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Survey and Studies in Floristic Diversity and Phytosociolgy in Maniyoor Subramanya Swamy Temple, Maniyoor, Kannur District

Nidhi Pradeep[1], Dr. L. Kousalya[2]
[1]*M.sc Botany,* [2]*Assistant Professor, Department of botany, Nirmala College for Women, Coimbatore.*

Abstract: ***Sacred grooves are relic forest patches that contains rich biodiversity and are conserved undisturbed for years due to the traditional beliefs that gods reside in them. The present study carried out in Maniyoor Subramanya swamy temple, Kannur documented 111 vascular plants falling under 106 genera and 46 failies were identified among which angiosperm dominated with 105 members, five of them were pteridophytes and also include a single gymnosperm.***

I. INTRODUCTION

Sacred groves are patches of virgin forest with plentiful biodiversity, which have been protected by the local people for centuries for their cultural and religious beliefs and taboos that the deities reside in them and protect the villagers from natural deaths calamities. Hughes and Subhash Chandran (1997) define sacred groves as 'segments of landscape containing trees and other forms of life and geographical features, that are delimited and protected by human societies having strong faith that conserving such a patch of vegetation in a relatively undisturbed state is necessary for expressing one's relation to the divine or to nature'. Hence, these remain as isolated tracts of climax vegetation in the midst of agricultural landscapes.

In India the highest number of SGs (5000) has been reported to be present in state of Himachal Pradesh followed by Kerala and Chattisgarh. In North Eastern India most of the sacred groves has been reported from Arunachal Pradesh, Meghalaya and Manipur (Malhotra *et al.* 1998) concept of sacred grove is one of the strategies developed by human societies to preserve the biological resources using a traditional perspective. Recognising the importance of sacred grove, both in terms of biodiversity and cultural diversity. In modern times, most of the sacred groves are being increasingly exposed to various kinds of challenges leading to either qualitative degradation or total disappearance.

II. MATERIALS AND METHOD

A. Study Area and Site

The study area is concentrated in the Kannur District which is located in the Northern division of Kerala. Maniyoor Subramanya Swamy Temple is a Hindu temple situated in Chekkikulam, Mayyil, belong to the Taliparamba Taluk which is about 16.7 km away from the Kannur town.

Chekkikulam lies in between 11.9498º N, latitude and 75.4529º E, longitude at an altitude of 8 m above the sea level. The climate is very hot and humid with minimum and maximum temperature ranging from 26º to 30ºC. The total annual rainfall is 3438 mm. The grove is spread about 2 acres.

The Temple is associated with another 4 temples, Kizakkenkavu Temple, Surya temple, Ayyapa temple and Sree Krishna temple. Temple is the worship of Balasubramanya. Thottam pattu and Bhagavathy Theyyam are the ritual forms associated with the festivals performed annually.

The Subramanya Swamy Temple in the study site is believed to be an ancient temple build 2500 years ago and so the Surya temple and the Ayyapa temple, hence in this scenario the present investigation was carried on floristic diversity and the phytosociological studies of the grove to its special relevance.

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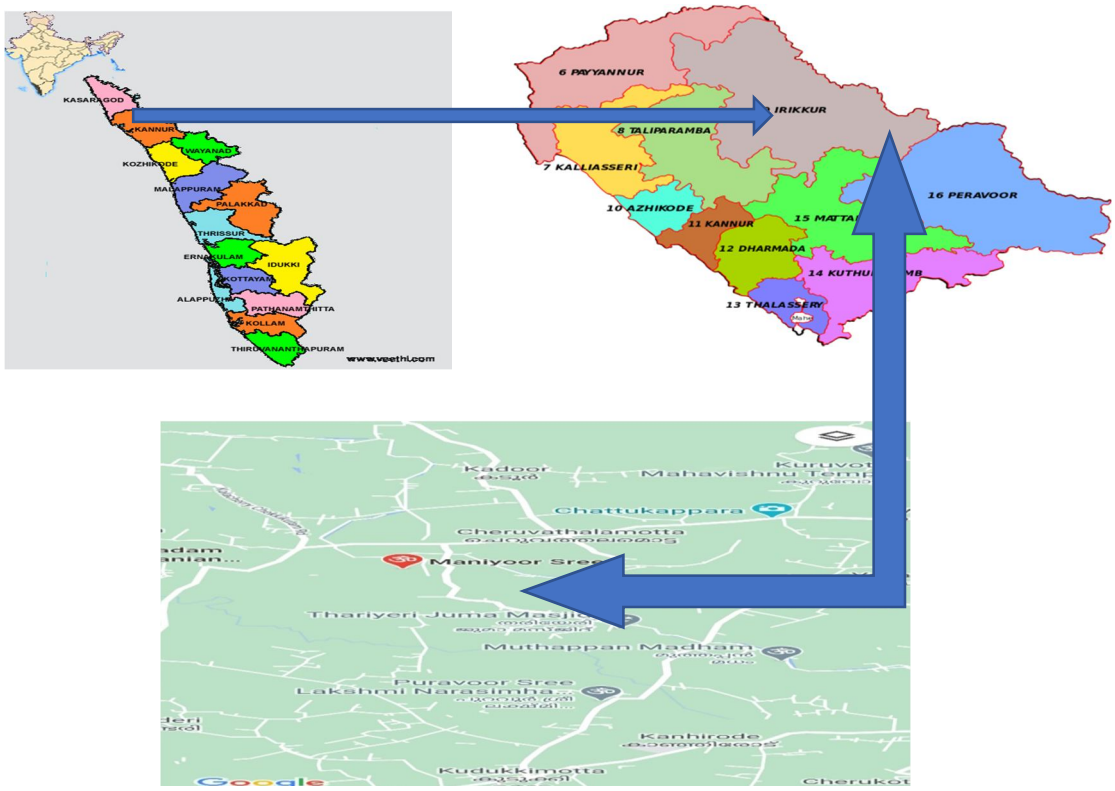

