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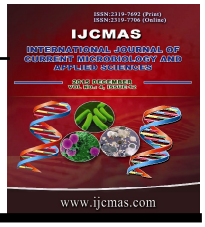

Original Research Article

A survey on some poisonous plants and their medicinal values in Dhoni Forest, Palakkad, Kerala, India

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Keywords

Poisonous plants, Toxin, Phytochemical constitutents

A B S T R A C T

Present investigation is to identify the morphological character and poisonous effect of selected but commonly available plants in Dhoni forest, Palakkad, Kerala. A total of 6 plants were mentioned along with vegetative and floral characteristics, poisonous plant parts, chemical constituents, side effects. Poisonous plants in small quantities itself can cause harm to living organisms. Defence mechanism in plants have morphological, physiological or chemical measures which help them to protect and deter the herbivores. The toxic chemical substances include proteins, oxalates, glycosides, terpenes, phenolics, alkaloids, anthocyanins, etc. Still poisonous plants too are used for various ailments due to wide number of phytochemical constituents present in it.

Introduction

Plants cannot run away from their predators, hence evolved so many mechanisms to escape from predators by means of physical, morphological and chemicals. Biologists call these adaptations "defence mechanism". A complicated array of chemical compositions help to deter herbivores and insects from eating them. It also produces adverse effects in human or economic animals such as livestock, laboratory animals, pets, wild animals, birds, fish and bees. These chemical substances may be toxic to some predators. Poisons are the most common method employed against herbivores. Vascular plants include ferns, fern allies, cycads and flowering plants. Leaves often contain various kinds of alkaloids that either kill the animals or make them sick. This chemical warfare typical of most ecosystem but is most noticeable in tropical rainforests.

Ayurvedic, Siddha and Unani have been in existence in India from ancient times. Siddha system is capable of treating all types of diseases by using poisonous plants. These plants comprise the third largest category of poisons known around world. According to World Health Organization, 80% of the population of developing countries depends on plant drugs for regular source of medicines.

Any substances can be harmful only at high concentration- as Paracelsus (1493-1541) said, " the dose make the poison". In India studies on poisonous plants has been done by Chopra et al (1949,1956,1984), Islam (1986, 1996), Desai (1999), Caisus (1986), Kumar and Sikarwar (2003) et al.

Poisonous principles are classified based on the chemistry of toxic compounds present in it: Alkaloids, Glycosides, Oxalates, Photosensitizing compounds, Phytotoxins, Polypeptides and Resins. Plants differ by degree of toxicity and classify them as extremely, moderately or minimally toxic. It is difficult to categorize plants with regard to their toxicity, since this varies with the age of the victim, environment, and stage of plant growth. Degree of toxicity is variable within a plant or plant family.

Most poisoning cases result from ingestion or other type of exposure to a plant for nutritional, therapeutic or recreational interest. Symptoms include gastro-enteritis, diarrhea and vomiting, nervous, respiratory and cardiac problems.

Knowledge of plant toxicity has always been important but has not always been reliable. Prehistoric peoples learned which plants to eat and which to avoid. In the Bibilical account, the fruits of one tree produced life, while another caused death (Genesis, Holy Bible).

The Journal of Ethnopharmacology, a US publication, published a study in 2004 described the Cerebea odollam, commonly known as "suicide tree" is consumed by more people to commit suicide than any other plant in this world. The fruit of this plant has the potential to block the calcium ion channels in heart muscle causing disruption of the heartbeat that ultimately leads to death.

Materials and Methods

Study Area

The gross area of the Palakkad Division is 240.33 Sq. km, including 72.83 Sq.km of Reserved Forests and 167.50 Sq. km of Vested Forests**.** The whole of Palakkad Forest Division is situated in Ottappalam and Palakkad Taluks of Palakkad Revenue District. The area lies between 10° 45' and 10° 55' North latitude and 76° 50' and 76° 10' East longitude. Palakkad Forest Division was formed by reorganizing Reserve Forests and Vested Forests of Palakkad Revenue District. The tract dealt with is a major portion of forests situated as a single block in Palakkad Taluk on the Eastern, Northern and Western side of Malampuzha reservoir. This block of forests extends over Walayar and Olavakkode Ranges.

Western Ghats which run almost north-south for a length of 1600 km river Tapti to Kanyakumari get divided practically into two by the Palakkad Gap, which falls in this Division. To the north of the gap is the Nilgiris with the highest peak Doda Betta. The rainfall in Palakkad District during the rainy season is comparatively lesser than that in the neighbouring districts of Thrissur and Malappuram because of the presence of this gap.

Collection and Identification of Plants

Plants mentioned in this study are all collected from Dhoni Forests, Kerala. These were identified using The Flora of Presidency of Madras (Gamble), Flowering Plants of Kerala (Sasidharan) and from other journals.

