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Water Quality of IRIL River

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Abstract: ***The physico-chemical and biological analysis of water carried out of the river over a stretch of about 22.5km. Temperature, transparency, pH, dissolved oxygen, biological oxygen demand, carbon dioxide, chlorides, total hardness, NO_2 and NO_3 etc. increased slightly from the upstream to down stream of the river. This increase in the parameters was the result of human activities. A total twenty six species of fish and seven group of aquatic insects were recorded during the investigation period.***

Keywords: Physico-chemical, parameters, Iril River, aquatic insects.

I. INTRODUCTION

Rivers are the veins of land with cultural and economical significance and monitoring and maintenance of river in this presence scenario is of primary importance. The river water is being utilized for drinking and irrigation purposes. Water quality in Imphal valley is not satisfactorily, heavily contaminated as rivers are exposed to domestic and industrial effluent. Since water pollution is very essentially a biological phenomenon, the degree of pollution can be estimated either from physical and chemical characteristics or from biological properties of water. The present paper includes biological estimates, their taxonomic composition along with chemical assessment of the Iril River water. The river is one of the most important big meandering feeder of Imphal river start from Lakhamai village of Poumei Naga (Senapati District) situated along the bank of the River. The river runs through Saikhul, Sagolmang areas and flows through Lamlai, Top, Naharup, Pangong and Irilbung respectively in Imphal East District before it joins with Imphal River at Lilong. It is fed with fresh water from the streams very clear. The water supplies plant located in Porompat, Imphal East District. The Iril River recorded a large population of indigenous fish particularly Labeo bata (Ngaton), Osteobrama belangeri (Khabag), Wallagu attu (Sareng) etc. were captured by local fisherman mostly in the month of July and August, floating of dead fishes were also observed during rainy season on the water surface simultaneously, present number of such fishes declined thus the present work has been established.

II. MATERIALS AND METHODS

The present study area concentrated on Iril River on the objective of fish diversity, quality of riverine ecology in relation to fishery status with the change chemical elements. The samples were collected from January to September, 2019 in PVC & BOD bottles during four seasons i.e. winter, pre-monsoon, monsoon and post monsoon. Thirty six samplings were performed on every month. Sample were collected from the sampling sites (1) Lilong, (2) Irilbung, (3) Pangong and (4) Naharup etc. stretching of 22.5Km. Water samples were analysed for pH, temperature, transparency, dissolved oxygen, BOD, total alkalinity, acidity, chloride, nitrite and nitrates etc. after the standard procedure APHA (1995). Fishes were analysed after Shrestha (1981), Jhingran (1985), Vishwanath (2002). While aquatic insects were analysed after Ward and Wipple (1964).

Fig. 1: Representation Map of Study Area (Iril River)

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III. RESULT AND DISCUSSION

In the present study as is evident from (Table-1) in general, the Iril water was nearly neutral in reaction with a mean pH range from 6.5-8.5 and with mean total alkalinity varying from 40-100mg/l. Analogous variations in alkanities were reported by Goel etal (1985). Upper stretch of the river Iril showed lower value of total alkalinity than lower stretch.

Concentration of dissolved oxygen was favourable for aquatic production 5-9 mg/l recorded comparatively lesser value than the down stream.

Lower value of D.O increase bacteria, Garge *etal* (2005). The concentration recorded in the present study showed satisfactory for survival of aquatic fauna. Biochemical oxygen demand concentration were recorded 1-5mg/L. whereas 1-2mg/L. is good for aquatic flora and fauna, CPCB (2003) BOD level 6-9mg/L in considered somewhat polluted Singh. N (2017). The present value showed the river water below the optimum level increase then comparatively good for fish.

Free carbon dioxide content in water recorded from 9.2 to 10mg/L. higher values were recorded during monsoon comparatively from other seasons.

