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**Pavithra Chinnasamy**  
Phytodiversity Research  
Laboratory, Department of  
Botany, Bharathiar University,  
Coimbatore, Tamil Nadu,, India

**Sarvalingam Ariyan**  
Phytodiversity Research  
Laboratory, Department of  
Botany, Bharathiar University,  
Coimbatore, Tamil Nadu,, India

**Rajendran Arumugam**  
Phytodiversity Research  
Laboratory, Department of  
Botany, Bharathiar University,  
Coimbatore, Tamil Nadu, India

## Poisonous pasture plants of Sathyamangalam hills, Tamil Nadu

**Pavithra Chinnasamy, Sarvalingam Ariyan, and Rajendran Arumugam**

### Abstract

The present paper attempts to provide poisonous aspects of 100 plants widely distributed in Sathyamangalam forest area of Tamil Nadu. The poisonous response of a particular plant broadly comes and two categories allergic reaction or accidental consumption. In order to escape from the predators, plants produce a number of defense characteristics such as excessive secondary metabolites, thorns, spines, bad odor etc., but it will cause some unusual effects on animals which feed on them. It's because of pasture lands are existing with these type of plants. The most of the farmers from the study area are aware of the poisoning effect of plant species. The interview is made assembling all the farm land holders in a place and information on the poisonous effect of the plant is collected. They even experienced these incidents with their own livestock. Collected information indicates the severity of poisonous plants is very low but they may cause some chronic difficulties like diarrhea, dizziness, gastrointestinal problems, mouth sores. An example of acute toxicity plants are *Abrus precatorius* seeds causes coma and death as like *Nerium oleander*, *Jatropha curcas*, *Ricinus communis* seeds will also cause severe results when animals consume it excessively but consumption of a few seeds will only cause digestive problems. Actually, the poisonous plants are rich in secondary metabolites so may the activity over medicinal treatment is considerably high. Sometimes the poisonous plants are used for food purposes after processing it. The poisonous plants occasionally used for suicidal purposes so it clearly shows that the peoples are little aware of the effect of plant and plant parts. So keeping all this in mind the study is carried out in Sathyamangalam hills to explore the effects and plants parts of poisonous plants. The objective of this study is to perceive about the poisonous plants in pasture lands. It will give suggestions to the negative causes of a particular plant species and the necessary to remove it from farmlands. The knowledge of the specific poison and its mode of action will aid in trying to treat specific poison causes.

**Keywords:** Indigenous knowledge, rural population, Sathyamangalam hills, Tamil Nadu

### 1. Introduction

In India there are about 700 poisonous plant species belonging to over 90 families of flowering plants <sup>[1]</sup>. The incidence of poisoning in India is among the highest in the world, and it is estimated that more than 50, 000 people die every year from toxic exposure <sup>[2]</sup>. While the plants are in the world which are used in the purpose of curing in different diseases there are also some of the plants which considered as the poisonous plants. Most poisonous plants will not kill an animal. Instead animals suffer from chronic toxicity. This is caused by repeating exposure over time. Some plants however will cause acute toxicity one time damaging exposure. Luckily this type of poisoning is rare <sup>[3]</sup> and several plants provide food forage and medicinal values when they are dried or cooked but in fresh state it may be a poisonous.

Current opinion appears to be that many of the plant chemicals toxic to humans and livestock are produced as part of the plant's defense against being eaten or to gain an advantage over competing plants <sup>[4]</sup>. Physiologically toxic compounds in plants are usually a defense mechanism against predation and have a distinct, unpleasant odor or a bitter taste and are not preferentially grazed. Most of the defense characters are thorns, spines, bad odour, leathery leaves, resins and latex. These all are generally causes the common poisonous effects such as skin disease, vomiting, digestive upset, nausea, diarrhoea, mouth edema, weak pulse, affect on milk yield, sleepiness, chronic ulcers, salivation and slow appetite. It clearly proved that every poisonous plants has the some poisoning level that is early said by Paracelsus (1493-1541) in the sixteenth century. Some of the poisonous plants cause serious problems like coma, die and blindness <sup>[4, 5]</sup>.

