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Ethnobotanical Survey on Toxic Plants in Feroke Municipality, Kozhikode District, Kerala

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Abstract: ***A total of 23 poisonous plants were reported in Feroke, Kozhikode District, Kerala, which belonged to 23 different genera under 13 families. The most dominant one was the poisonous family Apocynaceae. Regarding the habit, it was found that out of the 23 species studied, there were 4 herbs, 8 shrubs, 6 trees and 5 climbers/twiners. The poisonous parts of majority of plants identified were leaves, seeds, etc. Poisonous plants in small quantities itself can cause harm to living organisms Present investigation is to identify the morphological character and poisonous effect of selected but commonly available plants in Feroke, Kozhikode District, Kerala.***

Keywords: Poisonous plants, morphology, toxicity, chemical substances

I. INTRODUCTION

Plant toxins are substances produced as secondary metabolites by plants. Plants contain an outsized number of biologically active chemicals. Some of these are found to be extremely useful for treating various human and animal diseases. However, some plant constituents produce adverse health effects following exposure. The onset of these adverse effects can be quite sudden or take some time to develop and also there are relatively few plants that when ingested caused acute life threatening illnesses (Ogori Akama, 2019). The term "poisonous" designated much kind of ill effects. Among the key effects are allergic reactions, skin rashes or dermatitis and internal poisoning or irritation etc. The diagnosis of plant poisonings can be difficult. The substances liable for poisonings or toxic reactions originate from many various pathways within plants. However, most poisonous principles are considered to be secondary metabolites or by-products from the essential functions of the plant (Chandra Sekhar, 2012).

Poisonous plants were discovered in ancient times mostly by the trial and error methods of tribes. Ayurvedic, Siddha and Unani are alive in India from past. Siddha system is capable of treating all kinds of diseases by using poisonous plants (Gupta and Sharma, 2017).

Although there are many theories as to why plants produce these non-essential compounds. One of the key theories maintains that plants have evolved to supply these compounds so as to discourage animals from grazing on them and to stay insects from eating them. Poisonous plants have a seed, root, leaf, stalk, fruit or juice (latex/sap) where even a relatively small amount either taken or administered can harm to the human body. In some plants, the poisonous constituents occur throughout the entire plant. Toxicologically significant plant chemical constituents includes; alkaloids, glycosides, oxalates, phytotoxins, resins, terpenes, phenolics etc (Muenscher, 1965).

The objectives of present studies were, to identify the poisonous plants found in study area, to conduct detailed studies regarding the poisonous effects of those plants and to study the toxicity of the poisonous plants based on available literature.

II. MATERIALS AND METHODS

A. Study Area

The study was conducted in the Feroke Municipality of Kozhikode district, Kerala. The total area is 15 Km2. Located at 11.1735° N latitude and 75.8352° E longitude. Feroke is a crucial place with beautiful natural vegetation, situated on the bank of the River Chaliyar, near Kozhikode. The Western Ghats covers most of the world enhancing the scenic great thing about the place. The Western Ghats section, 14 km long with nine hairpin curves amidst hills and forests is a fascinating region.

Study area is blessed with diversified habitats like lush paddy fields, hills, highlands and different crop plantations. This area gets rain from two monsoon seasons, the south-west monsoon and therefore the north-east monsoon. The North-East monsoon season is during October to November. Pre-monsoon rains during March to May are amid thunder and lightning; the very best rainfall during this era in December. January and February are cooler, while March, April and should are warmer. The temperature ranges between 38.5 °C and 15°C.