1) *Beliefs About the Grove:* The taboos, rituals and beliefs supplemented with mystic folktales, regarding the groves have been the major reasons, preserving the Sacred grove in pristine condition. The study site is 4 acre spread sacred grove comprising one main temple and 4 sub temples.
2) *Maniyoor Sree Subramanya Swamy Temple:* It is the main temple of the sacred grove. The presiding deity is the temple is lord Balasubramanya. Legend behind the name of the temple is associated to the story of a Brahmin boy named Mani and his disappearance behind the idol in the sanctorum. Many astrologists and the historians believe that it is an ancient temple built 2500 years ago using red bricks. The wall carvings and sculptures in the temple was believed to be built during the Chola ages (600-700 BC). It was also said that a Koothambalam was present inside the temple where Chakyarkoothu was performed. It is also said that the temple has strong connection with the Kottiyoor Mahashiv temple. It is a folklore that Kerala Varma Pazhassi raja a young warrior Hindu prince of Kottayam in Malabar visited and camped in the temple provinces on his way to Wayanad and gave training to his soldiers for the war between Tipu Sultan and Pazhassi. Social gatherings occur in the temple during the consecration day festivals conducted annually and during special days.
3) *Kizakken Kavu Sree Bhagavathy Temple:* This temple is a sub temple of the Subramanya Swamy temple and is said to be the keezadam. The presiding deity of the temple is a Goddess Durga. The legend of the temple is associated to the story of a Brahmin and his journey to the Kottiyoor temple when the goddess durga accompanied and rested near the temple provinces. Velutha bhoothan thiruvady, Daivam pattu, Kaliyattam, Valiya Bhagavathy thottam are the major rituals practiced in the kavu. Social gatherings occur in the Kavu during Navarathri, and other special days. An offering called Thiruvakkady is submitted to the deity when desiring for a child by the infertile couples. A rich canopy is present behind the temple where a lot of rare endemic species are present. There is a small pond in front of the Kavu.
4) *Surya Temple:* It is a sub temple of the main temple and it is oldest temple of Kannur district which is believed to be built 4500 years ago. The presiding deity of the temple is Surya devan.
5) *Ayyappa Temple:* It is another sub temple where two Ayyappa are consecrated in the north east side of main temple. People pray for the fulfillment of their desires and also offers money to the temple committee for various purposes like renewal of the temple, Prasada oottu etc. especially during festival seasons.
6) *Sree Krishna temple:* It is another ancient sub temple believed to be built 1500 years ago. The presiding deity of the temple is lord Sree Krishna. Social gatherings and special Poojas occur in the temple during Janmashtami.

B. Floristic Survey

A brief floristic survey was carried out in the region of the sacred groove. The studies were performed during the month of November 2020 – February 2021. During the study plant species belonging to different families were identified and recorded. Plants were identified with the help of authentic book like Flora of presidency of madras (Gamble 1935), Flora of Cannanore (Ramachandran and Nair 1988) and also by using available field keys and taxonomic bulletins. The identification of doubtful species was confirmed with the help of consulting to the taxonomic experts in botany. Specimens were collected and the herbarium sheets were prepared as per the standard practices.

C. Phytosociological Studies

To study the structure and phytosociology of any plant community observation of each and every individual plant species growing in a habitat is not applicable. The quadrat method has been used for the purpose of studying phytosociology. The quadrat is a square sample plot for detailed analysis of vegetation studies. The minimum quadrat size of 1x1 was fixed by the species area curve method of phytosociological observations. Each time 20 quadrats were laid by the randomized method in each site. The minimum number of quadrat required i.e. 20 was determined by Grieg- smith (1974). The numerical data obtained were analyzed to find out density, frequency and abundance and synthetic attributes such as relative frequency, relative density, relative dominance, important value index, and relative value of index were calculated.

III. RESULTS

During the present study, a total of 111 vascular plants falling under 106 genera and 46 families were identified, out of which angiosperms dominate with 105 members, while 5 of them were Pteridophytes and *Gnetum ula* alone the gymnosperms. With respect to their habit there are 16 trees, 19 shrubs, 15 climbers, 50 herbs, 4 creeping herbs, 2 climbing shrubs, 1 epiphyte, 1 sub shrub, 1 twiner, 1 woody climber and 1 tufted grass. Dominating families are Poaceae (17), Asteraceae (10) Rubiaceae & Fabaceae (7) Acanthaceae (5) and Malvaceae (4) and Lamiaceae, Cyperaceae, Convulvulaceae, Euphorbiaceae, Moraceae, Arecaceae, represents the families with two species each. The documented families Acanthaceae, Asteraceae, Asclepediaceae, Annonaceae, Malvaceae, Rhamnaceae, Scrophulariaceae, Loganiaceae, Verbenaceae, Fabaceae, Adiantaceae, Meliaceae, Vitaceae, Menispermaceae, Ancitrocladaceae, Arecaceae, Moraceae, Poaceae, Crassulaceae, Lamiaceae, Convulvulaceae, Rubiaceae, Oleaceae, Nephrolepidaceae, Sapotaceae, Piperidaceae, Plumbaginaceae, Santalaceae, Icacinaceae, Annonaceae, Cyperaceae, Leeaceae, Onagraceae, Lygodiaceae, Euphorbiaceae, Anacardiaceae, Melostomaceae, Cucurbitaceae, Selaginellaceae, Santalaceae, Gnetaceae, Rutaceae, Zingiberaceae, Capparidaceae, Loranthaceae, Apiaceae, Polypodiaceae, & Apocyanaceae were observed in the study area. The members of these families which contributed towards the species composition in the Maniyoor temple was tabulated in Table I.

