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Standardization and Nutritional Analysis of Drumstick Powder Recipes

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Abstract: ***Drumstick (Moringa oleifera) mentioned as Moringa belonging to the family Moringaceae. Moringa oleifera is a multipurpose herbal plant used as a human food and an alternative for medicinal purpose worldwide. This study was aimed to develop High Calcium and High Iron recipes (S_1 and S_2) with incorporation of dried drumstick powder at 10 and 14 per cent . The drumstick is generally utilized as a preserved form, boiled form and incorporated into various dishes to make into new products. The nutrient content of dried Drumstick powder as follows Fibre 1.5g , Vitamin C 50mg, Iron 3.4mg ,Calcium 160mg , Moisture 22g, pH 6.26 and Phenolic compounds 25.4mg. Different types of snack recipes (Murukku, Carrot halwa) with varying proportions of Drumstick powder (5g and 7g) were developed along with a control. The organoleptic evaluation of the snack recipes was carried out using 9 – point Hedonic Scale. The organoleptic evaluation of Sample 1 (80%) has the high level of acceptability than the Sample 2 in the drumstick powder incorporated Murukku. Sample 1 (80%) has the high level of acceptability than the Sample 2 in the drumstick powder incorporated Carrot halwa. Sample 1 (80%) has the high level of acceptability than the Sample 2 in the drumstick powder incorporated Ketchup. The energy , calcium ,vitamin c were enriched in the drumstick powder incorporated food products like Murukku, Carrot halwa . The cost of Drumstick powder incorporated samples is slightly higher when compared with the standard. Therefore the cost is increased with increase in the incorporation level of Drumstick powder.***

Keywords - Moringa oleifera , Drumstick powder, Calcium, Iron

I. INTRODUCTION

Drumsticks or Moringa *(Moringa oleifera*) is belonging to family *Moringaceae* [khawaja Tahir Mahmood *et al* ., 2010]. *Moringa oleifera* is a sub tropical species that is known by different regional names as benzolive, drumstick tree, kelor, marango, mulangay, nebeday, saijhan, mooringai, and sajna [Satya Prakash Mishra *et al* ., 2012]. Moringa is native to the Himalayan foothills. As a commercial crop, it is cultivated extensively in India and Africa. Moringa is most commonly found in area with South and Southeast Asia population. Today it is widely cultivated in Africa, Sri Lanka, India, Mexico, Malaysia [Mohammed Rageeb Mohammed Usman *et al* ., 2012].India is the largest producer of Moringa, with an annual production of 1.1 to 1.3 million tonnes of pods from an area of 380 km². Among the states, Andhra Pradesh leads in both area and production (156.65 km²) followed by Karnataka (102.8km²) and Tamil Nadu (74.08 km²). In other states, it occupies an area of 46.13 km² [Bhupendra Koul *et al*.,2015]. Moringa is one of the richest plant sources of Vitamin A, B,{1,2,3,6,7}C,D, E AND K .The vital minerals present in Moringa include Calcium, Copper, Iron, Potassium, Magnesium, Manganese and Zinc. It has more than 40 natural anti-oxidants [khawaja Tahir Mahmood *et al* ., 2010]. Through research, the Moringa was found to contain many essential nutrients, anti-inflammatory nutrients and omega 3and 6 fatty acids. Due to the presence of several sorts of antioxidant compounds such as flavonoids, ascorbic acid, carotenoids and phenolics, Moringa is able to extend the period of food containing fats [Ahmad Faizal Abdull Razis et al.,2014]. Moringa oleifera acts as Anti- inflammatory, Antioxidant, Antimicrobial, Cardiovascular, Antihyperlipidaemic, CNSDepressant, Antifertility, Anticancer, Antihepatotoxic, Anti-ulcer [Bhoomika R Goyal *et al* ., 2007]. Moringa has been used as a traditional medicine around the World, for anaemia, skin, infections, blackheads, anxiety, bronchitis, catarrh, chest, congestion, asthma, blood impurities, cholera, glandular, swelling, headaches, conjunctivitis, cough, diarrhea, eye and ear infection, fever, abnormal blood pressure, hysteria, pain in joints, pimples, psoriasis, respiratory disorders, scurvy, semen deficiency, sore throat, sprain, tuberculosis, for intestinal worms, lactation, diabetes and pregnancy [Satya Prakash Mishra *et al* ., 2012]. The WHO has promoted Moringa as an alternative to imported food supplies to treat malnutrition [Pallavi Joshi *et al* ., 2017]. *Moringa oleifera* is called “The Mother’s Best friend” for its ability to increase milk production in nursing mother, is a highly nutritious and medicinal plant. *Moringa oleifera* is one of the World’s most useful trees , as almost every part of the tree can be used for food , medication and industrial purposes [Egbuna Chukwuebuka ,2015].