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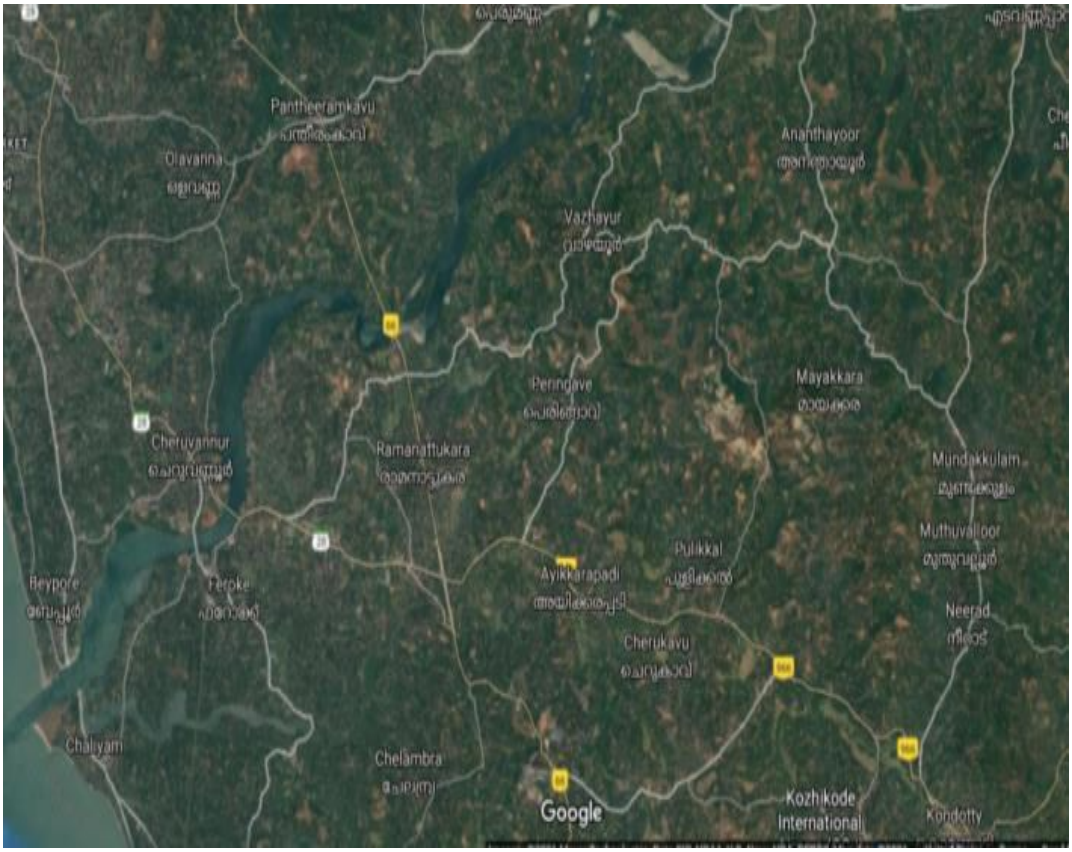

III. METHODOLOGY

A. *Collection and Identification of Plants*

All plants under study were present in Feroke, Kerala. Twenty three poisonous plants were identified.

B. *Study of Morphological character*

Some of the identified poisonous plants were selected for study and each of their morphological characters like habit, habitat, arrangement of leaves, inflorescence, flower characters, etc. were observed and recorded.

C. *Interview and Reference Method*

For collecting information about the poisonous activities of the chosen plants standard questionnaire method and private interview was conducted with some experienced people.
Secondary data was collected from the journals.

IV. RESULTS

A total of 23 poisonous plants were reported in the study area, which belonged to 23 different genera under 13 families (table 1). The most dominant one was the poisonous family Apocynaceae (table 2), represented by 6 species, followed by Euphorbiaceae (5 sp.) and Fabaceae (2 sp.). All the other 10 families were represented by 1 species each. Regarding the habit, it was found that out of the 23 species studied, there were 4 herbs (table 3), 8 shrubs, 6 trees and 5 climbers/twiners. The plants studied were found to cause more than 35 disorders/ ailments/problems, some of which were life threatening. It was the toxic ingredients found in the leaves, stem, root, seeds or latex which were causing these problems. Minor touch or proximity may induce some problems, while in majority of cases they were caused by accidental or purposeful ingestion (suicidal/ murder attempts) of the plant parts.
The need for transferring this knowledge to the community is the need of the time, to make them aware about the toxic plants seen around them and to take precautionary or remedial/ first aid measures and other medications, if accidentally affected by the toxins.