Table I: Species Composition In The Maniyoor Temple

SL.NO	NAME	FAMILY	COMMON NAME	HABITAT
1	*Abrus precatorius L*	Fabaceae	Kunnikuru	Climber
2	*Abrus pulchllus* Wall	Fabaceae	Kunnikuru	Climber
3	*Acanthus ilicifolius* Linn	Acanthacea	Vayalchulli	Shrub
4	*Adiantum lunulatum* burm.f	Adiantaceae	Maidenhair fern	Herb
5	*Ageratum conyzoides* L.	Asteraceae	Goat weed	Herb
6	*Ampelocissus latifolia* (Roxb.)	Vitaceae	Wild grape	Climber
7	*Anamirta cocculus* (L) Wight & Arn.	Menispermaceae	Fish berry	Climber
8	*Ancistrocladus heyneanus* Wall.exJ.Graham	Ancitrocladaceae	Modiravalli	Climber
9	*Areca catechu L.*	Arecaceae	Adakka	Tree
10	*Artocarpus heterophyllus* Lam.	Moraceae	Jackfruit	Tree
11	*Aurindinella*	Poaceae	Grass	Herb
12	*Axonopus compressus* (SW.)P.Beauv	Poaceae	Blanketgrass	Herb

13	*Blumea oxyodonta.*DC	Asteraceae	Spiny leaved blumea	Herb
14	*Brachiara ramosa* L.Stapf	Poaceae	Brown top millet	Herb
15	*Bryophyllum pinnatum* (Lam.) oken.	Crassulaceae	Life plant	Shrub
16	*Canthium coromandelicum* (Burmf.) Alsten	Rubiaceae	Coromandel	Shrub
17	*Caryto ureus* L.	Arecaceae	Choondappana	Tree
18	*Centella asiatica* (L)	Apiaceae	Centella	Herb
19	*Centrosema pubescence* Benth.	Fabaceae	Spurred butterfly pea	Climber
20	*Chassalia curviflora* (Wallich)	Rubiaceae	Karutha amalppori	Shrub
21	*Chloris barbata* (L.)Swartz	Poaceae	Swollen finger grass	Creeping Herb
22	*Chromolena odorata* L.R.M.King & H.Roxb	Asteraceae	Communist pacha	Herb
23	*Cleome viscosa* Linn.	Capparidaceae	Asian spider flower	Herb
24	*Clerodendrum viscosum* Vent.	Verbinaceae	Bleeding heart vine	Shrub
25	*Costus speciosus* Koen.ex.Retz	Zingiberaceae	Narum canna	Herb
26	*Cyanodon dactylon* L.Pers	Poaceae	Couch grass	Creeping herb
27	*Cyclea peltata* L.	Menispermaceae	Padathaali	Climber
28	*Dactyloctenium aegypticum (L.) Willd*	Poaceae	Crowfoot	Herb
29	*Dendrophthoe falcata* (L.f)	Loranthaceae	Bara Manda	Sub-shrub
30	*Desmodium trifolium* (L.) DC	Fabaceae	Nilam paranda	Herb
31	*Digitoria bicornis* (Lam) Roem. & schultz	Poaceae	Crab grass	Herb
32	*Drynaria quercifolia* (Linn.) J. Smith	Polypodiaceae	Basket fern	Epiphyte
33	*Echinocloa colona* (L.)	Poaceae	Jungle rice	Herb
34	*Eclipta alba* (L.)	Asteraceae	Kayyunni	Herb
35	*Elephantopus scaber* Linn	Asteraceae	Anachuvadi	Herb
36	*Eleucine indica* (L.) Gaertn	Poaceae	Indian gooze grass	Tufted grass
37	*Ergryotus uniloides* (Retz.) Nees ex Steud	Poaceae	Chinese love grass	Herb
38	*Ervatamia heyneana* (Wall.)	Apocyanaceae	Nag kuda	Tree
39	*Euodia lunu-ankenda* (Gaertn.)	Rutaceae	Kaneli	Tree
40	*Evolvulus numuralis* L.	Convulvulaceae	Musakarni	Herb
41	*Eupatorium perfoliatum* L.	Asteraceae	American boneset	Shrub
42	*Euphorbia hirta* L.	Euphorbiaceae	Asthma weed	Herb
43	*Ficus microcarpa* L.f.	Moraceae	Chinese banyan	Tree
44	*Glycosmis pentaphylla* (Retz)	Rutaceae	Kurumpannal	Shrub
45	*Gnetum ula* L.	Gnetaceae	Odal	Woody climber
46	*Hemidesmus indicus* (L.)R.Br.	Apocyanaceae	Indian sarsaparilla	Twiner
47	*Heteropogon contortus* (L.)P.Beauv.ex.Roem &schultz	Poaceae	Black spear grass	Herb
48	*Hibiscus hispidiassmus* .Griff	Malvaceae	Naranambuli	Herb
49	*Hibiscus surattensis* Linn.	Malvaceae	Bush sorrel	Shrub
50	*Hyptis suaveolens* (L.)Poit	Lamiaceae	Pignut	Herb
51	*Merremia vitifolia* (Burm.fill) Mers	Convulvulaceae	Moon flower	Climber
52	*Ishaemum indicum* (Houtt))	Poaceae	Indian murain grass	Herb