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II. METHODOLOGY

A. Procurement And Preparation Of Drumstick Powder

The drumsticks were collected from my house of Villupuram district during the season. The drumsticks are cut into pieces and washed thoroughly with water. Then scoop the pulp from the drumstick and separate the skin. Then the skin and pulp parts were dehydrated separately in the dryer 60^0 C for 6 hours to remove the moisture. The dried skin and pulp were separately grinded finely by using the mixture grinder and make into a powder. Finally mix the skin and pulp powder and make it into a drumstick powder and stored in air tight container for further analysis.

B. Chemical Analysis

The proximate and nutrient analysis of Drumstick powder play a essential role in assessing its nutritional significance .The proximate analysis for the Moisture, PH, Calcium, Iron, Fibre, Vitamin C, Phenolic compounds values found in this present study.

C. Preparation For Making Murukku

Figure .1 Flow Chart for The Preparation of Drumstick Powder Incorporated Murukku

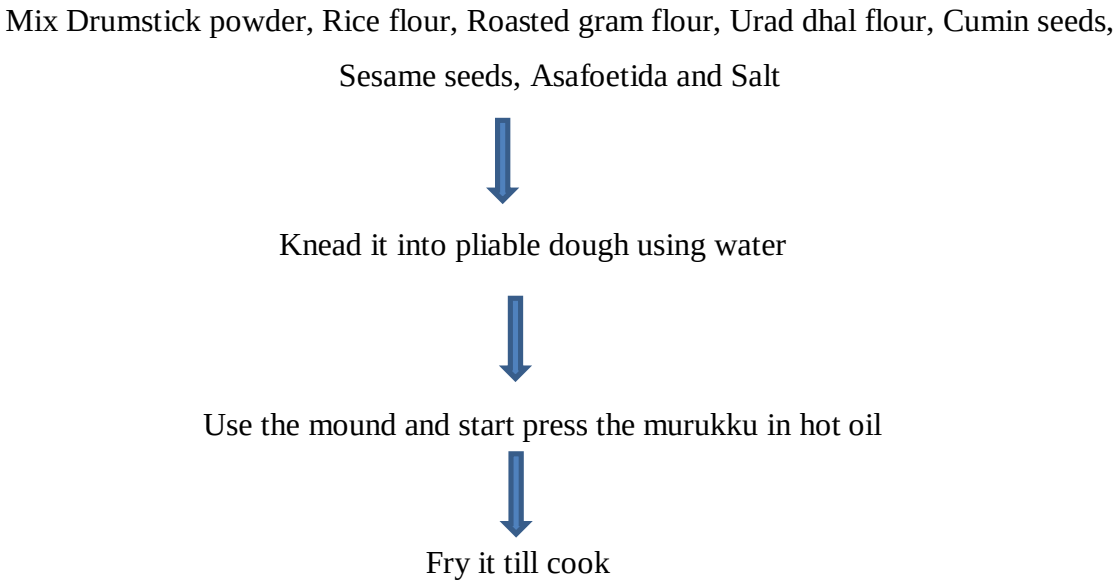

Plate.1. Drumstick powder incorporated murukku

C - Control, S_1 – 5g, S_2 – 7g

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D. Preparation For Making Carrot Halwa

