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TOXICITY EFFECT OF BIOPESTICIDE, *ARISAEMA MURRAYI* (HOOK) ON THE SWISS ALBINO MICE

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ABSTRACT: The poisonous and medicinal plants are found in a natural ecosystem. The *Arisaema murrayi* (Hook) is an herb which is highly poisonous. It is found in the hilly region of Mumbai area. Livestock, cattle and human beings do not consume fruits and tubers of the plant, so the forensic study of this plant is carried out. Aqueous extracts of tuber 2%, 4% and 6% feed orally to Swiss albino mice. Present investigation study includes the histopathology, phyto-chemistry and quantitative microscopy. It is observed that liver, intestine, and kidney were severally damaged by using the *Arisaema murrayi* (Hook) plant parts. The forensic study proved that these organs were damaged by the poison of *Arisaema murrayi* (Hook) plant of the tuber.

INTRODUCTION: The *Arisaema murrayi* Hook is commonly called as cobra lily or snake lily; it is a deadly poisonous plant. It is also called as Sapkanda or Rankanda. The poisoning was detected by anatomical features, visceral remnants, and quantitative microscopy. Fruits are borne on a long spadix is 4-6 inch in length, enclosed in the hood like spathe. Hood protects the fruits till the maturity. Fruits become yellowish brown after maturity. Fruit is two seeded. Black seeds are arranged on the basal placenta. In transverse section, fruits show 3 distinct zones. An outer most single layer is epicarp, middle multi-layered mesocarp, below mesocarp somewhat woody endocarp is present which encloses two seeds.

Epidermal layer of mesocarp is made up of thin-walled elliptical parenchymatous cells. Mesocarp is divided into two zones, the first layer which lies below the epidermis is formed by comparatively smaller parenchymatous cells. While the second zone of mesocarp is made by larger parenchymatous cells which are followed by endocarp. The seed consists of horseshoe-shaped xylem. Phloem consists of fibers, companion, and parenchymatous cells. In between horseshoe-shaped xylem region and pith, three smaller vascular bundles are present.

Recently, commercial repellents are plant based which is popular among customers Sandbhor *et al.*, 2014. Many plant poisoning cases in animals, as well as human beings, have been reported Parikh, 1985; Franklin, 1988. Some of these cases could not be solved based on the chemical examination of the remnants in viscera of deceased ^{1, 2, 3, 4, 5, 6, 7}. The present investigation was undertaken on *Arisaema murrayi*, Hook which deals with morphology, anatomy, and powder analysis of



fruits such type of study useful in the diagnosis of the toxin to Albino mice.

MATERIALS AND METHODS: Plant material of *Arisaema murrayi* Hook (Araceae) was collected from various places of Maharashtra such as Mahabaleshwar, Satara (Kas), Radhanagari, Lonavala, Khandala, and Mulshi (Dongarwadi). Efforts were made to collect the plants material along with the root tubers, leaves, flowers, fruits and seeds for correct botanical identification. Thin transverse sections were taken from fresh tubers, and fruits, dehydrated double stained and finally mounted in Canada balsam 8 macros, and microscopic characters were studied as per ^{9, 10}. Tubers and fruits were separated and dried in the shade, to prevent the decomposition of active principles. The powder was sieved in 70 mm mesh and stored for feeding orally to *Swiss albino* mice. Some powder of root tubers and fruits are used for phytochemical screening.

Forty Swiss albino male mice previously reared weighing about 20-25 gm, 3-4 week, divided into three groups, each consist of 10 animals were fasted for 24 hours, before the experiment. The first group of mice was fed orally for one week. 1ml suspension is containing 2 gm, 4 gm and 6 gm seed powder and tuber powder respectively in 100 ml of sterile water per day. Similarly, the second and third group was given suspension; the fourth group was kept as a control. Different groups of animals were kept in a separate cage was provided with normal food. In the forensic study, it is proved that the aqueous suspension fruit powder of plant causes death in Albino mice when feed by orally.

Dissected internal organs were collected and preserved in 70% alcohol/ 70% formalin solution for further quantitative microscopic studies.

RESULTS AND DISCUSSION: The present investigation of *Arisaema murrayi*, Hook poisoning on Albino mice has revealed that changes occur in behavior such as convulsion of limbs, drowsiness, dilation in pupils, and ultimately leading to death. Liver, kidney and small intestine got affected which carries some changes such as liver turns to black on edges and slightly congested, the color of kidney changed to black and small intestine showed black or sometimes yellowish patches, it was observed after exposure. Quantitative microscopic studies show that the fragmented material may remain in half-digested condition because toxic chemicals present in them, which were collected from the alimentary canal resembled macerated fragments of fruits of *Arisaema muraryi*, Hook.