53	*Ixora coccinea* L.	Rubiaceae	Chekki	Shrub
54	*Ixora luecantha* B.Heyne ex G.Don	Rubiaceae	Chekki	Shrub
55	*Jasminum malabaricum* Wight	Oleaceae	Pichii	Climber
56	*Justicia japonica* Thumb,Fl.Jap	Acanthaceae	Brazilian plume	Herb
57	*Justicia simplex* L.	Acanthaceae	Pink plume	Herb
58	*Kyllinga nemoralis* L.	Cyperaceae	White flower kyllinga	Herb
59	*Kyllinga monocephala* Stokes	Cyperaceae	Spike sedges	Herb
60	*Lantana camara* L.	Verbanaceae	Arippoo	Shrub
61	*Leea indica* (Burm.f.)	Leeaceae	Bandicoot berry	Shrub
62	*Leucas aspera* (Willd) Link	Lamiaceae	Thumba	Herb
63	*Lindernia crustacea* (L.) F. Muell	Scrophulariaceae	Hard slitwort	Herb
64	*Ludwigia hyssopifolia* (G.Don) Exell	Onagraceae	Water primrose	Herb
65	*Lygodium flexuosum* Linn.	Lygodiacae	Maidenhair creeper	Climber
66	*Macaranga peltata* Roxb. Mueller	Euphorbiaceae	Uppila	Tree
67	*Mallotus philippensis* (Lam.) Muell. Arg.	Euphorbiaceae	Kamala tree	Tree
68	*Mangifera indica* L.	Anacardiaceae	Mavu	Tree
69	*Melostoma malabaricum* L.	Melostomaceae	India rhoododendron	Shrub
70	*Merremia umbellata* (Linn)	Convulvulaceae	Prasarini	Climber
71	*Mikania macrantha* kunth	Asteraceae	Bitter vine	Climber
72	*Mimosa pudica* L.	Fabaceae	Thottavadi	Herb
73	*Mimosops elengi* L.	Sapotaceae	Elengi	Tree
74	*Mitracarpus verticillatus* (L.).DC	Rubiaceae	Girdle pod	Herb
75	*Mukia madraspatana* (L.)	Cucurbitaceae	Kurukkan vellari	Climber
76	*Murraya koenigii* (L.)	Rutaceae	Kariveppila	Shrub
77	*Naregamia alata* Wight &Arn.	Meliaceae	Nelanaringum	Shrub
78	*Nephrolepis cordifolia* (L.)	Nephrolepidaceae	Sword fern	Creeping Herb
79	*Ochlandra travancorica* Benth.ex Gamble.	Poaceae	Bamboo	Tree
80	*Ocimum tenuiflorum* L.	Lamiaceae	Krishna tulsi	Herb
81	*Olea dioica* Roxb.	Oleaceae	Karivetti	Tree
82	*Oplismus burmanii* (Retz.) P. Beauv.	Poaceae	Burmann,s basket grass	Herb
83	*Panica repens* L.	Poaceae	Torpedograss	Creeping Herb
84	*Pavelta indica* L.	Rubiaceae	Papata	Shrub
85	*Pennisetum hohenackeri* Hochst .ex Steud	Poaceae	Fountain grass	Herb
86	*Pennisetum polystachyon* (L.)schultz	Poaceae	Napiergrass	Herb
87	*Peperomia pellucida* (L.) Kunth	Piperidaceae	Pepper elder	Herb
88	*Phaulopsis imbricata* (Forssk)	Acanthaceae	Umhlonyane	Herb
89	*Piper trioicum* L.	Piperidaceae	Kurumulaku	Climber
90	*Plumbago zeylanica*	Plumbaginaceae	Vellakoduveli	Herb
91	*Pogostemon patchouli* (Pill)	Lamiaceae	Patchouli	Herb
92	*Pongamia pinnata* (L.)	Fabaceae	Pongam tree	Tree
93	*Pothos scandens* L.	Aracaceae	Anaparua	Climber

94	*Rungia pectinata* (L.)	Acanthaceae	Punakapundu	Herb
95	*Santalum album* L.	Santalaceae	Chandanam	Tree
96	*Saraca indica* L.	Fabaceae	Asoka	Tree
97	*Sarcostigma kleini* Wight & Arn	Icacinaceae	Vellodal	Climbing shrub
98	*Selaginella delicatula* (Dery.ex Poir) Alston	Selaginellaceae	Cheevothi	Herb
99	*Sida acuta Burm.*f	Malvaceae	Kurumthotti	Shrub
100	*Spermococe latifolia* Aubl.	Rubiaceae	Button wood	Shrub
101	*Stachytarpheta jamaicensis* (L.)	Verbenacea	indian snake weed	Herb
102	*Strychnux-nux-vomica* L.	Loganiaceae	Kaanjiram	Tree
103	*Synedrella nodiflora* (L). Gaertn	Asteraceae	Cindrella weed	Herb
104	*Torenia bicolor* Dalz	Scrophulariaceae	Clown flower	Herb
105	*Tricholepis amplexicaulis* C.B. Clarke	Asteraceae	Brahmdandi	Herb
106	*Tridax procumbens* L.	Asteraceae	Tridax daisy	Shrub
107	*Triumfetta rhomboidea* Jacq.	Malvaceae	Burbark	Herb
108	*Uvaria narum* Wall.	Annonaceae	Narumpanal	Herb
109	*Vernonia cinerea (L.)*	Asteraceae	Poovamkurunnal	Herb
110	*Wattakakka volubilis* (L.f) Stapf.	Asclepedaceae	Titakunga	Herb
111	Zyzyphis oenoplia(L.) Miller	Rhamnaceae	Jackal jujube	Climbing shrub

A. Medicinal Uses of Various Plants Reported From The Sacred Groove

Majority of the species harbour various medicinal uses for antimicrobial, antidiabetic, antioxidant, anticancer and anti-inflammatory uses. A few species can be used in treatment of Haemmorrhages such as *Ficus microcarpa* L.f, *Saraca indica* L., *Tridax procumbens* L., *Uvaria narum* Wall etc. Species such as *Acanthus ilicifolius*, *Clerodenrum viscosum*, *Oplismus burmanii* and *Sida acuta* are used in treatment of snake bite. *Ancitrocladeus heyneanus* is used in treatment of AIDS. Some of the species such as *Costus speciocus*, *Hemidesmus indicus*, *Heteropogon contortus*, *Lantana camara* are used as anticancerous agents

B. Biodiversity Induces Of Various Plants In Maniyoor Temple

The quantitative ecological characters such as frequency, abundance, density, basal cover and the synthetic characters such as relatice frequency, relative density, relative dominance, important value index and relative value of importance of all the study species are given in Table III.

Out of the 111 species *Cyanodon dactylon* L. Pers shows the highest density of 8.5 followed by *Brachiara ramose* L.Stapf (4.25) and *Aurindinella* (3.75) and the relative density of 9.02, 6.369 & 3.9 respectively. *Chromolena odorat*a L.R.M.King & H.Roxb secured the highest frequency of 65 followed by *Justicia japonica Thumb,Fl.Jap* & *Eupatorium perfoliatum* L. (60) & *Cyclea peltata* L., *Mimosa pudica* L., *Vernonia cineria* (L.) (50) . The highest relative frequency is reported in *Chromolena odorata* L.R.M.King & H.Roxb of 3.09, followed by *Eupatorium perfoliatum* L. (2.857) and *Dactyloctenium aegypticum* L. Willd (2.38) . It is observed that *Cyanodon dactylon* L.Pers shows the highest abundance of 56.66 followed by *Heteropogon contortus* (L.) P.Beauv.ex.Roem & Schultz (33.3) and *Brachiara ramose* L.Stapf (28.3). Highest basal area cover is reported by *Artocarpus heterophyllus* Lam (160) , followed by *Mangifera indica* L. (150) and *Ficus microcarpa* (120.8) . Based on the basal area the *Artocarpus heterophyllus* Lam. is the dominant species in the groove. The highest IVI of 12.83 is recorded in *Artocarpus heterophyllus* Lam, followed by *Mangifera indica* L. (11.755) and *Ficus microcarpa* (9.811) while *Clerodendrum viscosum* Vent. reported the lowest IVI of 0.45.