Fig.2. Flow Chart for The Preparation of Drumstick Powder Incorporated

Carrot Halwa

Combine Grated carrots, Milk, Ghee for 20 minute

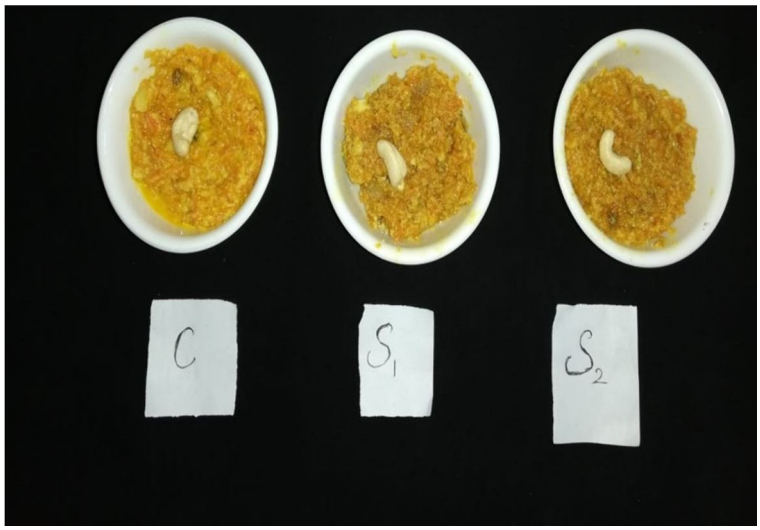
↓

Add Drumstick powder, Jaggery, Cardamom, Cashews, Raisins and Badam

↓

Simmer carrot halwa till all the milk evaporated. Serve it hot.

Plate.2. Drumstick powder incorporated carrot halwa



C - Control, S_1 – 5g, S_2 – 7g

III. ORGANOLEPTIC EVALUATION.

In the present study, selected recipes with different levels of incorporation by Drumstick powder were evaluated for its acceptability against standards by a tasting panels comprising of 20 members. The score card was used for evaluating the attributes like color, flavor, consistency, taste and overall acceptability.

A. Statistical Analysis Of The Data

Statistical analysis is done for the data obtained from the organoleptic evaluation of drumstick powder incorporated recipes.

IV. RESULT AND DISCUSSION

A. Nutrition Composition Of Drumstick Powder

The nutrient content of dried Drumstick powder as follows Fibre 1.5g , Vitamin C 50mg, Iron 3.4mg ,Calcium 160mg , Moisture 22g, pH 6.26 and Phenolic compounds 25.4mg.

B. Sensory Evaluation

The ultimate acceptability of a product is based on its sensory quality. Score card was maintained to know about flavor, mouth feel, apperarance, overall acceptability of Murukku.From the score card Murukku of Sample 1 was highly accepted by customer.

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Table–1 Mean and Standard deviation scores of acceptability of drumstick powder incorporated Murukku

Sample	Colour	Flavour	Taste	Texture	Overall Acceptability
Control	8.6±0.49	8.7±0.49	8.5±0.52	8.5±0.52	8.7±0.49
Sample 1	8.3±0.49	8.2±0.64	8.3±0.46	8.1±0.59	8.4±0.51
Sample 2	7.7±0.70	7.6±0.74	7.6±0.98	7.4±0.74	7.4±0.74