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Table 1. List of poisonous plants showing local name, family, habit, toxic part and toxin and clinical findings

Sl. No	SCIENTIFIC NAME	LOCAL NAME	FAMILY	HABIT	TOXIC PART	TOXIN	CLINICAL FINDINGS
1	*Abrus precatorius*	Kunni	Fabaceae	Climber	Seed	Abrin	Vomiting, diarrhea
2	*Allamanda cathartica*	Manjakolambhi	Apocynaceae	Climber	Bark, leaves, fruit, seeds, and sap	Plumericin	Abdominal crampingand diarrhea
3	*Bryophyllum pinnatum*	Ilamulachi	Crassulaceae	Herb	Leaf	Steroid&Phenantherene	Cardiac problem, reduction of bronchiolar diameter
4	*Calotropis gigantea*	Erikku	Asclepiadaceae	Shrub	Latex	Calcium oxalate crystals	Burning sensation of lips and mouth
5	*Catharanthus roseus*	Savanari	Apocynaceae	Herb	Whole plant.	Vinca alkaloids, Colchicine.	Abdominal pain, bone marrow suppression
6	*Cerbera odollam*	Odollam	Apocynaceae	Tree	Whole plant	Cardiac glycosides, Cerrin	Vomiting, Irregular heartbeat
7	*Datura stramonium*	Ummam	Solanaceae	Shrub	whole plant	Atropine, Scopolamine and other alkaloids.	Dry skin, Blurred vision
8	*Dieffenbachia seguine*	Dumb plant	Araceae	Herb	Whole plant	Oxalic acid, Asparagine.	Intense pain, inflammation
9	*Duranta erecta*	Sky flower	Verbenaceae	Shrub	Leaves and berries	Saponins	Drowsiness, vomiting
10	*Euphorbia tirucalli*	kodikalli	Euphorbiaceae	Shrub	Latex	4-deoxyingenol	Gastrointestinal injury, blindness
11	*Excoecria agallocha*	Kannampotti	Euphorbiaceae	Tree	Latex, leaves	Terpenoids, Flavanoids, Alkaloides	Blindness, irritation to eye
12	*Ficus benjamina*	Weeping fig	Moraceae	Tree	Plant sap	Furocoumarins, Ficin, Triterpines	Itching of eyes, cough, skin irritation
13	*Gloriosa superba*	Glory Lily	Liliaceae	Climber	Whole plant	Colchicine	Abdominal pain

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14	*Holigarna arnottiana*	Cheru	Anacardiaceae	Tree	Latex	Coumarines, Saponins, Tannins,Flavonoids	Skin rash and dermatitiis
15	*Manihot carthaginensis*	Rubber tree	Euphorbiaceae	shrub	Leaf	Hydrocyanic acid	Severe nephrotoxicity
16	*Mimosa diplotricha*	Anathottavadi	Fabaceae	Climber	Whole plant	Mimosine	Severe nephrotoxicity
17	*Nerium oleander*	Arali	Apocynaceae	Shrub	Whole plant	Glycosides, Oleandrin, Neriine	Vomiting, heart block
18	*Parthenium hysterophorus*	Carrot grass	Asteraceae	Herb	Pollen	Parthenin	Dermatitis and respiratory malfunction
19	*Rauvolfia tetraphylla*	Pambumkolli	Apocynaceae	Shrub	Root and Leaf	Rauvolfine Reserpine	Nausea, itching and skin rash.
20	*Ricinus communius*	Aavanakku	Euphorbiaceae	shrub	Seed	Ricin	Diarrhea, bdominal pain
21	*Strychnos nux-vomica*	Kanjiram	Loganiaceae	Tree	Seed	Strychnine	Nervousness, restlessness
22	*Thevetia peruviana*	Manja-arali	Apocynaceae	Tree	Seed	Thavetin A, Thevetin B and Peruvoside	Cardiovascular abnormalities
23	*Tragia involucrata*	Kodithoova	Euphorbiaceae	Tree	Leaf	Flavonoids, Saponins	Burning and inflammation

Table 2. Represention of Families and Number of Plants

SL.NO	FAMILY	NO.OF PLANTS
1.	Apocynaceae.	6
2.	Euphorbiaceae.	5
3.	Fabaceae.	2
4.	Asclepiadaceae.	1
5.	Solanaceae.	1
6.	Araceae.	1
7.	Verbenaceae.	1
8.	Crassulaceae	1
9.	Moraceae.	1
10.	Liliaceae.	1
11.	Anacardiaceae.	1
12.	Asteraceae.	1
13.	Loganiaceae.	1

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Represention of Families and Number of Plants

