

POISONOUS PLANTS WITH MEDICINAL VALUES FROM BILASPUR DISTRICT, CHATTISGARH

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SUMMARY

A brief account of poisonous plants of Bilaspur district, Chattisgarh has been presented in this paper. A total 40 poisonous plant species belonging to 32 genera and 20 families have been described. This is also briefly emphasized that plants contain numerous chemical compounds which are poisonous when misused and the same plants also yield compounds which are used for preparing life saving drugs. Typical examples are *Gloriosa superba* and *Catharanthus roseus* (*Vinca rosea*) and many more. All poisonous plants enumerated here are arranged alphabetically on their scientific name followed by family's, local name, poisonous part and toxic compound (s) therein..

Keywords : Poisonous plants, Alkaloids, Bilaspur-Chattisgarh

Introduction

Bilaspur district lies between 21°37' & 23°78'N and 81°12' & 83°40'E covering an area of ca 9,755 sq. km. The district is bounded on the East by Raigarh district on West by Mandla and Shahdol districts of Madhya Pradesh, on the North by Ambikapur district and on the South by Durg, Raipur and Raigarh districts.

Poisonous plants are in abundance in Bilaspur district which are not identified by the local people, particularly Pre School children are prone to be victimized by eating poisonous plants accidentally. In humans and animals poisoning ingredients enter in the body either accidentally or intentionally. Among animals, poisoning is usually accidental and sometimes it occurs during unfavourable conditions like pasture scarcity, drought and over grazing but in most of the cases toxic ingredients enter in animal system through

grazing. Sometimes due to confusion or ignorance human being use poisonous plant for daily need like wild edible plants, infectivity of food with noxious plants, or by the use of plants as remedies for some ailments. All these plants can affect either whole body spectrum or slightest quantity. Because plant contain a variety of toxic compounds commonly called "secondary compounds" that affect the behavior and productivity of wild and domestic animals. Vigorous effect of a toxic chemical may depend upon the growth and flowering status, amount consumed by the plants, vulnerability of plants against this fatality. The toxic chemicals found inside the plants are following kinds such as glucosides, glycosides, milky-juice (latex), alkaloids, tannins, proteins, oxalates, enzyme inhibitors, antivitamins, phytoestrogens, volatile etheric layers, photo sensitizing substances resin and acrid juice; many of

which are classified on the basis of their structural and chemical properties (Katewa *et al*, 2008).

- Alkaloids include indole alkaloids, pyrrolizidine alkaloids, tropane alkaloids, opium alkaloids,
- Glycosidal toxins include cardiac glycosides, saponin glycosides, cyanogenetic glycosides.
- Tannins like pyrogallol.
- Proteins like lectin, abrin, ricin, cicutoxin, anisatin, gelonin, falcarinol, oenotheratoxin etc. Photo sensitizing substances including hypericin .
- Enzyme inhibitors like Protease inhibitors, Amylase inhibitors, Avidin.

Plant toxins

- Abrin, Anacardiac, Anemonin, Azadiractin
- Berberine, Brucine
- Calcium oxalate, Calotropin, Cannabinol, Cardol, Carpine, Clematine, Colchine, Colosynthin, Curacasin, Curcine, Cuscutin
- Dioscorine,
- Echitamine, Euphorbon
- Hydrogen cyanide, Hyoscine
- Karabin
- Levodopa
- Neriodorin
- Oduvin
- Parthenin, Plumbagin, Plumeric, Protopine, Prunassin,
- Ricin
- Sangurinin, Saponin, Serotonin, Sesquiterpen, Sikkimianine, Strychnine, Superbine,
- Thevetin, Trichosanthin, Tylophorine
- Ushcharin, Ushuriol
- Zanthoplanin

Such poisonous constituents occur throughout the whole plant or concentrated in one or more parts. This amount varies in a given species according to habitat, weather, and type of soil, season and age. Some reports indicate that mycotoxin synthesizing fungi, mineral imbalance and some insects, helminths and bacteria also interact with plants for the formation of harmful poison.

All these plants mentioned in this paper are also used ethnobotanically but the enhanced dose creates harmful effects in human as well as in animals. So the inter-relationship of pharmacology and toxicology is important as therapeutic efficacy occurs at a lower dose, where over dosing can induce poisoning. However, poisonous plants may contain active compounds with useful biological activities (McGaw and Eloff, 2005). The objectives of this research to spread this valuable information in hand of all the people so that people became aware about the poisonous affect of plant in man and livestock. The researchers are encouraged to search literature for known toxic properties of plants and developed a procedure against the toxic effect (Watt and Breijer-Brandwyk, 1962; Verma *et al*, 1993; Hutchings *et al*, 1996; Neuwinger, 1996; Van *et al*, 2002; Botha and Penrith, 2008; Ozturk *et al*, 2008 & Chandra *et al*, 2012).