After exposure investigation, lungs of mice were found to be congested. The small intestine has shown black or sometimes yellowish patches are performed and hemorrhaged. Liver changed to black on edges and slightly congested. Congestion on the sinusoid cells is mostly binucleated cells with many glycogen globules, fatty vacuolation around the nucleus. Intestine-mucosa and villi are damaged, goblet cells and the columnar epithelium is also damaged. The basement membrane is normal. Mucosa is irregularly arranged. Kidney-congestion of vessels has occurred, convoluted tubules, glomerules, and medullary rays are normal.

TABLE 1: MORPHOLOGICAL CHANGES OF INTERNAL ORGAN IN MICE TREATED WITH ARISAEMA MURRAYI (HOOK)

S. no.	Name of the Organ	Group I 2 %	Group II 4 %	Group III 6 %	Group IV Control
1	Lung	congested	Slightly congested	Slightly shrunken	Normal
2	Heart	Normal	Normal	Normal	Normal
3	Liver	Black	Black	Black	Normal
4	Stomach	Slightly swollen	Slightly swollen	Slightly swollen, pale yellow	Normal
5	Small intestine	Filled with fluid, blackish yellow perforated and hemorrhages	Filled with fluid black	Filled with fluid blackish yellow	Normal
6	Large intestine	Normal	Normal	Normal	Normal
7	Kidney	Black	Black	Black	Normal

TABLE 2: PHYTOCHEMICAL CHANGES IN SWISS ALBINO MICE WITH THE TREATMENT OF AQUEOUS EXTRACT OF ARISAEMA MURRAYI (HOOK)

S. no.	Test	Reagents/ Chemicals	Observations	Arisaema Fruit	Arisaema Tuber
1	Starch	I ₂ - KI	Blue color	-ve	-ve
2	Saponin	Neutral water	Foam formation	+ve	+ve
3	Protein	Picric acid	Yellow color	+ve	+ve
4	Protein	Potassium Ferocyanide	Brown color	+ve	-ve
5	Tannin	10% FeCl ₃	Blue color	+ve	+ve
6	Sugar	20% NaOH	No coloration	-ve	-ve
7	Sugar	Benidict's	Blue color	+ve	+ve
8	Anthroquinone	Benzene + NaOH	No coloration	-ve	-ve
9	Polyphenol	Toluidine blue	Blue color	+ve	+ve

TABLE 3: TREATMENT OF ALCOHOLIC EXTRACT OF ARISAEMA MURRAYI (HOOK) ON SWISS ALBINO MICE

S. no.	Test	Reagents/ Chemicals	Observations	Arisaema Fruit	Arisaema Tuber
1	Alkaloid	Mayer's	Precipitation	+ve	+ve
2	Alkaloid	Wagner's	Precipitation	+ve	+ve
3	Alkaloid	Dragendorff's	Precipitation	+ve	+ve
4	Alkaloid	Hanger's	Precipitation	+ve	+ve
5	Flavonoides	HCl + Mg turning	No coloration	-ve	-ve
6	Glycosides	Acetone + HNO ₃	No coloration	-ve	-ve

In histopathological observation, it was observed that congestion of the sinusoid cells and many glycogen globules, fatty vacuolation around the nucleus of some of the cells in the intestine, mucosa, and villi are damaged. Goblet and columnar epithelium cells are also damaged. The mucosa was irregularly arranged. Congestion of the vessel occurred in the kidney. The plant *Datura innoxia* pushes certain chemicals especially in the seed, which results in the mortality of the pest insect and therefore could be a potent source for checking the population build up by various insects¹¹.

The phytochemical investigation was carried out on fruits. It was that presence of an alkaloid colchicines present in the fruits. This chemical is toxic. By T.L.C. technique it was proved that the colored spots shown by visceral content and colored spots obtained by a genuine sample of fruit are nearly the same¹². The natural insecticide is eco-friendly and more resistant from mosquitoes.

Hence, from the preceding account, it was proved that the death of Albino mice occurred due to toxic principles of fruits. With the help of our study, we would like to suggest that the plants come at the top of the list of poisonous plant category. A fruit of

these plants fascinates to the children being crimson red. The leaf of *Thevetia peruviana* (Pers.) or *yellow oleander* were extracted in aqueous and treated against the adults of *Holotrichia serrate*, F¹³. Sometimes unknowingly cattle's are being fed the fruits along with fodder and caused to fetal death. The extent of changes of white grub induced by topical application of *Parthenium hysterophorus*, *Pongamia glabra*, *Azadirachta indica*, *Calophyllum inophyllum* and *Ipomoea fistulosa* on the oviposition and hatchability occurred¹⁴.

CONCLUSION: However, the present study was noticed to be resistant to plant extract used against the *Swiss albino* mice. The use of natural resources of plant extractives is used against the *Swiss albino* mice which are useful to crop protection is important in crop production.

The natural extracts have always been among the used by farmers who are applied to the earliest agricultural fields. These products are harmless to the environment and cheaper than chemical pesticides. The plant often extracts effective and often decompose quickly; thereby resulting in largely avoiding the pollution caused by conventional pesticides.

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CONFLICT OF INTEREST: Nil

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