Interview and reference method

Information's are gathered from knowledgeable informants during field trips

and questionnaire and discussion with tribesmen. Plants reported as poisonous was collected, dried and pasted on the herbarium sheet. Identification is done through authentic literature and from Herbaria.

Field Study

Extensive field trip was conducted covering all seasons during the study period. Field notes were prepared and processed the specimen in the conventional way.

Result and Discussion

Taxonomic, general properties and chemical constituents of toxic plants

Datura stramonium *L., Family : Solanaceae, Local name : Ummam*

Subshrubs, 60-120 cm tall, branched, pubescent; the branches often purplish. Leaves alternate, simple, sinuately dentate, minutely puberulose; petiole 2-5 cm long. Flowers single or paired, axilary, white; Calyx tubular, 5-dentate, puberulous, persistent; strongly reflexed in fruit, apiculate. Corolla white or purplish suffused; shallowly 5-lobed, with the lobes,triangular-acuminate. Stamens 5; anthers long, with the lobes narrow oblong, usually white. Capsule erect, ovoid, spiny and densely pubescent, splitting by 4 valves; spines up to 5 mm long; seeds many, reniform and black.

Maibam Rasila Devi, Meenakshi Bawari, S.B.Paul, G.D.Sharma (2011) studied about the neutoxic and medicinal properties of *Datura stramonium*. They found the presence of tropane alkaloid and anticholinergic drugs atropine, scopolamine and narcotic cocaine. All parts of the plants are toxic but the highest amount of the alkaloids is contained in ripe seeds. When a mother uses for asthma, results in desensitizing nicotine receptors, causing permanent damage to the foetus (Pretorius & Marx, 2006).

Asparagus racemosa *Willd.,* Family : Liliaceae, Local name : Sathavari

Woody perennial climbers; stem spinescent, terete, green; rootstock with fascicled elongated tuberous roots. Cladodes from the axils of scale leaves in clusters of 2-6, linear-falcate, slightly triquetrous, base narrow, apex acute. Racemes long, slender, axillary, solitary or clustered. Flowers bisexual. Perianth-lobes 6, white, oblong, acute. Stamens 6, adnate to the perianth lobes; filaments subulate. Ovary globose 3-celled; ovules 2 per cell; stigma 3, recurved. Berries globose, purple on ripening; seeds globose.

Asparagus is unsafe to use in medicinal amounts during pregnancy. As extracts have been used for birth control, so they might harm hormone balances during pregnancy. Asparagus might cause an allergic reaction in people who are sensitive to other members of the Liliaceae family including onions, garlic etc, symptoms include a runny nose, trouble breathing, puffiness or swelling around the mouth and lips. Berries contain several furostanol and spirostanol glycosides.

Strychnos nux-vomica *L.,* Family : Loganiaceae, Local name : Kanjiram

Trees, bark yellowish or blackish-grey, smooth or scurfy with lenticels. Leaves simple, opposite, elliptic, shiny, coriaceous; glabrous; 3-5 nerved from base, prominent, glabrous; intercostae reticulate. Flowers bisexual, greenish-white. Flowers greenish-yellow. Stamens 4, anthers sessile inserted at the throat of corolla tube. Ovary 2-celled.

Globose berry, yellowish-red or orange, glabrous; seeds 3 or 4, orbicular, flat, shiny, greenish-white.

Strychnine is a highly toxic, colourless, bitter crystalline alkaloid extracted from the seeds of *Strychnos nux-vomica*. It is used as a pesticide, particularly for killing small vertebrates such as birds and rodents. Strychnine, when inhaled, swallowed or absorbed through eyes or mouth, causes a poisoning which results in muscular convulsions and eventually death through eyes or mouth, causes a poisoning which results in muscular convulsions and eventually death through asphyxia. In smaller doses acts as an athletic performance enhancer.

Gloriosa superba *L.,* Family : Liliaceae, Local name : Menthonni

Herbaceous climbers with tuberous roots. Leaves subsessile, alternate, opposite or whorled, 5-ovate-lanceolate, apex acuminate, ending in a tendril. Flowers bisexual, showy, axilliary, solitary or in few-flowered, terminal racemes. Perianth-lobes 6, free, linear-oblong, reflexed or spreading, base narrow, margin undulate, apex acuminate, yellowish below and reddish above. Stamens 6; filaments 3-4 cm long; anthers oblong-linear, versatile. Ovary oblong, 3-locular; stigmas 3. Capsule ellipsoid-oblong.