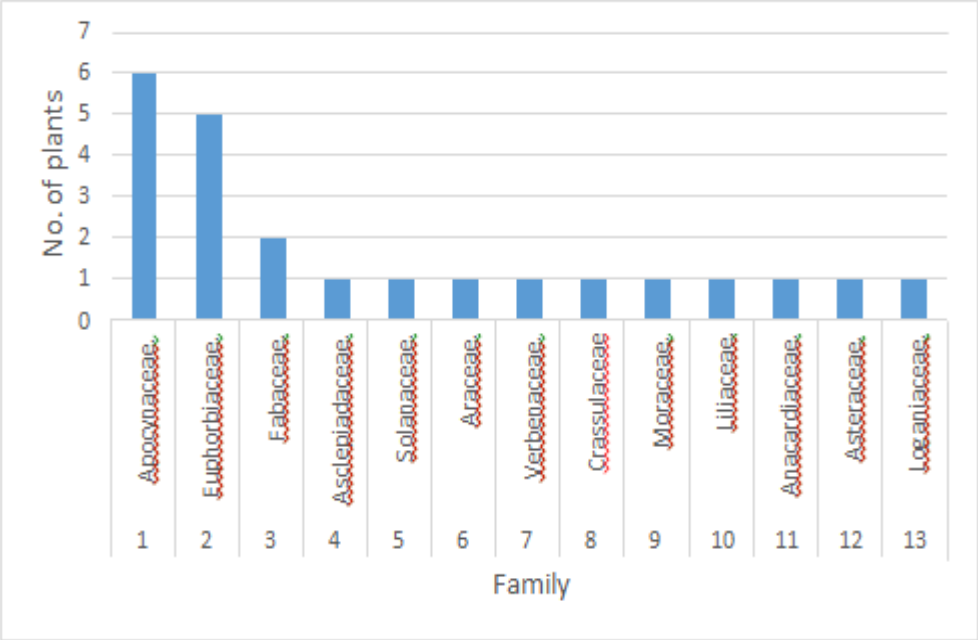

Table 3. Representatin of Plant Habit

HABIT	NO. OF SPECIES
Trees	6
Herbs	4
Shrubs	8
Climbers/ twiners	5

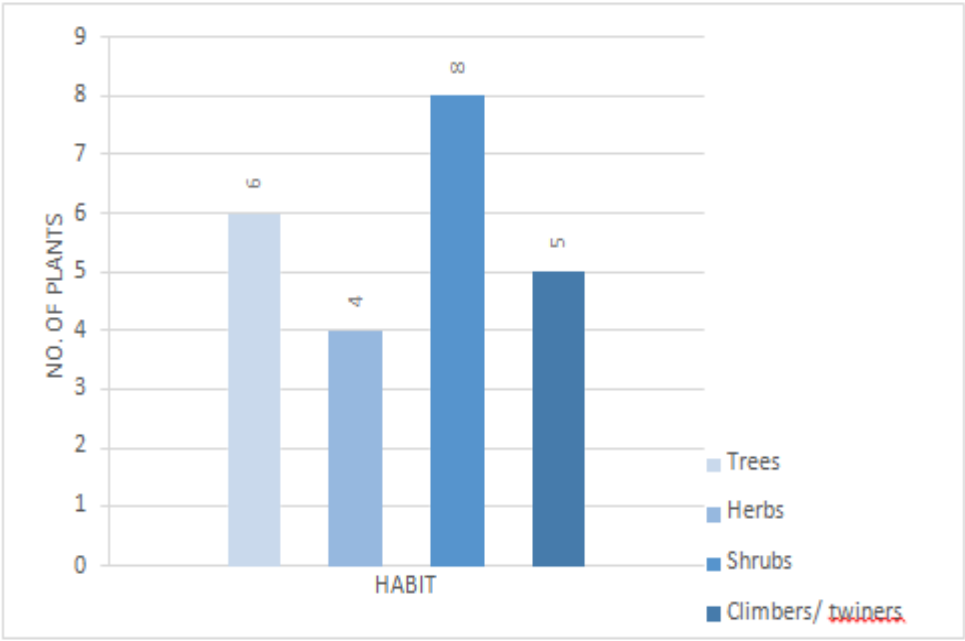

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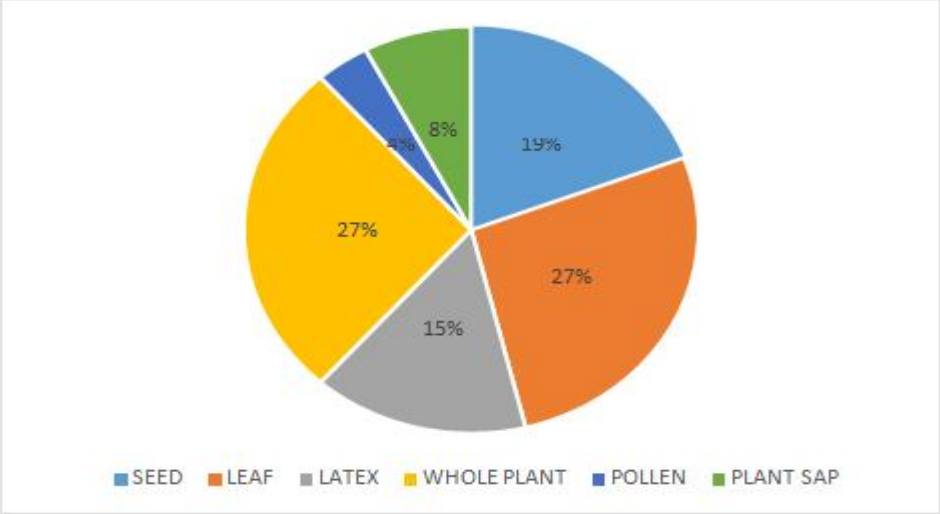
Table 4. Reperesentation of Plant Parts Used

Sl.	TOXIC PART	NO. OF PLANTS	PERCENTAGE(%)
1	Seed	5	19
2	Leaf	7	27
3	Latex	4	15
4	Whole plant	7	27
5	Pollen	1	4
6	Plant sap	2	8

Representation of Plant Parts Used



V. DISCUSSION

A total of 23 poisonous plants were reported in the study area, which belonged to 23 different genera under 13 families. Similar types of studies were conducted and result was also obtained by other researchers. 46 species of poisonous plants belonging to 25 families are identified and recorded (Mendhe *et al*., 2015). Highest number of various 8 poisonous species recorded was from Euphorbiaceae, followed by Papilionacea and Solanceae, each with 4 species of poisonous plants. The poisonous parts of majority of plants identified were latex, fruits, seeds, corm, bulb and leaves.

A study on 5 poisonous plants belonging to 4 families have been identified and recorded (Anju and Mary, 2014). The plants were, Datura stramonium, Diffenbechia picta, Caladium bicolor, Laportea interrupta and Asparagus officinalis. Among the families, Araceae is dominant with 2 species, followed by Solanaceae, Utricaceae and Asparagaceae, each with 1 species of poisonous plants. In most of the plants, whole part is identified as poisonous.

A study on 7 poisonous plants belonging to 6 different families have been recorded (Jaya and Gopalan, 2015). Among them, liliaceae is dominant with 2 species, followed by solanaceae, Loganiaceae, fabaceae and utricaceae and Apocynaceae, each with 1 species. The poisonous parts of majority of species were root, berry, bark, leaves and seeds, fruit. In some plants, whole plant is toxic.