Data recorded increased from the normal range 0.0-0.16mg/L, CPCB (2203). Temperature varied from 14-28^{0}C water temperature also showed considered variations and probably a major environmental factor influencing to the distribution of fish communities in the river, (Table – II) so that, in the post monsoon indicated in the observations, temperature range 14^{0}C in the upstream areas of Naharup Pangong areas.

The range in temperature showed the favourable for fish culture in the river.

Acidity varied from 7-25mg/L. Maximum value were recorded 25mg/L in the month of July. Acidity water reduces appetite and growth of fishes. Toxicity and hydrogen sulphide, methane copper made lowering the pH. Acid water influences other aquatic plants too. Fishes are prone to attach the parasites and diseases in the acidic water.

Chloride content varied from 4-17mg/L. Higher value recorded during post monsoon. Human excreta particularly in urine content chloride in an amount of equal to the chloride consumed with food and water 6gm of chloride per person per day. Maximum chloride content in fresh water is 500mg/L, WHO (2003). Nitrite and nitrate content in the water recorded 0.04-0.16 and 0.10-0.3mg/L respectively which is also supported by Devi *etal* (2003).

Aquatic life depends on the physico – chemical parameters of the water. Fish and other aquatic fauna in Iril River were found to be distributed but influenced by the combination of several physical, chemical and biological factors (Fig. 1).

The riverbed with muddy soil and sandy substrates and also growing vegetations showed a good diversity of aquatic fauna comprising 26 species of fish and seven groups of aquatic insects were collected (Fig. 2). Muddy and sandy substrates in the river showed a dominance of *Puntius species* in most of the sampling sites, which are the indicators of organic pollution as well as lower parts of the river.

On the basis of macro-invertebrates and their biotic index, the study sites can be categorized into two types viz. Unpolluted and slightly polluted. The situation is demonstrated by high score of Chironomus were collected from the soil of lower stream region based on the presence of a big proportion of Ephemeropterans and Coleopterans at upstreams region while presence of Dipterans at downstream regions big headed fish was also found, some authors Yasuno etal (1965) and Bern etal (1990) have categorized Chironomus as representative of polluted water.

Iril River water is considered to play in vital role in issuing social & economic development. The data focusing on physico-chemical characteristics revealed that the water of different parameters are favourable for fish as recorded within the acceptable limit. However, it is always advisable to drink water after proper boiling treatment & filtration. Due to rapid urbanization, river received sewage, domestic wastes agricultural wastes, over fishing even using electrical devices etc. were also seen during breeding season in the river are the main sources of pollution and declining fish population, Viswanath (2002).

Another factors of decreasing indigenous fish population suggested, obstruction of fish migration by Ethai barrage. Thus, the need of the hour is to monitor and motivate the people in and around the catchment areas of the river as well as systematic routine analysis is required for monitoring water quality.

For this immediate actions, local club organizations, NGOs, Panchayate, Zilla Parishad, Block level should be gear up by fishery department along with the state government with seriously to conserve the river water and random effluent, dumping must be banned, proper treatment & unauthorized letting out of these effluent in the surface water bodies should be firmly checked without any delayed.

