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Forensic Analysis of Botanical Weapons used in India

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Abstract- Crime Scenario in India has been increased in many folds after Independence, a number of conventional and new trends of crime facts have been evolved in recent past years. In the field of Botany, plant and its byproducts are being used in the propagation of different crimes and illegal activities for revenge, as these botanical wastes or resin is cheaply available in the market. In India, a number of plants are found in all parts of the country which have a very high toxicity value in terms of producing toxicity and physiological changes in the body of humans as well as of animals. In the present study, three plants (Jatrophacurcas, Abruspictorious, Datura strontium) were examined and reviewed for their dependence in terms of toxicity. It was observed that the plants contains highly toxic contents and can be used as biological weapon as a poison in heinous crimes.
Keywords: Botanical Weapon, Plant Toxicity, Forensic Botany

I. INTRODUCTION

Crime Scenario in India has changed on various grounds and due to easy availability of poisons of different nature. A few plants which are named as Botanical weapons have been employed in different crimes such as murder, burglary, cattle revenge as they have very high toxic content. The toxin present in these plants may induce Physiological & psychological changes in the body that may lead to paralysis or even death which depends upon the doses. Common poisonous plants encountered can be categorized in the following

A. Irritant Plants

Irritant plants are those plants when administered in the body, thena large number of toxins that cause pain in the digestive tract, diarrhea, vomiting, abdominal cramps, and urinary tract due orders, For example, Castor oil, colocynth, Mayapple, cotton seeds, glory lily, marking nuts, red pepper seeds, rosary pea etc.

B. Cardio Toxic Plants

These plant acts on automatic nervous system and on sites of cardiovascular action (beta-adrenergic blockers and other sympathetic-inhibitors, sympathomimetic, anticholinergic and cholinomimetic substances). Many toxins involve more than one of these mechanisms, including hypoxia, electrolyte and metabolic imbalances for example, autumn crocus, common oleander, yellow oleander, suicide tree etc.

C. Neuro Toxic Plants

Neuro toxic plants have destructive impact on nervous system, these may adversely affect functions in developing and mature nervous system, e.g.-calotropis, cassava, chuckling pea, Datura, strychnos etc.

D. Hepato Toxic Plants

Hepatotoxic plants have impact on liver and its metabolism usually these are weeds which are grown in many tropical subtropical parts those plants basically a weed which is grown in many tropical and subtropical parts. For example Neem, Lantana camara etc.

E. Miscellaneous Toxic Plants

Miscellaneous toxic plants and plant products, including are canut,

F. Different Poisonous Plants

1) *Jatrophacurcas*- Jatrophacurcas (pinion of India) commonly called as 'Ratanjyot' in India is a drought resistant deciduous shrub which belongs to the family Euphorbiaceae. Jatrophacurcas is native to tropical America, but is now found abundantly in

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many tropical and sub-tropical regions throughout Africa and Asia. Its strength as a crop comes from its ability to grow on very poor and dry sites. Jatrophacurcas is a resilient plant that can adopt too many ecological conditions in any rural or urban areas of the country. Due to the toxicity of its leaves, Jatrophacurcas is not browsed and therefore traditionally used in protecting hedges around arable land and housing

2) *Datura strontium*-Daturastramonium is known by the Jimson weed or Devil's snare is a plant in the nightshade family. It is believed to have originated in Mexico. The root is long, thick, fibrous and white. The stem is stout, erect, leafy, smooth, and pale yellow-green. The stem forks off repeatedly into branches and each fork forms a leaf and a single, erect flower. The leaves are about 8 to 20 cm (3–8 in) long, smooth, toothed, soft, and irregularly undulated. All parts of Datura plants contain dangerous levels of the tropane, alkaloids, atropine, hyoscyamine, and scopolamine, which are classified as deliriants or anticholinergics.

3) *Abruspictorious*-It's commonly called as jequirity. It is a slender, perennial climber that twines around trees, shrubs, and hedges. It is a legume with long, pinnate-leafleted leaves. Abrusprecatorius is a severely invasive plant in warm temperate to tropical regions, so much so that it has become effectively pan tropical in distribution. The plant is native to India and grows in tropical and subtropical areas of the world. Once Abrusprecatorius plants grow under favourable conditions and their deep roots are extremely difficult to remove, seeds of the plant are hard-shelled seeds, The plant is best known for its seeds, of the plant are used as beads and in percussion instruments, but they are highly toxic because of the presence of abrin. Ingestion of a single seed, well chewed, can be fatal to both adults and children.