Nearly half of these poisonous plants are also 'weedy' or invasive and threat to human and animal health as well as cause environmental and or economic damage <sup>[5, 6]</sup>. Animals have the gut defense system which keeps them safe from poisoning and the skin defense system which keeps them safe from physical harm. Humans are built the same way <sup>[5]</sup>. The best way to assure that forage is as safe as possible is to keep these plants out of your fields and pastures. Proper weed identification is crucial <sup>[5-7]</sup>. It is very necessary to known about the poisonous plants its poisonous effect and how they are looking like in the agricultural field, what are the poisonous parts.

### Correspondence

**Rajendran Arumugam**  
Phytodiversity Research  
Laboratory, Department of  
Botany, Bharathiar University,  
Coimbatore, Tamil Nadu, India

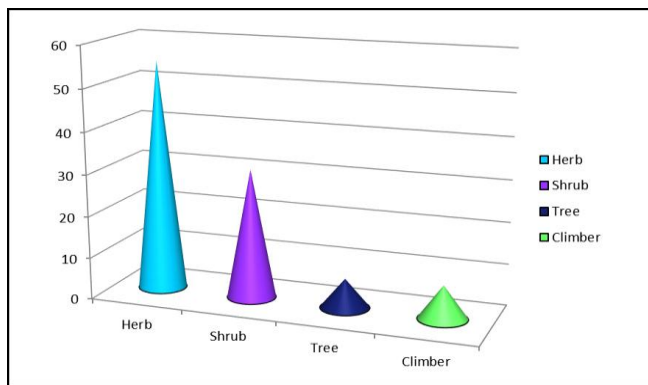
**2. Materials and methods**

The present investigation was undertaken to study the floristic diversity of the Poisonous pasture plants of Sathyamangalam, Erode district, Tamil Nadu. Several field trips were made from September 2013 to March 2014, covering different seasons, in order to know the phenology of the plants. The collected specimens were identified taxonomically with the help of available monographs, taxonomic revisions and floras [8, 9] and by using field keys.

The specimen was then poisoned in a saturated solution of mercuric chloride in alcohol. Further processes pressing, mounting and labeling were done before submitting herbarium. The voucher specimens were deposited in the Herbarium of Department of Botany, Bharathiar University (BUH), Coimbatore, and Tamil Nadu. Further, the local peoples were contacted to get the information about the economic and traditional utility of the collected plant species.

**3. Result and discussion**

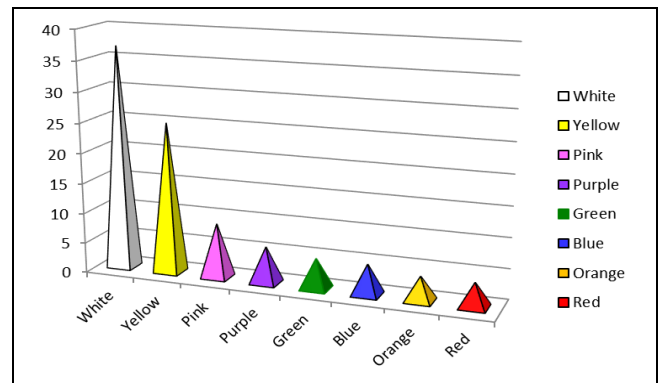
A total number of 100 species belonging to 43 families were identified. The families Asteraceae (9), Euphorbiaceae (7), Apocyanaceae, Amaranthaceae (each 6 species), followed by Acanthaceae (3) and Asclepiadaceae (3) were found to be most specious families (table 1). Similar observation reported by [10]. Some plants causes poisoning to both human beings as well as livestock populations, while some causes poisoning to human beings only. The life form study found that herbs (54) followed by shrubs (31), climbers (8), and trees (7) which indicates the herbs are commonly caused poisonous than any other life forms (fig 1). Such observation was reported by [11].



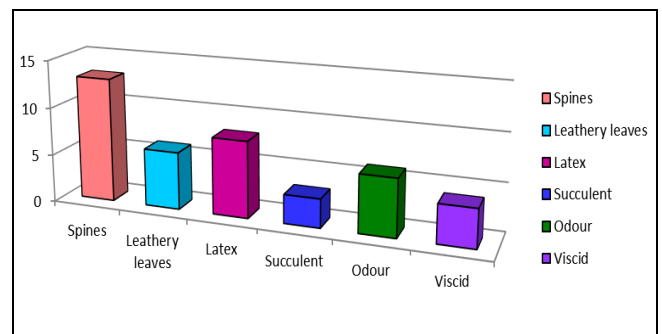
**Fig 1:** Analysis of diverse life-forms in the study

The poisonous parts of majority of plant species were leaves, whole plant, seeds, latex and root. The flower color analysis

indicates that white color is more dominant followed by yellow, pink, purple, green, blue, orange and red (fig 2). The analysis of poisonous plant part shows that spiny plants are more dominant followed by latex, odor, leathery leaves, viscid and succulent (fig 3). It is better to avoid eating all plants that have colored or milky juices and also to avoid all unknown white or red fruits [12].