Materials and mehods

Extensive survey was conducted in Bilaspur district of Chhattisgarh and we had gathered information on poisonous plants from local people of various age groups from different localities. Voucher specimens were also collected to authenticate the gathered information and properly identified with the help of floras and deposited in well preserved condition in the herbarium of Botanical Survey of India, Central Regional Centre, Allahabad (BSA).



Fig.1. *Argemone mexicana* L.



Fig.2. *Calotropis gigantea* (L.) R. Br.



Fig.3. *Calotropis procera* (Aiton) R. Br.



Fig.4. *Abrus precatorius*



Fig.5. *Datura stramonium* L.



Fig.6. *Gloriosa superba* L.



Fig.7. *Plumbago zeylanica* L.



Fig.8. *Trichosanthes bracteata* (Lam.)
Voigt

Table 1- List of poisonous plants grown in Bilaspur district of Chattisgarh

(Many of these plants also yield chemical compounds which are used for manufacturing life saving drugs/ medicines)

S. No.	Botanical name / Family / Vernacular name	Habit	Poisonous Parts	Active Compounds	Mode of action
1.	<i>Abrus precatorius</i> L. (Fabaceae) 'GHUGHCHI' (see Fig 4.)	Climber	Roots, seeds & leaves	Abrin	Chewing of seed causes gastro-intestinal irritation and vomiting.
2.	<i>Alstonia scholaris</i> (L.) R.Br. (Apocynaceae) 'SAPTPARNI'	Tree	Latex	Echitamine	Latex is causes blindness.
3.	<i>Anacardium occidentale</i> L. (Anacardiaceae) 'KAJU'	Tree	Pericarp of fruits	Cardol & anacardiac acid	Oil is corrosive cause's blisters on skin & inflammation on eyes.
4.	<i>Argemone mexicana</i> L. (Papaveraceae) 'SHATYANASHI' (Fig.1)	Herb	Seeds	Sanguinarin, berberine, protopine	Intake of raw seed causes vomiting diarrhea followed by oedema of feet & legs and intense pain all over the body.
5.	<i>Arisaema tortuosum</i> (Wall.) Schott (Araceae) 'DHEI'	Herb	Corms and plants	Calcium oxalate	Intake of this part causes inflammation of mucous membrane.
6.	<i>Calotropis gigantea</i> (L.) R. Br. (Asclepiadaceae) 'MADAR' (Fig.2)	Shrub	Latex & leaves	Gigantin & calotropin	Latex is injurious for eye and fishes.
7.	<i>Calotropis procera</i> (Aiton) R. Br. (Asclepiadaceae) 'MADAR' (Fig.3)	Shrub	Latex	Calotropin, calotoxin & uscharin	Intake of laex fatal- injurious to eyes causes blindness, fish poison.
8.	<i>Cannabis sativa</i> L. (Cannbinaceae) 'BHANG'	Herb	Dried flower & fruiting top of female plants	Cannabinol, cannabidiol	Smoking causes loss of control in nervous system
9.	<i>Casearia elliptica</i> Willd. (Flacourtiaceae) 'BERRI'	Tree	Fruits	Cathartic acid	Fruit juice causes breathing troubles and unconsciousness.
10.	<i>Catharanthus pusillus</i> (Murr.) G. Don (Apocynaceae) 'KAPAVILA'	Herb	Latex and Seeds	Carpine	Plant toxic for cattle causes temporary madness, blindness with urticarial rashes all over the body.
11.	<i>Catharanthus roseus</i> (L.) Don (Apocynaceae) 'BARO MASIYA'	Shrub	Whole plant	Amorphous alkaloid	All the alkaloid act as poison to heart.
12.	<i>Cleistanthus collinus</i> (Roxb.) Benth. & Hook.f. (Euphorbiaceae) 'GARAREI'	Tree	Root	Saponin & oduvin	Intake of root by chance causes violent gastro intestinal irritant.
13.	<i>Clematis gouriana</i> Roxb. ex DC. (Ranunculaceae) 'IDIYA'	Climber	Leaves and stem	HCN, Clematine & anemonin	Juice of fresh leaves and stem is vesicant and produced blisters.
14.	<i>Cuscuta reflexa</i> Roxb. (Convolvulaceae) 'AMAR BAIL'	Climber	Whole plant	Cuscutin	It causes depression with nausea & vomiting.
15.	<i>Datura metel</i> L. (Solanaceae) 'DHATURA'	Shrub	Whole plant	Hyoscine	Intake of seed creates affect on mucous membrane.
16.	<i>Datura stramonium</i> L. (Solanaceae) 'DHATURA' (Fig.5)	Shrub	Whole plant	Hyoscine	Intake of whole plant causes throat dryness, giddiness and finally leads to coma.
17.	<i>Dioscorea hispida</i> Dennst. (Dioscoreaceae) 'BAICHADI'	Climber	tuberss	Dioscorine	Intake of large amount causes paralysis of the respiratory system and even death.