II. PRELIMINARY EXAMINATION

A. *Microscopic Examination*

Fluorescence microscope was used for the study of both of the plant structure. Many unsaturated organic compounds can fluoresce when these compounds are excited and the absorbed energy is released instantaneously as light of a longer wavelength. A fluorescence microscope excites the compounds using a short wavelength (UV to blue region of the light spectrum, 350-480 NM) light source, such as the mercury vapor lamp.

B. *Observation Table*

Properties	Jatrophacurcas	Datura strontium
Color of leaf	Light green	Dark Green
Shape of leaf	Broadly ovate	Tringularovated
Size of leaf	10-15 cm long and 7.5-1.25 cm broad	10–20 cm long and 5–18 cm broad,
Apex of leaf	Acute	Blunt at the apex.
Venation of leaf	Palmate	Subglabrous spreading herb with cylindrical stem.
Margin of leaf	Cordate	Single layered, rectangular with cuticularized outer walls
Taste of leaf	Characteristics bitter	Bitter

A microscopic study of these plants under a Microscope (Fluroresence)

C. *Forensic Analysis of Plants*

Forensic Botany is the application of plant sciences to criminal investigations. Forensic Botany incorporates several sub-disciplines Palynology (the study of pollens), Dendrochronology (the study of tree rings), Limnology (the study of aquatic environments),

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Systematics (the classification of plants), ecology (the study of ecosystems), and molecular biology. Application of Forensic Botany includes:

1) Botanical evidence in link to object or location
2) Botanical evidence in clandestine graves
3) Botanical evidence in estimating time elapsed since death.

D. Dependence of Toxicity

Different plants of interest of study are considered on the basis of their toxic nature. The degree of toxicity also depends on the location (including height above sea level), climatic factors, including the local microclimate (light, warmth, and humidity), and the growing season, type of soil, fertilization, plant variety and age. The condition of the poisonous plant material is equally important (dried, chewed, cooked, as tea). The dose of course is the most important factor.

E. Poisoning in India

In Indian Scenario, the use of plants and their residues has been evolved from ancient history of India, utilized for burning, medicinal use and for curing diseases and illness of the domestic animals also, but in criminal activities various plants can be used as they have a high toxicity value.

F. Importance of Forensic Botany

From the view of Forensic investigations, poisonous plants are used as Botanical weapon now as days for the criminal activities to consume poison mostly in rural areas. Botanical evidences are very crucial and important for the process and examination by recognition, collection, and preservation of botanical evidence for subsequent laboratory testing. For legal advice and concerns the botanical evidence can be called into court for properly being performed. Plants can also be examined by using simple microscopy or more sophisticated plant DNA testing to enhance the information which helps in criminal Investigations. Forensic botany, first requires the identification of the plant species by morphological characteristics, microscopy, or molecular biology. Forensic botany has been very helpful for Criminal investigation directly or indirectly, traditional botany uses simple, most suitable, easy, inexpensive methods for the identification and examination of plant species. Application of botany in Forensic investigations obtains data and clues for linking and identification. Identification of pollen or stomach contents can be useful in verifying a victim's geographical location or the time of death. A wide variety of plant species exist which grow to a particular location and many are restricted to specific geographic locations. Such linkage of particular features play a vital role and aid for Forensic Botanists to examine the evidences. The development of DNA typing methods for plant, has also made an advantage for a forensic botanist to analyze, identify, and as an aid in Crime Scene management.