**Fig 2:** Analysis of the flower color of the plants from study



**Fig 3:** Analysis of physical factors produced by the poisonous plants from the study

The chemical nature of the poison is also very important when considering poisonous plants. Some common poisonous compound found in plants include glycosides, alkaloids, oxalates, oils, minerals, resins and nitrates. Some of these poisonous affect the nervous system, some the blood and still others the intestinal track or the heart [13-15]. The Solanaceous species *Datura stramonium* poisoning many animals contaminated feed, so it should be eradicated from pasture when possible. It causes diarrhoea, depression, loss of appetite and loss of condition (table 1).

**Table 1:** List of poisonous plants collected from the study area with poisoning effect

S. No	Botanical name	Family name	Habit	Flower colour	Poisonous part	Poisoning effect
1	<i>Abrus precatorius</i> L.	Fabaceae	Climber	White	Seeds	Nausea, Liver failure
2	<i>Aegle marmelos</i> (L.) Correa.	Rutaceae	Tree	White	Leaves	Digestive upset
3	<i>Aerva lanata</i> (L.) Juss ex Shult.	Amaranthaceae	Herb	White	Whole plant	Skin disease, Urinary tract
4	<i>Aerva javanica</i> (Burm.f.) Shult.	Amaranthaceae	Herb	White	Whole plant	Renal toxicity
5	<i>Agave cantula</i> Roxb.	Agavaceae	Shrub	White	Fluid, thorns	Dermatitis, itching
6	<i>Ageratum conyzoides</i> L.	Asteraceae	Herb	White	Leaf, seeds	Vomiting
7	<i>Allamanda cathartica</i> L.	Apocynaceae	Shrub	Yellow	Whole plant	Diarrhea, mild catharsis
8	<i>Allium cepa</i> L.	Lilliaceae	Herb	White	Stalks	Weakness, Mouth edema
9	<i>Alternanthera paronychioides</i> A. St-Hill.	Amaranthaceae	Herb	White	Whole plant	Effect mouth
10	<i>Alternanthera pungens</i> Kunt	Amaranthaceae	Shrub	White	Whole plant	Digestive problems
11	<i>Amaranthes spinosus</i> L.	Amaranthaceae	Herb	White	Spines	Spines cause mouth injury
12	<i>Argemone Mexicana</i> L.	Papaveraceae	Herb	Yellow	Spines	Spiny
13	<i>Artabotrys hexapetalus</i> (L. f.) Bhandari.	Annonaceae	Shrub	Green	Leaves	Diarrhea, indigestion
14	<i>Asclepias curassavica</i> L.	Asclepiadaceae	Shrub	Orange	Leaves	Depression, weakness