Sl.no	Name	Total no of individual species	Total no of quadrats in which species occur	Density	Abundance	Frequency	Relative density	Relative frequency	Basal cover	Relative dominance	IVI	RIVI
1	*Abrus precatorius L*	6	2	0.3	3	10	0.318	0.476	35	2.742	3.536	1.178
2	*Abrus pulchllus Wall*	8	4	0.4	1.5	20	0.424	0.972	22	2	3.396	1.132
3	*Acanthus ilicifolius L.*	12	3	1.5	4	15	0.159	0.714	3.5	0.274	1.147	0.382
4	*Adiantum lunulatum burm.f*	4	1	0.2	4	5	0.212	0.238	1.5	0.117	0.567	0.189
5	*Ageratum conyzoides L.*	18	6	0.9	3	30	0.955	1.428	0.4	0.031	2.414	0.804
6	*Ampelocissus latifolia (Roxb.)*	2	1	0.1	2	5	0.106	0.238	15.5	1.214	1.558	0.519
7	*Anamirta cocculus (L) Wight & Arn.*	8	2	0.4	4	10	0.424	0.476	9.5	0.744	1.644	0.548
8	*Ancistrocladus heyneanus Wall.ex J.Graham*	10	6	0.5	1.6	30	0.53	1.428	8.5	0.666	2.624	0.874
9	*Areca catechu L.*	1	1	0.05	1	5	0.053	0.238	60.8	4.764	5.055	1.685
10	*Artocarpus heterophyllus Lam.*	1	1	0.05	1	5	0.053	0.238	160	12.539	12.83	4.276
11	*Aurindinella spp.*	75	4	3.75	18.75	20	3.9	0.972	1.04	0.081	4.953	1.651
12	*Axonopus compressus (SW.)P.Beauv*	120	5	6	24	25	6.369	1.19	3.92	0.307	7.866	2.622
13	*Blumea oxyodonta.DC*	12	7	0.6	1.7	35	0.6	1.666	1.3	0.101	2.367	0.789
14	*Brachiara ramose L.Stapf*	85	3	4.25	28.3	15	4.5	0.714	2.74	0.214	5.428	1.809
15	*Bryophyllum pinnatum (Lam.) oken.*	3	1	0.15	3	5	0.159	0.238	3.8	0.297	0.694	0.231
16	*Canthium coromandelicum (Burmf.) Alsten*	6	3	0.3	2	15	0.319	0.714	10.6	0.83	1.863	0.621
17	*Caryto ureus L.*	5	2	0.25	2.5	10	0.265	0.476	36.35	2.848	3.589	1.196
18	*Centella asiatica (L)*	8	2	0.4	4	10	0.424	0.476	0.4	0.031	0.931	0.31
19	*Centrosema pubescence Benth.*	18	6	0.9	3	30	0.955	1.428	0.45	0.035	2.418	0.806
20	*Chassalia curviflora (Wallich)*	13	8	0.65	1.625	40	0.69	1.904	0.45	0.035	2.629	0.873
21	*Chloris barbata(L.)Swartz*	45	4	2.25	11.25	20	2.38	0.972	0.6	0.47	3.822	1.274
22	*Chromolen odorata L.R.M.King & H.Rob*	22	13	1.1	1.692	65	1.167	3.09	0.7	0.054	4.311	1.437
23	*Cleome viscosa Linn.*	12	8	0.6	1.5	40	0.6	1.904	2.27	0.177	2.681	0.893
24	*Clerodendrum viscosum Vent.*	2	1	0.1	2	5	0.106	0.238	1.36	0.106	0.45	0.15
25	*Costus speciosus Koen.ex.Retz*	4	3	0.2	1.33	15	2.12	0.714	5.8	0.454	3.288	1.096
26	*Cyanodon dactylon L.Pers*	170	3	8.5	56.66	15	9.02	0.714	1.36	0.106	9.84	3.28
27	*Cyclea peltata L.*	20	10	1	2	50	1.06	2.38	2.5	0.195	3.635	1.211
28	*Dactyloctenium aegypticum (l.) Willd*	12	8	0.6	1.5	40	0.6	1.904	4.6	0.36	2.864	0.954
29	*Dendrophthoe falcata (L.f)*	13	6	0.65	2.1	30	0.69	1.428	3.66	0.286	2.404	0.801
30	*Desmodium trifolium (L.) DC*	4	1	0.2	4	5	0.212	0.238	2.1	0.164	0.614	0.204
31	*Digitoria bicornis (Lam) Roem. & schultz*	24	8	1.2	3	40	1.273	1.904	1.5	0.117	3.354	1.118
32	*Drynaria quercifolia (Linn.) J. Smith*	10	4	0.416	2.5	20	0.441	0.972	12.5	0.979	2.392	0.797
33	*Echinocloa colona (L.)*	22	2	1.1	11	10	1	0.476	1.5	0.117	1.82	0.606
34	*Eclipta alba (L.)*	14	4	0.7	3.5	20	0.743	0.972	2.5	0.195	1.91	0.636
35	*Elephantopus scaber Linn*	15	5	0.75	3	25	0.796	1.19	3.2	0.25	2.236	0.745
36	*Eleucine indica (L.) Gaertn*	40	2	2	20	10	2.12	0.476	1.2	0.094	2.69	0.896
37	*Ergryotus uniloides (Retz.) Nees ex Steud*	18	3	0.9	6	15	0.955	0.714	10.2	0.799	2.468	0.822
38	*Ervatamia heyneana (Wall.)*	10	8	0.5	1.25	40	0.53	1.904	11	0.862	3.296	1.09
39	*Euodia lunu-ankenda (Gaertn.)*	8	4	0.4	2	20	0.424	0.972	2.3	0.18	1.576	0.525
40	*Evolvulus numuralis L.*	6	3	0.3	2	15	0.318	0.714	2.14	0.167	1.199	0.399
41	*Eupatorium perfoliatum L.*	21	12	1.05	1.75	60	1.1	2.857	2.3	0.18	4.137	1.379
42	*Euphorbia hirtaL.*	12	7	0.6	1.714	35	0.6	1.666	0.63	0.049	2.315	0.771
43	*Ficus microcarpa L.f.*	2	1	0.1	2	5	0.106	0.238	120.8	9.467	9.811	3.27

