was used as foaming agent. Lemon gives antioxidant property for vitamin C. Chandan gives anti-tanning and anti-aging property. For soothing effect liquorice was added, honey also have anti-bacterial and anti-flammatory property, coffee also give anti-aging property. Multani mati was sebum controller and natural cleanser and rose water was for remove impurities and black heads.

Table NO. 4:- Formulation Table For Herbal Face Wash

Sr. no.	Name of Ingredients	Quantity for 100 gm.
1.	Neem extract	10 %
2.	Turmeric extract	5 %
3.	Aloe veraextract	10 %
4.	Lemon	5 %
5.	Tulsi extract	10 %
6.	Pudina extract	10 %
7.	Chandan	1 %
8.	Liquorice extract	5 %
9.	Honey	2 %
10.	coffee	0.1 %
11.	Multani mati	2 %
12	Rose water	30 %
13.	Sodium CMC	10 %
15.	Glycerol	5 %
16.	Sodium benzoate	1 %
17.	Sodium lauryl sulphate	2%

III. EVALUTION

1) *Appearance:* The appearance of the formulation was examined visually for various parameters.
2) *Colour:* Colour was checked out against a white background, pale yellow colour to be observed by visual examination.
3) *Odour:* Odour found to be characteristics by smelling it.
4) *Consistency:* Consistency was checked by applying on the skin, found to be smooth.
5) *Greasiness:* Greasiness was analysed by applying on the skin.
6) *pH:* pH of 1% aqueous solution of the formulation was measured by digital pH meter . pH of the formulation was 6.64
7) *Washability:* The product was applied to the skin and washed with running water. After few minutes the formulation was washable with water.
8) *Homogeneity:* The formulation put into a container. Homogeneity was cheeked out by visual examination and found that all the particles of each are uniformly distributed.
9) *Spreadability*[23] *:* The formulation is easily spreadable on face.

$$\text{Spreadability} = m*\frac{l}{t}, \text{ where, m = weight to the upper slide (10 gm.)}$$

l = length of the glass slide (7.5cm.)

t = time in sec (7.8 sec.)

$$\text{So, Spredability} = \frac{10\times7.5}{7.8} = 9.5\text{gm.cm/sec}$$

10) *Skin Irritability Test:* Formulated sample shows no irritation, inflammation, skin redness when applied on skin during study.

11) Stability Study

Table NO. 4:- Stability Study Data

Sl. No.	Parameter	Observation			
		Initial	10 Days	20 Days	30 Days
1.	Colour	Yellow	Yellow	Yellow	Yellow
2.	Odour	Characteristic	Characteristic	Characteristic	Characteristic
3.	Consistency	Semi-solid	Semi-solid	Semi-solid	Semi-solid
4.	pH	6.64	6.6	6.56	6.5
5.	Spreadability	Easily spreadable	Easily spreadable	Easily spreadable	Easily spreadable
6.	Wash ability	Good	Good	Good	Good
7.	Grittiness	No gritty particles	No gritty particles	No gritty particles	No gritty particles
8.	Foam ability	Good	Good	Good	Good
9.	Skin Irritability Test	No	No	No	No

IV. RESULTS AND DISCUSSION

After 1 month study the appearance of the face wash maintained its colour and homogeneity. Any face separation did not observed in the formulated facewash. On the other-hand the pH of the facewash is also stable. The formulated facewash was screening a positive activity on different kinds of human pathogen like E.coli (-ve) and S.aureus (+ve). Subsequently they did not harvest any microbial growth when it was placed in the agar medium, the facewash as free of microorganisms. This is a fully herbal facewash and did not hold alcohol. Aloe vera, Neem, Turmeric and other herbal extracts shows their antifungal, antimicrobial and anti-inflammatory characteristics on the other hand Liquorice(Glycyrrhiza glabra), Honey and pudina shows there soothing and nourishing effect. For various facewash concentrations amount, the agar diffusion method was used to regulate their antibacterial activity. For E. coli (-ve), the zone of inhibition was found to be 8 mm for 50 µl, 11 mm for 100 µl, 18 mm for 150 µl, and 20 mm for 200 µl, respectively. For S. aureus, the zone of inhibition was found to be 5 mm for 50 µl, 10 mm for 100 µl, 13 mm for 150 µl, and 15 mm for 200 µl, respectively. These findings demonstrated the significant antibacterial activity of the herbal facewash.

A. Result of Antibacterial Study

Table no. 5:- amount of sample vs zone of inhibition table

Organism	Zone of Inhibition (mm)			
	50 µl	100 µl	150 µl	200 µl
E.coli(-ve)	6 mm	10 mm	15mm	18 mm
S. aureus(+ve)	5mm	8 mm	12 mm	15mm