Table – 1

Parameters	Jan	Feb	March	April	May	June	July	Aug	Sep
Temp ^{0}C	26.1±3.1	27.3±2.1	25±2.1	26±1.0	25.2±2.5	26.5±1.3	24±2.2	25±2.3	24±1.6
Transp. (cm)	---	---	16.3±2.3	20.3±1.7	21.1±6.1	23.1±5.1	24.1±4.6	25±2.1	18.2±1.2
pH	7.5±0.7	7.4±0.9	7.0±0.1	7.3±1.2	7.5±0.3	6.8±5.7	7.0±0.1	7.3±2.1	7.6±1.2
D.O (mg/L)	8.8±1.2	9.1±3.1	8.7±2.3	7.2±1.5	6.9±1.8	6.4±0.8	6.8±1.2	0.8±0.1	6.9±0.2
BOD (mg/L)	3.1±1.2	3.2±1.9	2.9±1.9	3.0±2.0	2.8±1.6	2.6±1.9	2.7±1.3	2.7±1.9	2.3±1.8
Total alkalinity	60.8±23.5	58.2±15.6	58. ±16.9	56.3±14.3	54.2±1.0	50.8±15.6	50.7±13.6	52.4±1.2	51.0±18
Acidity	20.3±12.6	22.4±11.6	18.6±1.7	19.12±1.2	20.65±2.0	23.53±12.	25.6±11.7	25.61±1.2	27.3±1.0
CO_2	13.5±1.0	11.6±2.0	10.7±2.8	10.9±3.2	11.5±1.2	12.3±2.3	13.4±1.6	12.5±2.5	11.2±13.