44	*Glycosmis pentaphylla (Retz)*	4	1	0.2	4	5	0.212	0.238	3.6	0.282	0.732	0.244
45	*Gnetum ula L.*	1	1	0.05	1	5	0.053	0.238	75.8	5.94	6.231	2.077
46	*Hemidesmus indicus (L.)R.Br.*	20	8	1	2.5	40	1.06	1.905	0.9	0.071	3.036	1.012
47	*Heteropogon contortus (L.)P.Beauv.ex.Roem &schultz*	100	3	5	33.3	15	5.307	0.714	1.2	0.094	6.115	2.038
48	*Hibiscus hispidiassmus .Griff*	5	4	0.25	1.25	20	0.265	0.972	7.8	0.611	1.848	0.616
49	*Hibiscus surattensis Linn.*	2	1	0.1	2	5	0.106	0.238	8.2	0.642	0.986	0.328
50	*Hyptis suaveolens (L.)Poit*	12	6	0.6	2	30	0.6	1.428	0.45	0.035	2.063	0.687
51	*Merremia vitifolia (Burm.fill) Mers*	8	4	0.4	2	20	0.424	0.972	1.6	0.125	1.521	0.507
52	*Ishaemum indicum (Houtt))*	52	4	2.6	13	20	2.76	0.972	0.48	0.037	3.769	1.243
53	*Ixora coccinea L.*	10	4	0.5	2.5	20	0.53	0.972	5.6	0.438	1.94	0.646
54	*Ixora luecantha B.Heyne ex G.Don*	8	6	0.4	1.3	30	0.424	1.428	0.45	0.035	1.887	0.629
55	*Jasminum malabaricum Wight*	12	7	0.6	1.7	35	0.6	1.666	2.2	0.172	2.438	0.812
56	*Justicia japonica Thumb,Fl.Jap*	20	12	1.2	1.6	60	1.273	2.857	2.14	0.167	4.297	1.423
57	*Justicia simplex L.*	24	8	1.2	3	40	1.273	1.904	1.87	0.146	3.323	1.107
58	*Kyllinga nemoralis L.*	40	2	2	20	10	2.12	0.476	1.37	0.107	2.703	0.901
59	*Kyllinga monocephala Stokes*	20	1	1	10	5	1.06	0.238	1.37	0.107	1.405	0.468
60	*Lantana camara L.*	22	8	1.1	2.7	40	1.167	1.904	2.6	0.203	3.274	1.091
61	*Leea indica (Burm.f.)*	6	2	0.3	3	10	0.318	0.476	20.2	1.583	2.377	0.792
62	*Leucas aspera(Willd) link*	4	1	0.2	4	5	0.212	0.238	2.5	0.195	0.645	0.225
63	*Lindernia crustacea (L.) F. Muell*	4	2	0.2	2	10	0.212	0.476	1.8	0.141	0.829	0.276
64	*Ludwigia hyssopifolia (G.Don) Exell*	2	1	0.1	2	5	0.106	0.238	5.6	0.438	0.782	0.26
65	*Lygodium flexuosum Linn.*	6	2	0.3	3	10	0.318	0.476	1.5	0.117	0.911	0.303
66	*Macaranga peltata Roxb. Mueller*	8	3	0.4	2.6	15	0.424	0.714	12.2	0.956	2.094	0.968
67	*Mallotus philippensis (Lam.) Muell. Arg.*	5	3	0.25	1.66	15	0.265	0.714	4.12	0.322	1.301	0.433
68	*Mangifera indica L.*	1	1	0.05	1	5	0.053	0.238	150	11.755	12.046	4.015
69	*Melostoma malabaricum L.*	2	2	0.1	1	10	0.106	0.476	3.5	0.274	0.856	0.285
70	*Merremia umbellata (Linn)*	6	2	0.3	3	10	0.318	0.476	1.2	0.094	0.888	0.296
71	*Mikania macrantha kunth*	10	8	0.5	1.25	40	0.53	1.904	0.7	0.054	2.488	0.829
72	*Mimosa pudica L.(Laajvanti)*	20	10	1	2	50	1.06	2.38	0.91	0.071	3.511	1.17
73	*Mimosops elengi L.*	1	1	0.05	1	5	2.229	0.238	0.92	0.072	2.539	0.846
74	*Mitracarpus verticillatus*	42	2	2.1	21	10	0.053	0.476	0.06	0.047	0.576	0.192
75	*Mukia madraspatana (L.)*	4	2	0.2	2	10	0.212	0.476	2.2	0.172	0.86	0.286
76	*Murraya koenigii (L.)*	2	1	0.1	1	5	0.106	0.238	7.8	0.611	0.955	0.318
77	*Naregamia alata Wight &Arn.*	12	1	0.6	12	5	0.6	0.238	0.9	0.071	0.909	0.303
78	*Nephrolepis cordifolia (L.)*	4	1	0.2	4	5	0.212	0.238	1.8	0.141	0.591	0.197
79	*Ochlandra travancoriaca Benth.ex Gamble.*	2	1	0.1	2	5	0.106	0.238	25	1.95	2.294	0.764
80	*Ocimum tenuiflorum L.*	3	1	0.15	3	5	0.159	0.238	0.9	0.071	1.468	0.489
81	*Olea dioica Roxb.*	3	1	0.15	3	5	0.159	0.238	78	6.112	6.509	2.169
82	*Oplismus burmanii*	12	1	0.6	12	5	0.6	0.238	0.16	0.012	0.85	0.283
83	*Panica repens L.*	50	2	2.5	25	10	2.6	0.238	2.7	0.211	1.049	0.349
84	*Pavelta indica L.*	2	1	0.1	2	5	0.106	0.238	4.8	0.376	0.72	0.24
85	*Pennisetum hohenackeri Hochst ex Steud*	40	2	2	20	10	2.12	0.476	1.8	0.141	2.737	0.912
86	*Pennisetum polystacgyon (L.)schultz*	30	3	1.5	10	15	1.592	0.714	1.8	0.141	2.447	0.815
87	*Peperomia pellucida (L.) Kunth*	10	8	0.5	1.25	40	0.53	1.904	4.8	0.376	2.81	0.936
88	*Phaulopsis imbricata (Forssk)*	10	2	0.5	5	10	0.53	0.476	5.8	0.454	1.46	0.486
89	*Piper trioicum L.*	12	6	0.6	2	30	0.6	1.428	3.2	0.25	2.278	0.759
90	*Plumbago zeylanica L.*	5	1	0.25	5	5	0.265	0.238	8.9	0.697	1.2	0.4
91	*Pogostemon patchouli (Pill)*	8	2	0.4	4	10	0.424	0.476	13.2	1.034	1.934	0.644