A study on 483 species belonging to about 79 families have been recorded (Joao Pessoa, 2017). Of these, 466 species corresponding to about 96.5% are recorded by their medicinal use, eight as both medicinal and poisonous and 27 as only poisonous. The floristic diversity observed is dominated by higher plants with just one species, Selaginella convoluta, belonging to the Ferns was reported. A study on 28 poisonous plants belonging to 14 different families have been recorded (Katewa, 2008). The poisonous parts of majority of species were seeds, latex and roots. Besides these, poisonous parts of some plants were fruit, stem bark, tubers or bulbs and sometimes whole plant also.

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VI. CONCLUSION

A total of 23 poisonous plants were reported in the study area, which belonged to 23 different genera under 13 families. The most dominant one was the poisonous family Apocynaceae. Regarding the habit, it was found that out of the 23 species studied, there were 4 herbs, 8 shrubs, 6 trees and 5 climbers/twiners. The plants studied were found to cause more than 35 disorders/ ailments/problems, some of which were life threatening. It was the toxic ingredients found in the leaves, stem, root, seeds or latex which were causing these problems. One red listed plant is identified from study area. *Gloriosa superba* is categorized as critically endangered species in Karnataka state. The need for transferring this knowledge to the community is the need of the time, to make them aware about the toxic plants seen around them and to take precautionary or remedial/ first aid measures and other medications, if accidentally affected by the toxins.