Chloride	6.3±1.4	6.4±1.2	5.6±2.8	12.5±1.0	12.6±2.0	13.5±3.1	12.4±1.6	12.6±2.6	11.7±3.2
Total Hardness	29.8±2.8	29.5±5.6	30.6±1.2	30.8±2.1	32.6±1.2	33.0±2.6	32.0±2.6	32.9±5.0	30.6±6.5
Calcium	8.6±1.2	9.5±2.6	9.6±3.6	10.0±1.7	12.3±2.8	13.3±1.7	14.0±1.6	13.5±2.8	13.6±2.5
Nitrite	0.03±1.4	0.4±3.6	0.6±4.8	0.3±2.6	0.8±0.16	0.9±0.12	0.5±2.6	0.3±0.02	0.1±0.03
Nitrate	0.15±0.18	0.17±0.00	0.16±0.19	0.02±0.01	0.09±0.05	0.00±0.01	0.09±1.7	0.08±0.04	0.10±0.16

IV. DISTRIBUTION OF FISHES DURING THE INVESTIGATION PERIOD

Table - 2

Months	Sampling Sites				Total
	I	II	III	IV	
Jan	2	2	1	-	5
Feb	4	5	4	5	18
March	3	4	2	5	14
April	4	3	4	6	17
May	5	4	6	7	22
June	4	7	5	8	24
July	3	8	4	5	20
Aug	6	5	4	6	21
Sep	2	3	6	8	19
Total	33	41	36	50	160

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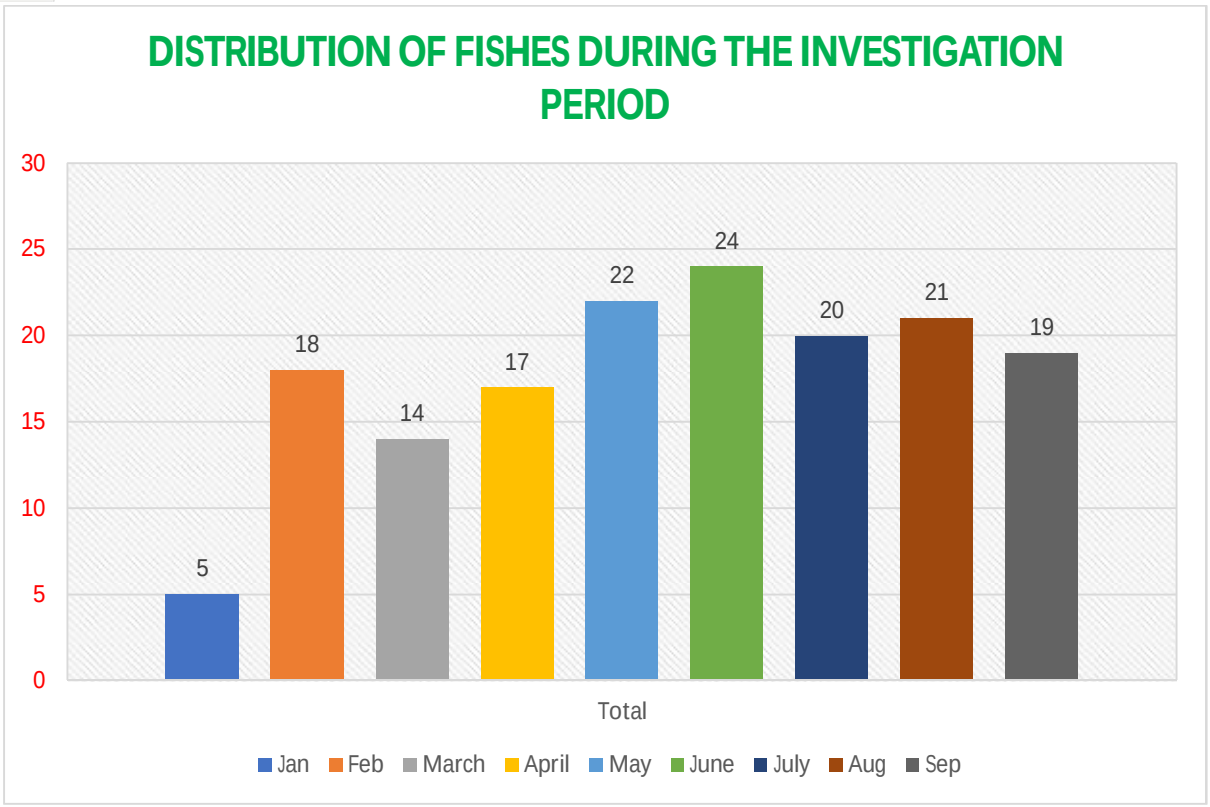