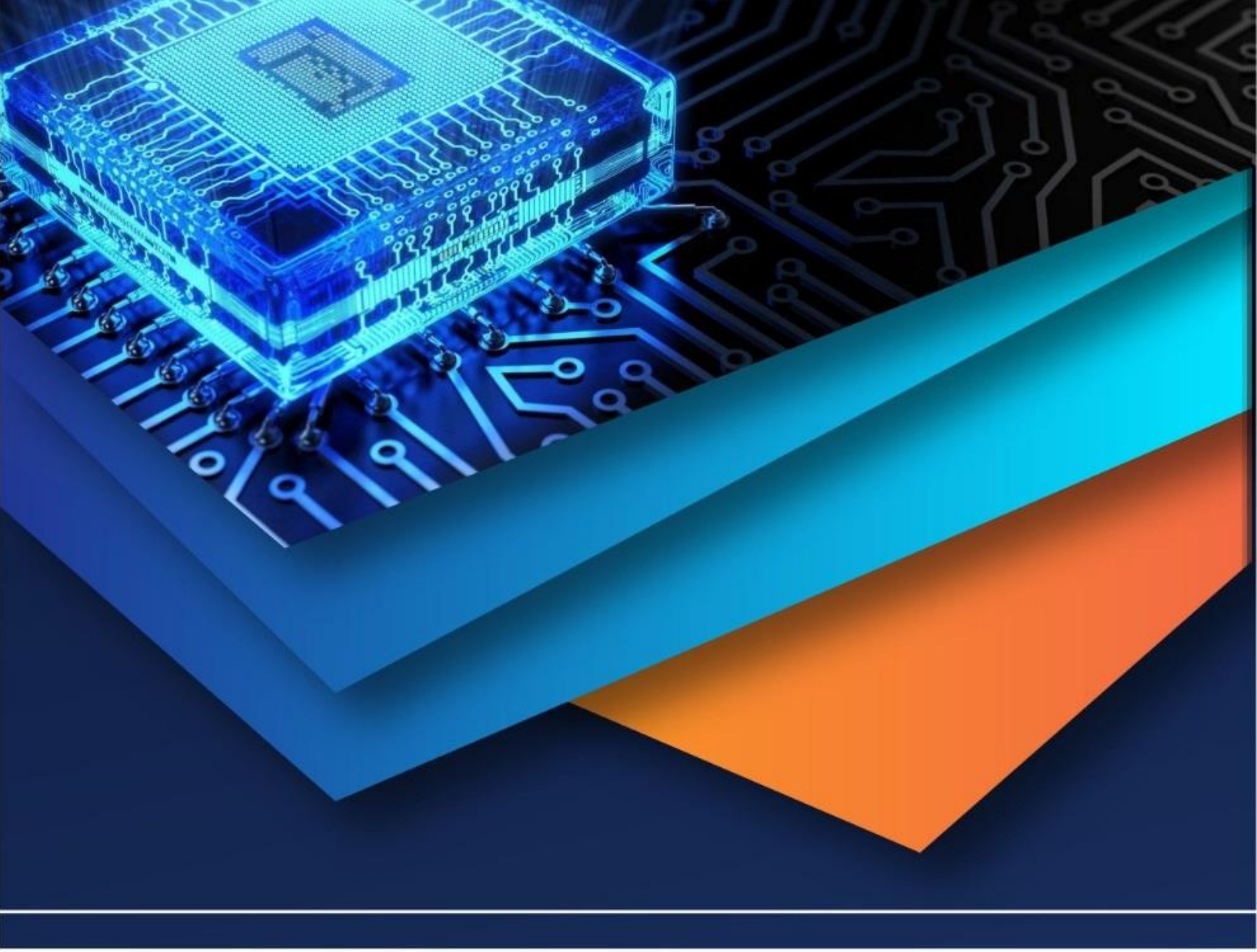
III. CONCLUSION

Due to lack of knowledge about the toxic properties of plant, poisoning cases are prone to accidental poisoning and cattle poisoning also. In crime scene investigations, botanical information helps in identification, individualization, and in reconstruction of scene of occurrence. It reveals botanical geographic and properties of the plant, leaf, root, pollen grain, etc. if found at the crime scene. So a forensic expert should have a sound knowledge about the forensic approach of botanical clues or evidences collected at the crime scene. As per earlier case studies, most cases are more prone to accidental cases of human as well as of cattle poisoning and mostly homicidal poisoning of cattle's in villages for revenge.

REFERENCES

[1] 0 Hall, DW. The contributions of the forensic botanist to crime scene investigations. The Prosecutor 1988; 22:35-8.
[2] Lee HC, Palmbach T, Miller MT. Henry Lee's crime scene handbook. San Diego (CA): Academic Press; 2001.
[3] Bock JH, Norris DO. Forensic botany: an under-utilized resource. J Forensic Sci 1997;42:364-7
[4] Miller Coyle H, Ladd C, Palmbach T, Lee HC. The Green Revolution: botanical contributions to forensics and drug enforcement. Croat Med J. 2001;42:340-5.
[5] Horrocks M, Walsh KAJ. Fine resolution of pollen patterns in limited space: differentiating a crime scene and alibi scene seven meters apart. J Forensic Sci 1999;44:417-20
[6] Quatrehomme G, Lacoste A, Bailet P, Grevin G, Ollier A. Contribution of microscopic plant anatomy to postmortem bone dating. J Forensic Sci 1997;42:140-3.
[7] url- https://doi.org/10.1007/s10340-010-0293-6
[8] url- http://www.ijabpt.com/pdf/14030-G.%20R.%20Naik.pdf
[9] http://cdn.intechopen.com/pdfs/26834.pdf

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