92	*Pongamia pinnata (L.)*	10	6	0.5	1.66	30	0.53	1.428	45	3.526	5.484	1.828
93	*Pothos scandens L.*	10	4	0.5	2.5	20	0.53	0.972	2.5	0.195	1.697	0.565
94	*Rungia pectinata (L.)*	30	8	1.5	3.75	40	1.592	1.904	0.8	0.626	3.122	1.04
95	*Santalum album L.*	7	2	0.35	3.5	10	0.371	0.476	32	2.507	3.354	1.118
96	*Saraca indica L.*	4	2	0.2	2	10	0.212	0.476	16.8	1.316	2.004	0.668
97	*Sarcostigma kleini Wight & Arn*	1	1	0.05	1	5	0.053	0.238	0.8	0.626	1.664	0.554
98	*Selaginella delicatula (Dery.ex Poir) Alston*	20	2	1	10	10	1.06	0.476	0.4	0.031	1.567	0.522
99	*Sida acuta Burm.f*	12	4	0.6	3	20	0.6	0.972	0.5	0.039	1.611	0.537
100	*Spermococe latifolia Aubl.*	22	4	1.1	5.5	20	1.167	0.972	1.8	0.141	2.28	0.76
101	*Stachytarpheta jamaicensis Vahl.*	8	3	0.4	2.66	15	0.424	0.714	3.5	0.274	1.412	0.476
102	*Strychnux-nux-vomica L.*	10	4	0.5	2.5	20	0.53	0.972	95	7.44	8.942	2.98
103	*Synedrella nodiflora (L.) Gaertn*	22	8	1.1	2.75	40	0.167	1.904	1.08	0.084	2.155	0.718
104	*Torenia bicolor Dalz*	2	1	0.1	2	5	0.106	0.238	4.5	0.35	0.694	0.231
105	*Tricholepis spp.*	7	2	0.35	3.5	10	0.371	0.476	2.1	0.164	1.011	0.337
106	*Tridax procumbens L.*	70	5	3.5	14	25	0.371	1.19	0.95	0.744	1.561	0.52
107	*Triumfetta rhomboidea Jacq.*	8	2	0.4	4	10	0.424	0.476	1.5	0.117	1.077	0.359
108	*Uvaria narum Wall.*	2	1	0.1	2	5	0.106	0.238	3.1	0.241	0.585	0.195
109	*Vernonia cinerea (L.)*	40	10	2	4	50	2.12	2.38	3.2	0.25	4.75	1.583
110	*Wattakakka volubilis (L.f) Stapf.*	4	2	0.2	2	10	0.212	0.476	3.1	0.241	0.929	0.309
111	*Zyzyphis oenoplia (L.) Miller*	5	1	0.25	5	5	0.265	0.238	3.5	0.274	0.777	0.259

C. Red Listed Plants From The Sacred Groove

In the present study, 13 red listed species are identified in Maniyoor temple, among which the least endangered species were *Ixora leucantha* B.Heyne ex G.Don and the endangered species include 9 of them, they are *Drynaria quercifolia* (L) J.Sm, *Ervatomia heyneana* (Wall), *Euodia lunu-ankenda* (Gaertn), *Gnetum ula* L., *Jasminum malabaricum* Wight., *Naregamia alata* Wight, *Ochlandra travancoriana* Benth ex.Gamble, *Plumbago zeylanica* L., & *Santalum album* L. Only one threatened species in the groove include *Centella asiatica* (L) j.Sm & *Saraca indica* L. is the only one vulnerable species in the groove.

Table: IV Red Listed Plants From The Sacred Groove

Sl. No	Name	Status
1	*Ancitrocladeus heyneanum* Wall.ex.J Graham	Nearly endemic & endangered
2	*Centella asiatica* (L) J.Sm	Threatened
3	*Drynaria quercifolia* (L) J.Sm	Endangered
4	*Ervatomia heyneana* (Wall)	Endangered
5	*Euodia lunu-ankenda*(Gaertn)	Endangered
6	*Gnetum ula* L.	Endangered
7	*Ixora leucantha* B.Heyne ex.G.Don.	Least endangered
8	*Jasminum malabaricum* Wight.	Endangered
9	*Naregamia alata* Wight.	Endangered
10	*Ochlandra travancoriana* Benth ex.Gamble	Endangered
11	*Plumbago zeylanica* L.	Endangered
12	*Santalum album* L.	Endangered
13	*Saraca indica* L.	Vulnerable

IV. SUMMARY

The main objective of the study includes analyzing floristic composition, phytosociological studies in documented species, listing out red listed species and planning conservative strategies for the protection of sacred grooves. In the present study field survey and the gradual method of phytosociological study were adopted for investigation and interviews for socio-economic importance. Out of the total species about 13 red listed species were reported and the important thing is their medicinal properties and the necessity of conservation of the species for the society.