Fig. 1

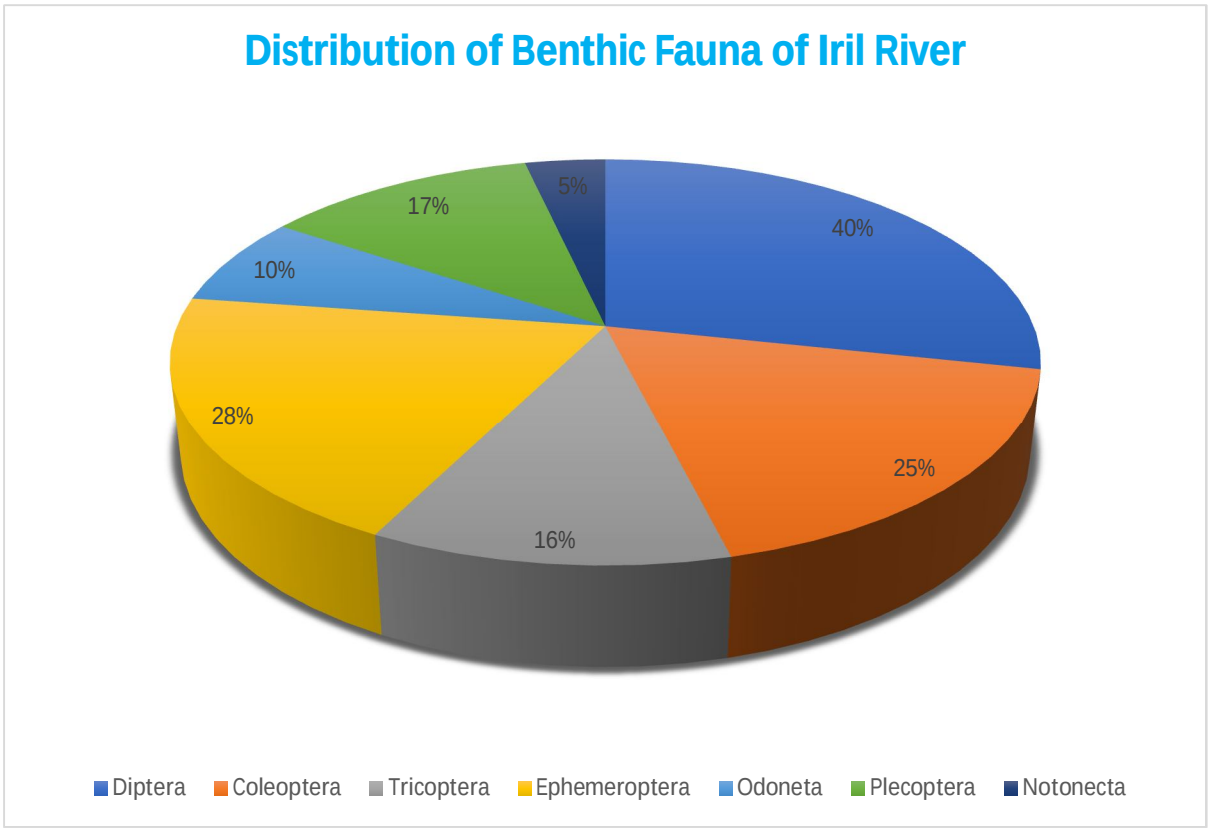

Fig. 2

Altogether 26 different fish species were identified belonging 22 generas, 11 families and 5 orders have been recorded from the Iril river to be quantitatively abundant has revealed the present investigation during Jan to Sept 2019

Table – 3

Scientific Name	Local Name	Family	Order
1. Notopterus notopterus (Pallas)	Kandala	Notopteridae	Osteoglossiformes
2. Barilius bendelisis (Ham)	Ngawa	Cyprinidae	Cypriniformes
3. Esomus danricus (Ham-Buch)	Ngashang	Cyprinidae	Cypriniformes
4. Rasbora rasbora (Ham-Buch)	Nunga	Cyprinidae	Cypriniformes
5. Cirrhinus mrigala (Ham)	Mrigale	Cyprinidae	Cypriniformes
6. Ctenopharyngodons Idella (Val)	Grass Carp	Cyprinidae	Cypriniformes
7. Cyprinus carpio (Linn)	Puklaobi	Cyprinidae	Cypriniformes
8. Cyprinus carpio specularis (Lacepede)	Catla (carp fish)	Cyprinidae	Cypriniformes
9. Hypopthalmichthyes molitrix (Val)	Common Carp	Cyprinidae	Cypriniformes
10. Labeo calbasu (Ham)	Kuri	Cyprinidae	Cypriniformes
11. Osteobrama cotio cotio (Ham)	Ngaseksha	Cyprinidae	Cypriniformes
12. Puntius chola (Ham-Buch)	Phabounga	Cyprinidae	Cypriniformes
13. Puntius conchonus (Ham-Buch)	Phabounga	Cyprinidae	Cypriniformes
14. Labeo rohita (Ham)	Rou	Cyprinidae	Cypriniformes
15. Mystus bleekery (Day)	Ngasep	Bagridae	Siluriformes
16. Mystus cavasius (Ham)	Ngasep	Bagridae	Siluriformes
17. Ompok bimaculatus (Bloch)	Ngaten	Siluridae	Siluriformes
18. Wallago attu (Schncider)	Sareng	Siluridae	Siluriformes
19. Clarius batrachus (Linn)	Ngakra	Claridae	Siluriformes
20. Heteropneustes fossilis (Boch)	Ngachik	Heteropneustidae	Siluriformes
21. Anabas testudineus (Boch)	Ukabi	Anabantidae	Siluriformes
22. Colisa fasciata (Bloch)	Phetin/Ngabema	Belontidae	Siluriformes
23. Channa marulus (Ham)	Porom	Channidae	Siluriformes
24. Channa punctatus (Bloch)	Ngamu bogra	Channidae	Siluriformes
25. Matocembelus armatus (Lecepede)	Ngaril Arangba	Mastocembetidae	Siluriformes
26. Corica soborna (Ham)	Mukanga	Clupeidae	Clupiformes