All parts of *Gloriosa superba* are poisonous and specifically the roots are highly poisonous. The active principle constitutents includes highly active alkaloids like Colchicine, Gloriosine, Superbrine, Chelidonic acid and salicyclic acid. Mode of poisonous action is attributed to its anti-mitotic activity that arrests mitosis in metaphase. Cells with high turn over and high metabolic rate like intestional epithelium, hair follicle, bone marrow cells etc are highly susceptible. Lethal dosage is 60mg in adult. Within a few hours of ingestion, the victim may experience nausea, vomiting, abdominal pain and bloody diarrhea. As the toxic syndrome progresses, it causes respiratory depression, hypotension, haematuria, seizures, and ascending polyneuropathy. Long term effects include peeling of the skin and prolonged vaginal bleeding in women. In 2005, Ashok Kumar Samanta and Uday Kumar reported a case study outlining the Clinico-Pathological aspects of poisoning by Gloriosa. They insist the awareness to people not going for dangerous, non-tested remedies and save themselves from the toxic effects.

Mimosa pudica *L.,* Family : Fabaceae, Local name : Thottavadi

Straggling herbs; stem 4-angular, with prickles. Leaves alternate, pinnae 5-10 pairs; leaflets ca 20 pairs, oblong, overlapping, apex acute-mucronate, base oblique-truncate; rachis, tomentose. Flowers pink. Lomentum flat, margin with recurved prickles; seeds 3-5, subrhombic.

Hafsa Ahmad, Sakshi Sehgal, Anurag Mishra and Rajiv Gupta in Jun-december 2012 are studied about pharmacognostic aspects of *Mimosa pudica*. The dried methanol extract of the root was administered orally to Swiss albino mice for 21 consecutive days. It has an antifertility effect as it prolongs the estrous cycle and disturbs the secretion of gonadotropin hormone in albino mice. Also noticed a significant reduction in the number of ova in rats with the root powder compared with the control rats and a significant icrease in the number of degenerated ova.

Laportea interrupta *(L.) Chew,* Family : Urticaceae, Local name : Anachoriyan

Erect monoecious annual herbs with stinging hairs. Leaves simple, alternate, broadly ovate, apex acuminate, margin coarsely serrate, sparsely hairy, membranous, 3-nerved from base. Flowers in short, cymose clusters aggregated in slender lax, axillary spikes. Male flowers: tepals 4 ; stamens 4, filaments unequal; pistillode linear, clavate. Female flowers: tepals 4, unequal, basally connate into a cup; ovary obliquely attached, ovoid, style lateral, filiform. Achenes ovoid.

P.A. Robertson and W.V. Macfarlane in 1957 proved that a stable, non-dialysable substance, resistant to heat, neutral in reaction, unattracked by proteolytic enzymes appears to be the essential pain-producing materials. It also induces sweating, piloerection and arteriolar dilation. Schildknecht.H in 1981 discovered that

stinging hairs of leaves causes intense itching shows resemble to a hypodermic needle with a large bulbous base, exciting a poisonous substances when the tip is broken.

Ichnocarpus frutescens (L.) R.Br., Family : Apocynaceae,

Climbers, branchlets brown-tomentose. Leaves simple, opposite, ovate, apex obtusely acute, base rounded, nerves 5 pairs, brown-pubescent below; petiole to 5 mm long. Flowers 3.5 mm long, in terminal or axillary panicled cymes. Calyx lobes ovate, acute, pubescent. Corolla white, salver shaped, contracted at mouth, tube 2 mm long, hairy inside, throat densely white-villous, lobes twisted, oblong, acuminate. Stamens included, anthers deeply sagitate at base, apiculate at apex. Carpels 2, free, stigma columnar. Mericarps follicular, slender, rusty puberulus; seeds many, compressed, crowned with long silky coma.

In this study conclude that medicinal plants do have toxic effects to human beings and most of them are fatal. Certain precautions about these toxic plants are enough to use these as medication purpose.

Table.1 Plant name and Medicinal properties

Sl. No.	Plant Name	Parts used	Toxicity principle	Medicinal Properties
1.	*Datura stramonium*	Whole plant	Flavanoids, tannins, steroids, tannins	Antiinflammatory,respiratory decongestion,anticancer, antiinflammatory
2.	*Asparagus racemosa*	Root, Berry	Spirostanol, furostanol	Regriferant, demulcent, antidysenteric, tuberculosis, gonorrhoea
3.	*Strychnos nux-vomica*	Bark, Leaves, Seeds	Strychnine	Skin eruptions, ulcers, colic
4.	*Gloriosa superba*	Root	Colchicine, Gloriosine, Salicyclic acid	Tonic, antifungal,antibacterial, colic.
5.	*Mimosa pudica*	Leaves, Root	Mimosine,tannin, tubulin, turgorines	Antiinflammatory, antiuterine complaints
6.	*Laportea interrupta*	Leaves, Fruits	Stinging hairs	Continuous fever
7.	*Ichnocarpus frutescens*	Leaves, Root	Phenolic acids, flavanoids,sitosterol	Antiinflammatory, analgestic, antidiabetic

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