Sample – A – 5g , Sample –B- 7g

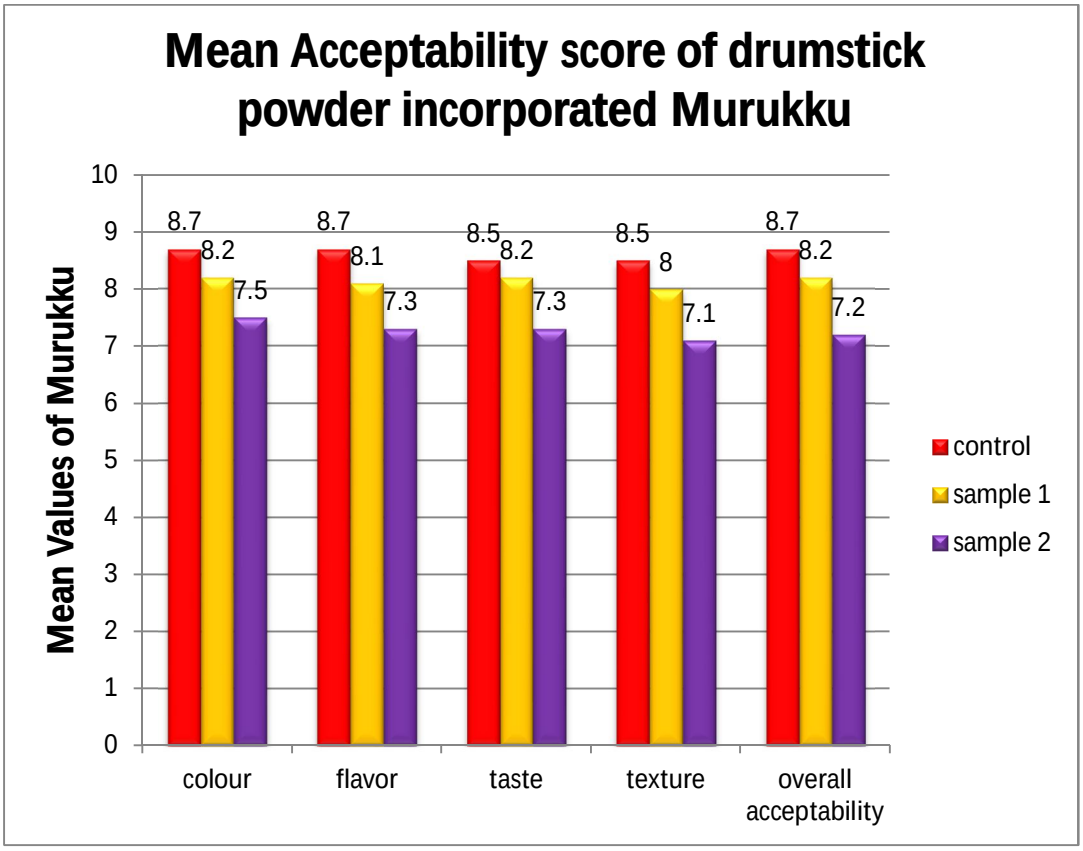

Figure 3: sensory evaluation of Murukku

Table–2 Mean and Standard deviation scores of acceptability of drumstick powder incorporated Carrot halwa

Sample	Colour	Flavour	Taste	Texture	Overall Acceptability
Control	8.7±0.62	8.7±0.40	8.5±0.64	8.5±0.74	8.7±0.64
Sample 1	8.2±0.46	8.1±0.59	8.2±0.59	8±0.56	8.2±0.59
Sample 2	7.5±0.52	7.3±0.63	7.3±0.73	7.1±0.96	7.2±0.52