Thus, in this case study on selected sacred groove implies that, these small tracts of forest play an important role in sustainable biodiversity preservation. It is therefore important to develop management approaches that encourages the conservation of these sites. The present study has been revealed that the existence of sacred groove is an adequate necessity for the conservation and maintenance of many medicinal and economic plants. For ensuring the protection of such grooves, human intervention should be strictly controlled. During the current study in Maniyoor temple, it is observed that the area is depleted by uncontrolled human intervention. Some plastic wastes and bottles were found in the temple provinces.

From the phytosociological analysis of various plants in the groove, a higher number of red listed species have been reported. The plants in the endangered category includes 9 species, the least endangered is reported only one in number, one species belong to threatened and one is listed under nearly endemic and endangered. From this it is clear that conservation priority of the groove is higher. Phytosociological studies indicate that, highest density than other species, exhibit highest frequency hence this species is widely distributed in the groove. Got higher abundance value. *Artocarpus heterophyllus* Lam. considered to be the dominant species based on the basal cover of 160. The ecological importance of each species was calculated on the basis of IVI, the lowest IVI was reported by *Clerodendrum viscosum* Vent. & *Costus speciosus* Koen.ex. Retz. So that this species is considered least significant there by less important. The ethnobotanical studies of plants revealed that these plants have a vital role in treatment of many diseases, there by maintenance and propagation of existing red listed species in the sacred groove is necessary for achieving this, the threatened plants should be allowed to multiply in number within their existing natural habitat that is in and around the groove.

V. CONCLUSION

The present study attempted at documenting the floral diversity and analysing the phytosociology of the Maniyoor Temple. The case study conducted explored the species richness and distribution of various species in the groove and documented the medicinal uses of most of the species. The study listed out the IUCN conservation status of various plants from the grove. The results indicate that the grove exhibit fairly good biodiversity of useful species, hence there is an urgent necessity for the conservation of this biodiversity. The study also referred to the folktales and beliefs regarding the sacred groove. The study concluded in suggesting various strategies for the conservation of useful species in the grove.

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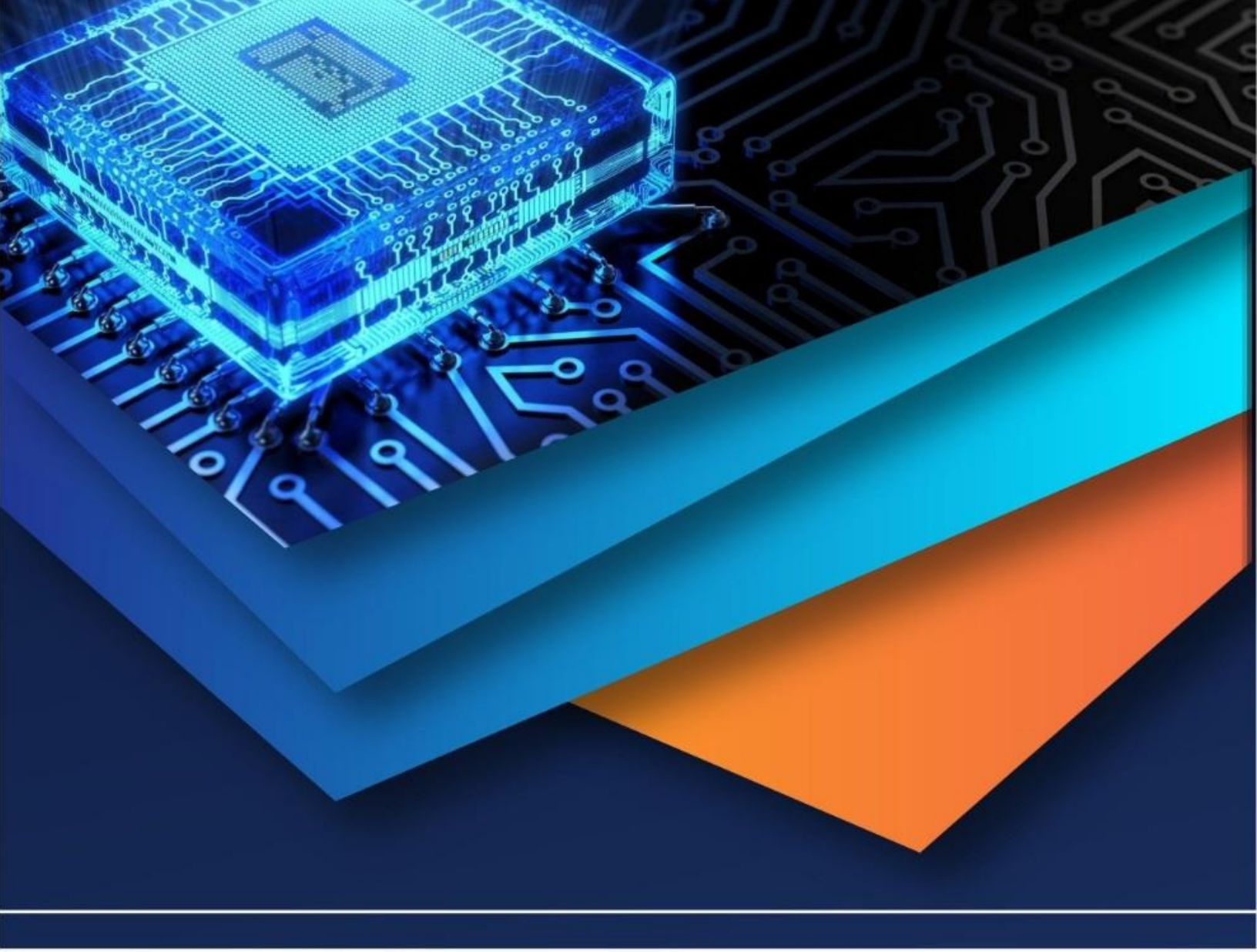

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