15	<i>Barleria prionitis</i> L.	Acanthaceae	Shrub	Yellow	Spines	Affect nervous system
16	<i>Barleria cuspidata</i> L.	Acanthaceae	Herb	Yellow	Spines	Gastrointestinal effect
17	<i>Blepharis maderaspatensis</i> (L.) B.	Acanthaceae	Herb	White	Whole plant	Stomach ulcer
18	<i>Blumea bifoliata</i> (L.) DC.	Asteraceae	Herb	Yellow	Leaves	Cytotoxicity
19	<i>Brassica juncea</i> (L.) Czern.	Brassicaceae	Herb	Yellow	Whole plant	Depression
20	<i>Calotropis gigantea</i> (L.) R. Br.	Asclepiadaceae	Shrub	Blue	Latex	Latex injurious to eyes
21	<i>Calotropis procera</i> (Ait.) Ait. f.	Asclepiadaceae	Shrub	White	Latex	Latex injurious to eyes
22	<i>Canna indica</i> L.	Cannaceae	Herb	Red	Leaves	Hallucination
23	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Climber	White	Whole plant	Allergic reactions
24	<i>Carica papaya</i> L.	Caricaceae	Tree	White	Leaves, fruits	Consumption leads abortion
25	<i>Cassia occidentalis</i> L.	Caesalpinaceae	Shrub	Yellow	Leaves	Damage Muscle
26	<i>Cassia auriculata</i> L.	Caesalpinaceae	Herb	Yellow	Leaves	dark or red urine
27	<i>Catharanthus roseus</i> (L.) Godson.	Apocyanaceae	Herb	Pink	Whole plant	Digestive problems
28	<i>Catharanthus pusillus</i> (Murr.)	Apocyanaceae	Herb	White	whole plant	Temporary blindness
29	<i>Celosia argentea</i> L.	Amaranthaceae	Herb	Pink	Inflorescence	Irritation
30	<i>Chenopodium album</i> L.	Chenopodiaceae	Herb	white	Whole plant	Digestion problems
31	<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	Herb	White	Whole plant	Weak pulse
32	<i>Cissus quadrangularis</i> L.	Vitaceae	Shrub	White	Juice	decreased appetite
33	<i>Citrus aurantifolia</i> (Christm.)	Rutaceae	Shrub	White	Leaves	Affect on milk yield
34	<i>Citrus limon</i> (L.) swingle	Rutaceae	Shrub	White	Leaves	Nausea, vomiting
35	<i>Cleome gynandra</i> L.	Capparaceae	Herb	White	Whole plant	Severe nausea
36	<i>Cleome viscosa</i> L.	Capparaceae	Herb	Yellow	Whole plant	Weakness
37	<i>Corchorus fascicularis</i> Lam.	Tiliaceae	Herb	Yellow	Leaves	Salivation when eat it in bulk
38	<i>Crossandra infundibuliformis</i> (L.) Nees.	Acanthaceae	Herb	Orange	Leaves	Acute toxicity, dermatitis
39	<i>Croton bonplandianum</i> Baill.	Euphorbiaceae	Herb	White	Whole plant	Diarrhea, Mouth burning sensation
40	<i>Datura metal</i> L.	Solanaceae	Herb	White	Whole plant	Narcotic, Hallucination
41	<i>Datura stramonium</i> L.	Solanaceae	Herb	White	Whole plant	Memory loss, coma
42	<i>Duranta erecta</i> L.	Verbinaceae	Shrub	Yellow	Seeds, leaves	Sleepiness, weak heart beat.
43	<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Herb	Yellow	Whole plant	Affect digestive system
44	<i>Euphorium odoratum</i> L.	Asteraceae	Herb	White	Whole plant	Nausea, Liver damage
45	<i>Euphorbia tirucalli</i> L.	Euphorbiaceae	Shrub	Orange	Thorns, juice	Eating leads cattle death
46	<i>Euphorbia antiquorum</i> L.	Euphorbiaceae	Shrub	Pale green	Thorns, juice	Latex poison, hallucination
47	<i>Euphorbia tortilis</i> Rottl.	Euphorbiaceae	Shrub	Yellow	Thorns juice	Latex leads death of cattle
48	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae	Climber	Violet	Leaves	Acute toxicity, vomiting
49	<i>Heliotropium indicum</i> L.	Boraginaceae	Climber	Blue	Leaves	Low blood pressure, Hallucination
50	<i>Ipomea campanulata</i> L.	Convolvulaceae	Climber	Purple	Leaves	Growth
51	<i>Ipomea carnea</i> Jacq.	Convolvulaceae	Herb	Pink	Leaves	Bioaccumulation
52	<i>Ipomea sepiaria</i> Koen.	Convolvulaceae	Climber	Pink	Leaves,seeds	Mouth Irritation
53	<i>Ixora coccinea</i> L.	Rubiaceae	Shrub	Red	Leaves	Digestive upset
54	<i>Jasminum grandiflorum</i> L.	Oleaceae	Herb	Whitishpink	Leaves	Stress, weakness
55	<i>Jatroba curcas</i> L.	Euphorbiaceae	Shrub	Green	Leaves,seeds	Unconsciousness
56	<i>Jatropha gassypifolia</i> L.	Euphorbiaceae	Shrub	Red	Leaves,seeds	Vomiting, Death
57	<i>Lantana camara</i> L	Verbenaceae	Shrub	Pink	Berries	Affect lungs, nervous system
58	<i>Lawsonia inermis</i> L.	Lytheraceae	Shrub	Cream	Leaves,seeds	Narcotic poison
59	<i>Leucas aspera</i> (Willd.) Linn.	Lamiaceae	Herb	White	Leaves	Irritation
60	<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Herb	Yellow	Leaves	Digestive upset
61	<i>Malvastrum coromandelianum</i> L.	Malvaceae	Herb	Yellow	Leaves	Liver damage
62	<i>Martynia annua</i> L.	Martyniaceae	Herb	Purple	Seeds	Neurotoxin
63	<i>Mentha arvensis</i> L.	Lamiaceae	Herb	Blue	Leaves	Birth defects
64	<i>Mollungo pentaphylla</i> L.	Molluginaceae	Herb	White	Whole plant	Injury to liver, Salivation
65	<i>Mukia maderaspatana</i> (L.) M.Roem.	Cucurbitaceae	Climber	Yellow	Leaves	Urinary trouble
66	<i>Nerium oleander</i> L.	Apocyanaceae	Herb	Pink	Whole plant	Digestive upset
67	<i>Nicotiana tabacum</i> L.	Solanaceae	Herb	White	Whole plant	Coma and die
68	<i>Nyctanthes arbor-tristis</i> L.	Nyctaginaceae	Tree	White	Leaves	Weakness, frequent grazing leads to death
69	<i>Ocimum americanum</i> L.	Lamiaceae	Herb	White	Leaves	Respiratory problems
70	<i>Ocimum basilicum</i> L.	Lamiaceae	Herb	White	Leaves	Respiratory problems
71	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Herb	White	Leaves	Respiratory problems
72	<i>Opuntia stricta</i> (Ker.Gawl.) L.D Benson	Cactaceae	Shrub	Yellow	Prickle	Prickly, weakness
73	<i>Oxalis corniculata</i> L.	Oxalidaceae	Herb	Yellow	Whole plant	Renal damage
74	<i>Parthinium hysterophorus</i> L.	Asteraceae	Shrub	White	Whole plant	Allergic dermatitis
75	<i>Pedaliium murex</i> L.	Pedaliaceae	Shrub	Yellow	Bad odour	Smell, vomiting
76	<i>Phyllanthus acidus</i> L.	Euphorbiaceae	Tree	Red	Leaves	Liver damage
77	<i>Plectranthus amboinicus</i> (Lour.) Spreng.	Lamiaceae	Herb	Blue	Smell of leaf	Chronic ulcers