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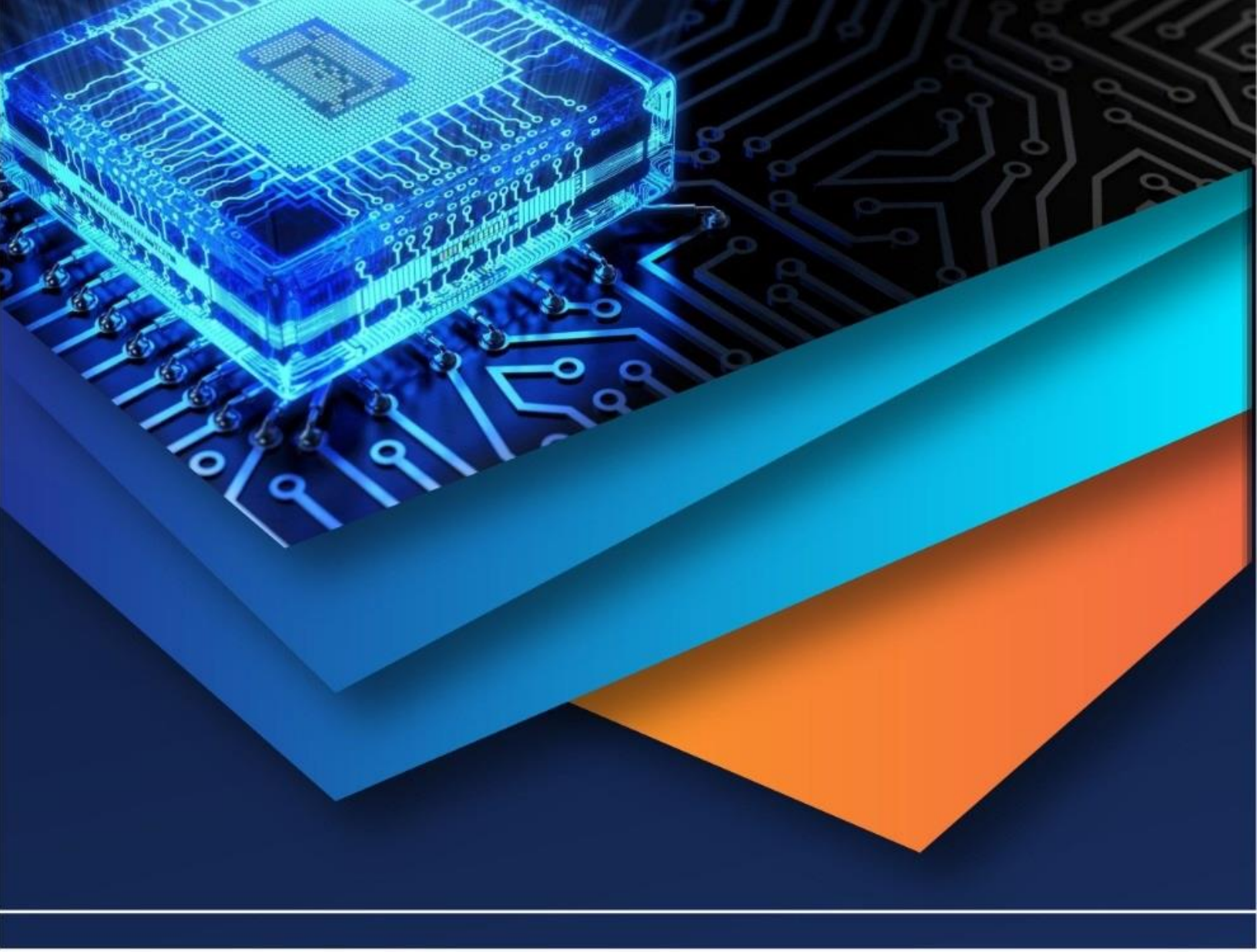

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