Sample – A – 5g , Sample –B- 7g

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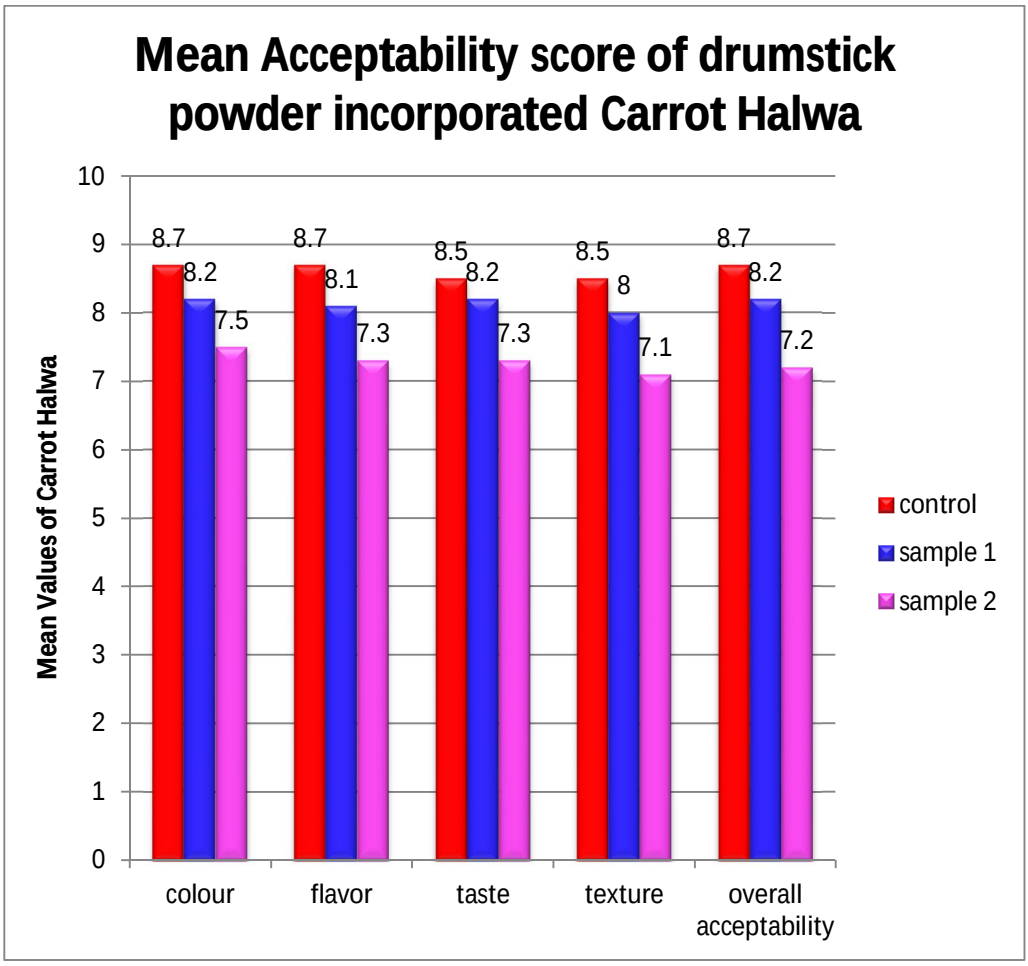

Figure 4 : sensory evaluation of Carrot halwa

C. Cost Analysis

The cost of drumstick powder incorporated Murukku (50g) are Rs.27(C), Rs.31(S_1) and Rs.33(S_2).The cost of Drumstick powder incorporated samples is slightly higher when compared with the standard. Therefore the cost is increased with increase in the incorporation level of Drumstick powder. The cost of drumstick powder incorporated Carrot halwa (50g) are Rs.27(C), Rs.31(S_1) and Rs.32(S_2).The cost of Drumstick powder incorporated samples is slightly higher when compared with the standard. Therefore the cost is increased with increase in the incorporation level of Drumstick powder.

D. Nutritive Value

The Energy, Vitamin C, Calcium content of Murukku were found to be enriched on incorporation of Drumstick powder.

V. CONCLUSION

The Drumstick is the main produce of the plant containing large number of nutrients, especially Calcium, Iron and phenolic compounds. The Drumstick is a seasonal and non- perishable. Drying of drumstick enhancing the nutrient content and which makes as the availability of drumstick throughout the year. The drumstick is generally utilized as a preserved form, boiled form and incorporated into various dishes to make into new products. The drumstick needs to be proper processing to gain value addition products.