78	<i>Pongamia pinnata</i> (L.) Pierre.	Fabaceae	Tree	Purple	Leaves	Decreased growth
79	<i>Portula capillosa</i> L.	Portulacaceae	Herb	Pink	Whole plant	Chronic weight loss
80	<i>Prosopis juliflora</i> (Sw.) DC.	Fabaceae	Herb	Yellow	Spines	Thorns cause blindness
81	<i>Psidium guajava</i>	Myrtaceae	Shrub	White	Leaves	Digestive disorder
82	<i>Ricinus communis</i> L.	Euphorbiaceae	Shrub	Green	Seeds	Stomach irritation, Diarrhea
83	<i>Ruellia tuberosa</i> L.	Acanthaceae	Herb	Purple	Seeds	Toxic seed coat causes death
84	<i>Sesamum indicum</i> L.	Pedaliaceae	Herb	Purple	Seeds	Hepato-toxic
85	<i>Sida acuta</i> Burn.	Malvaceae	Herb	Yellow	Whole plant	Weakness
86	<i>Sida cordifolia</i> L.	Malvaceae	Herb	Yellow	Whole plant	Lysosomal storage disease
87	<i>Sida rhombifolia</i> L.	Malvaceae	Herb	Yellow	Whole plant	Liver failure, weakness
88	<i>Solanum surattense</i> Burm.	Solanaceae	Shrub	Violet	Prickle	Prickly, Coma leads death
89	<i>Solanum nigrum</i> L.	Solanaceae	Shrub	White	Berries	Nausea, Abdominal pain
90	<i>Solanum trilobatum</i> L.	Solanaceae	Herb	Purple	Spines	diarrhea, salivation
91	<i>Tabernaemontana divaricata</i> (L.) R. Br.	Apocyanaceae	Shrub	White	Leaves	Digestive upset
92	<i>Tecoma stans</i> (L.)	Bignoniaceae	Shrub	Yellow	Leaves	Causes death
93	<i>Tecomaria capensis</i> (Thunb.) Lindl.	Bignoniaceae	Shrub	Orange	Leaves	Salivation
94	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Shrub	Pink	Leaves	Weakness
95	<i>Tridax procumbens</i> L.	Asteraceae	Herb	White	Leaves	Stress
96	<i>Vernonia cinerea</i> (L.) Less.	Asteraceae	Herb	Violet	Leaves	Slow appetite
97	<i>Vitex negundo</i> L.	Lamiaceae	Shrub	Purple	Leaves	Severe diarrhea
98	<i>Wedelia chinensis</i> (Osbeck) Merr.	Asteraceae	Herb	Yellow	Leaves	Mouth blisters
99	<i>Wrightia tinctoria</i> (Roxb.) R.Br.	Apocyanaceae	Tree	White	Latex	Cause dropsy
100	<i>Xanthium indicum</i> J.	Asteraceae	Herb	Green	Thorns, seeds	Gastrointestinal irritation