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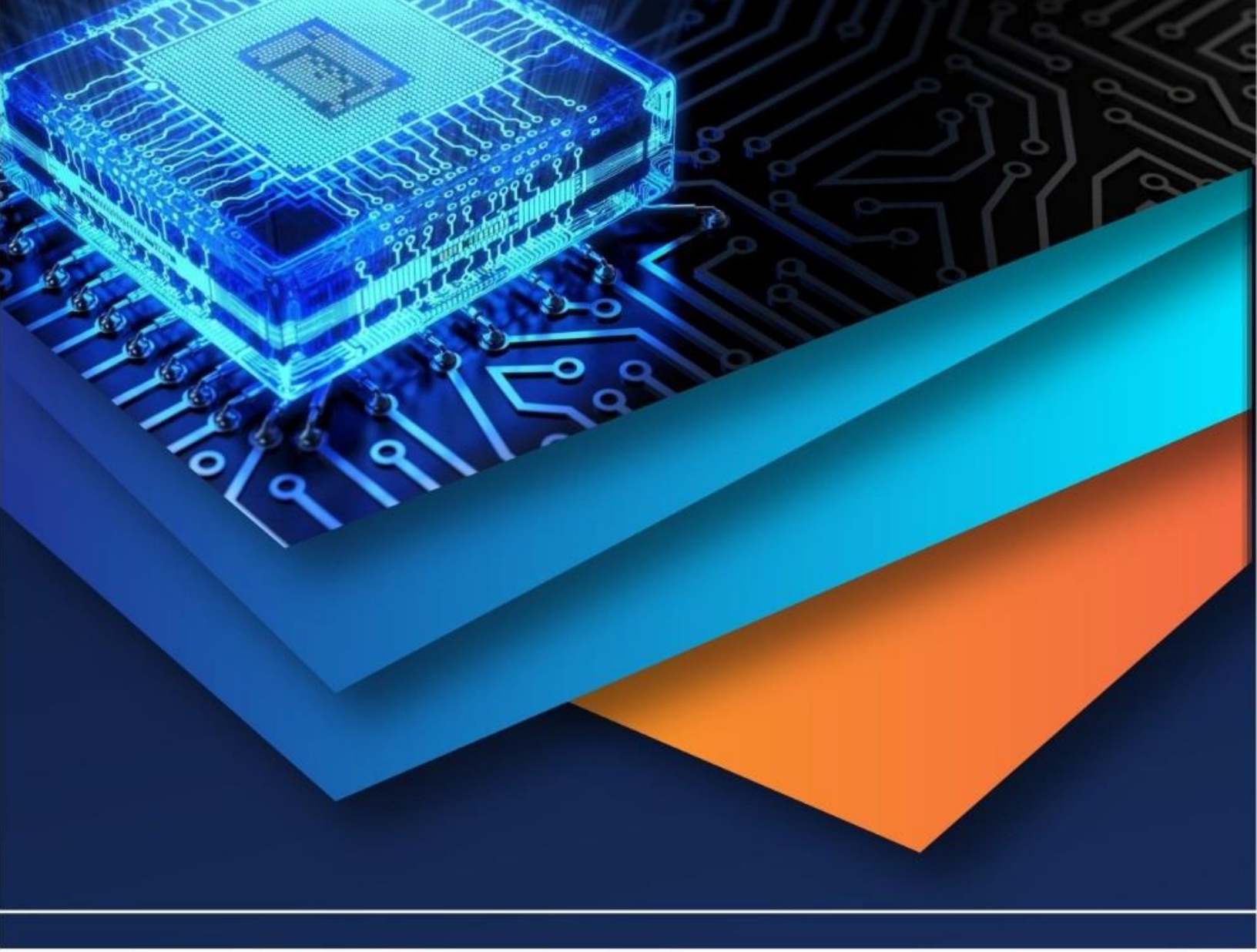

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