VI. ACKNOWLEDGEMENT

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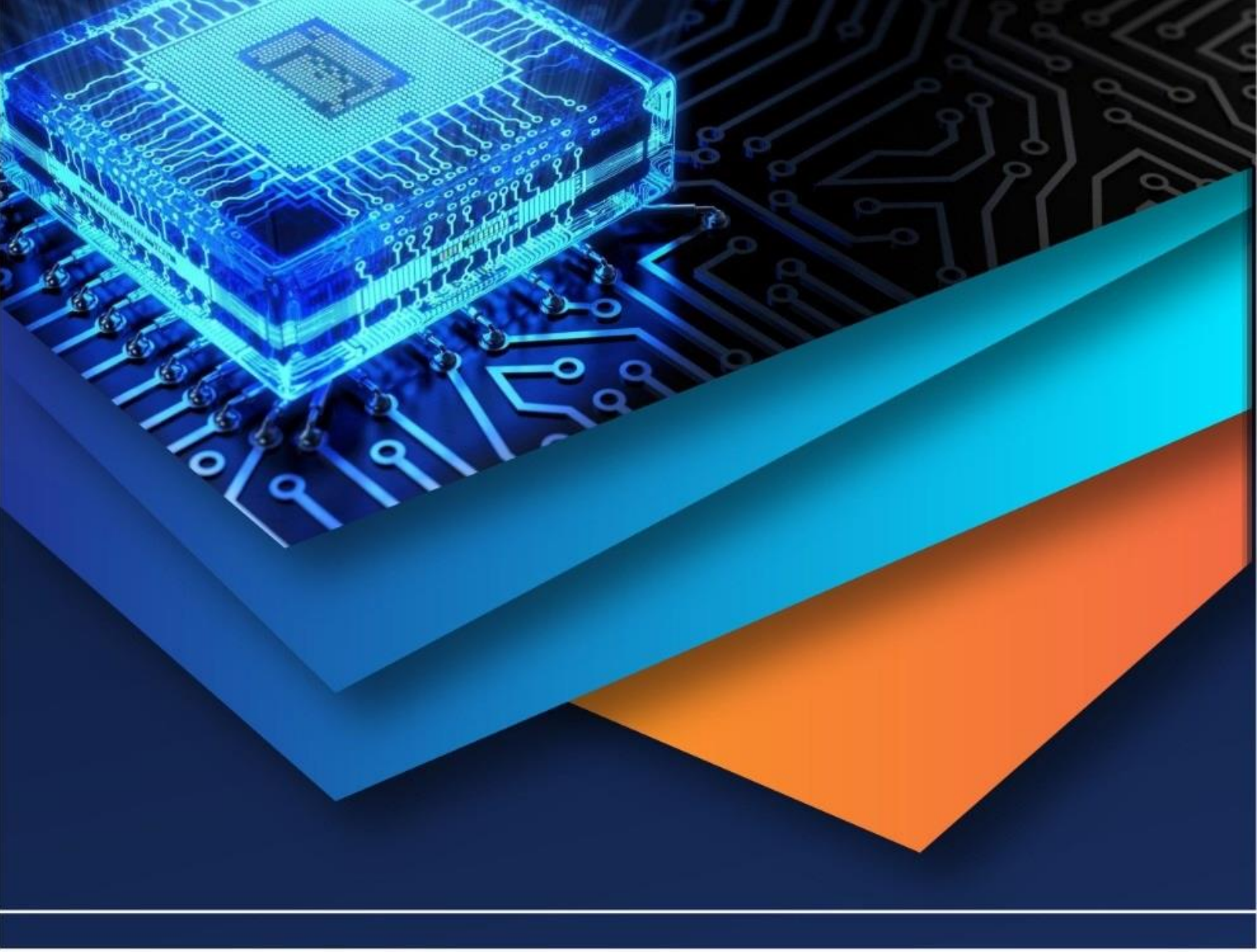

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