The plants identified *Solanum surattense*, *S. nigrum* and *S. trilobatum* from the study area. Many solanaceous species are potentially poisonous due to the toxic alkaloid called solanins and cause weakness come paralysis, convulsion, coma and death [16] (table 1).

The species *Amaranthes spinosus* and *Alternathera pungens* of Amaranthaceae members were identified from the study. Amarantheaceous species accumulates toxic levels of nitrates and also contain oxalates. Nitrates are metabolized into nitrites, which bind to haemoglobin and make it unable to carry oxygen. Also causes difficulty in breathing, nervousness, frequent urination, coma and death, weakness, surviving animals may abort [17] (table 1).

The species *Brassica juncea* was identified from the family Brassicaceae. The family Brassicaceae contains toxic glycosinolates in fresh and dry seeds and vegetative parts. Most cases of poisoning involved cattle are decreasing appetite, anemia, weakness, severe vomiting and diarrhoea, paralysis, abortion collapse and death (table 1).

The whole plants of *Catharanthus roseus*, *C. pusillus* and *Allamanda cathartica* are poisonous as against this *Nerium olendor* from the same family has seeds as poisonous. Poisonous smoke of the plants can be dangerous. It is reported that its toxicity come from oleraderoside and nerioside cardiac glycosides [18-21]. They cause nausea, severe stomach pain, diarrhea, vomiting, weakness, irregular heartbeat, and dilation of pupils, dizziness, drowsiness, respiration, paralysis and death [10].

In this analysis, there are more than 50 species of invasive were identified. They are mainly native to tropical America and Australia. Most of the collected plants from Sathyamangalam are invasive in nature. Some of the species from the study is *Agave americana* Roxb, *Asclepias curassavica* L., *Cardiospermum halicacabum* L., *Hyptis suaveolens* (L.) Poit. And *Lantana camara* L (fig.4).

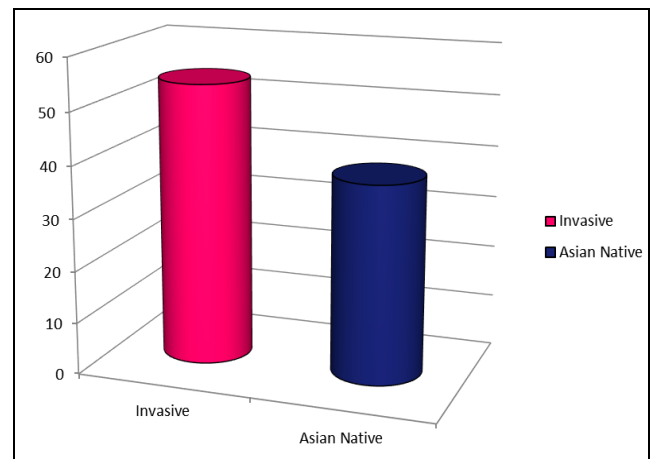


Fig 4: Analysis of Invasive and Asian native plants from the study

#### 4. Conclusion

Poisonous plants always shows their identity in everywhere with their unusual features like bad odour, bitter taste, waxy outgrowth and thorns. The present study greatly gives the enough knowledge about the poisonous plants. It may be very useful in eradicating these plants from outdoor gardens and from the agricultural field. All the farmers should be aware of these plants and the effects. It is concluded that removing of these plants from our gardens and fields will protect the animals and children from the toxic exposure.

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