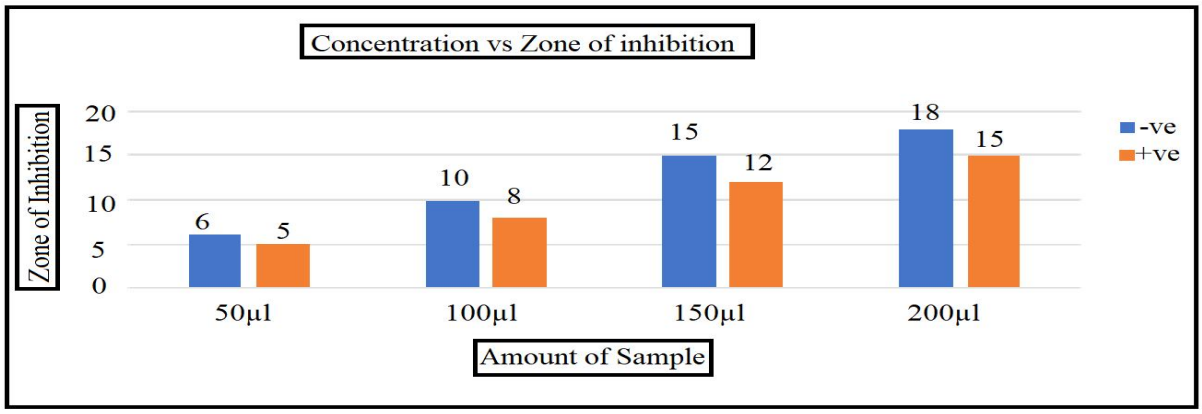


Figure 1: Amount Of Sample Vs Zone Of Inhibition

V. CONCLUSION

In this study, the active components of several extracts were united to create an efficient formulation for herbal facewash.
The facewash is fully alcohol free. Aloe vera, Neem, Turmeric, Tulsi and other extracts were used in the present research for their potential anti-bacterial characteristics. The zone of inhibition findings provided additional proof that this herbal facewash is microbes free. It can treat different types of skin disease as well as Lemon works as an antioxidant which is essential for glow of skin and it works as an anti-ageing agent. Multani mati is a natural scrubber. Honey works as a soothing agent and nourish the skin layer. Through the above test it is proved that the product can definitely provide a better and healthy skin. It is absolutely safe and alcohol free. The natural herbs works properly and it is shown that the natural ingredients used in this facewash have individual and specific therapeutic and pharmacological effect on the human skin.

VI. ACKNOWLEDGEMENT

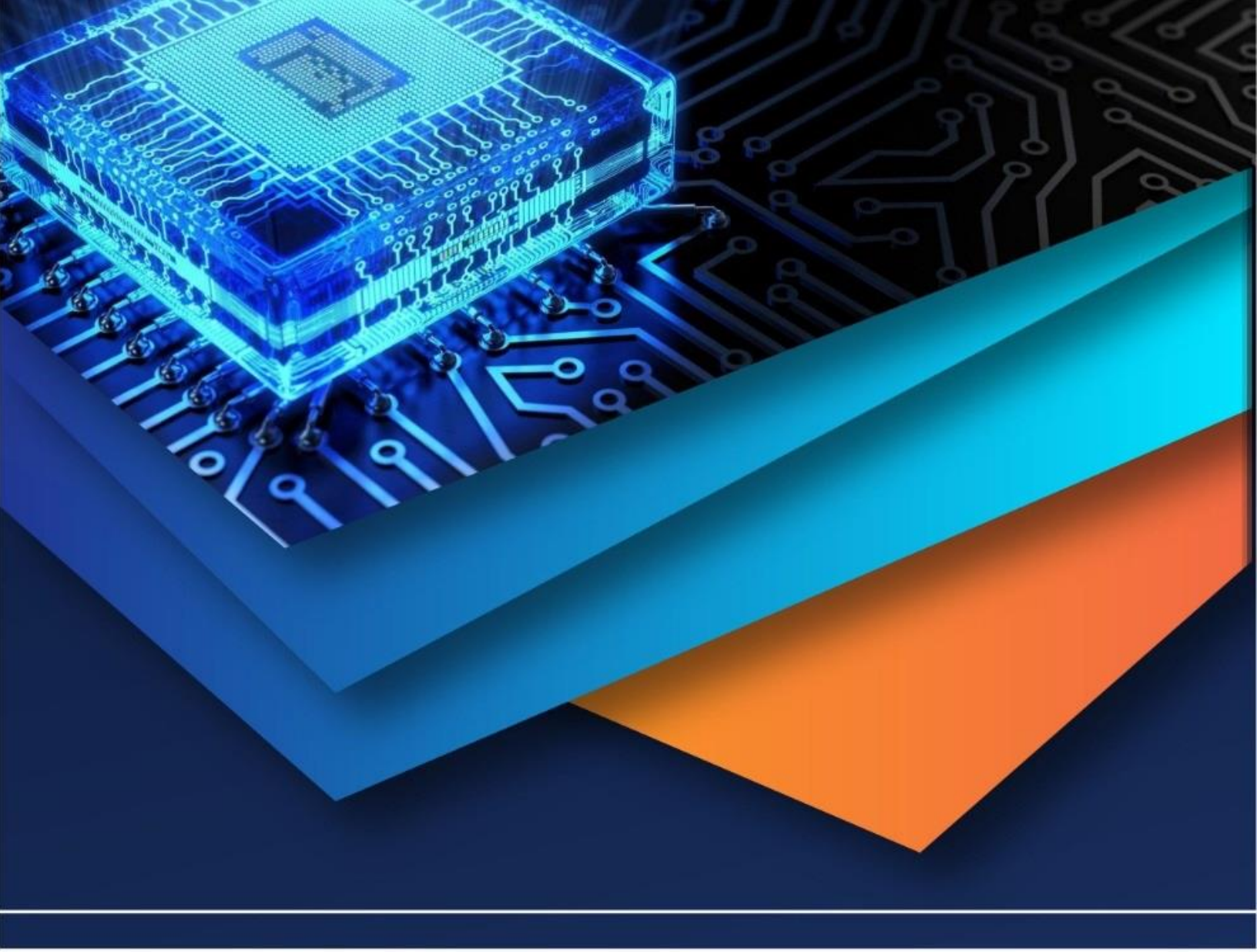
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A. Conflict Of Interest

Nil

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