18.	<i>Dioscorea pentaphylla</i> L. var. <i>pentaphylla</i> (Dioscoreaceae) 'BHALUKAND'	Climber	tubers	Dioscorine	Tuber is acrid and causes inflammation of mucous membrane of mouth.
19.	<i>Euphorbia antiquorum</i> L. (Euphorbiaceae) 'TRIDHARA'	Tree	Latex	Euphorbon	Latex injurious to eyes and causes diarrhea.
20.	<i>Euphorbia neriifolia</i> L. (Euphorbiaceae) 'SEHUD'	Shrub	Latex	Euphorbon	Latex is acrid causes dermatitis and injurious for eyes.
21.	<i>Euphorbia tirucalli</i> (Euphorbiaceae) 'TIRUKALLI'	Shrub	Latex	Euphorbon	In small amount purgative while larger dose is irritant & emetic.
22.	<i>Gloriosa superba</i> L. (Liliaceae) 'KALIHARI' (Fig.6)	Climber	Tuber	Colchicine & superbine	Injurious for gastrointestinal irritation, vomiting and purging.
23.	<i>Jatropha curcas</i> L.(Euphorbiaceae) 'KULBINDI'	Shrub	Seed	Curcine, curacasin	Seed pugative produce nausea, vomiting and also causes burning in the stomach.
24.	<i>Jatropha gossypifolia</i> L. (Euphorbiaceae) 'JARABINDI'	Shrub	Seed & Bark	Curcine, curacasin	Seed is very poisonous causes severe vomiting.
25.	<i>Lathyrus aphaca</i> L. (Fabaceae) 'JANGALI MATAR'	Herb	Seed	Prussic acid	Ripe seed produces narcotic effect and possible cause of lathyrism.
26.	<i>Melia azedarach</i> L. (Meliaceae) 'BKAYAN'	Tree	Seeds	Azadiractin	Poseon may result from ingestion of toxic fruits containing resin which causes severe irritation, nausea, and degeneration of the liver and kidney.
27.	<i>Mucuna pruriens</i> (L.) DC. (Fabaceae) 'KENWACH'	Twiners	Hairs on fruits	Levdopa & serotonin	Hairs on contact with skin produce itching and blisters.
28.	<i>Nerium indicum</i> Mill. (Apocynacea) 'KANER'	Shrub	Whole plant	Neriodorin, Karabin	Karabin is a cardiac poison, acting on the heart like digitalin.
29.	<i>Parthenium hysterophorus</i> L. (Asteraceae) 'GAJARGHAS'	Herb	Whole plant	Parthenin, Sesquiterpen	Seed and plant causes allergic dermatitis in contact.
30.	<i>Plumbago zeylanica</i> L. (Plumbaginaceae) 'CHITRAK' (Fig.7)	Shrub	Root	Plumbagin	Root juice causes blister on skin.
31.	<i>Plumeria rubra</i> L. (Apocynaceae) 'GULAYCHI'	Tree	Root bark	plumeric acid	Latex is injurious for eyes.
32.	<i>Ranunculus sceleratus</i> L. (Ranunculaceae) 'JALDHANIA'	Herb	Whole plant	Acrid juice, Anemonin	Contact of plant causes blisters on skin.
33.	<i>Ricinus communis</i> L. (Euphorbiaceae) 'ARAND'	Shrub	Seed	Ricin	Intake of seed causes vomiting, colic, gastroenteritis and circulatory collapse.
34.	<i>Semecarpus anacardium</i> L. f. (Anacardiaceae) 'BHILMA'	Tree	Latex and fruits	Urushiol	Juice of fruits causes blisters on skin, inflammation of eyelids.
35.	<i>Strychnos nux- vomica</i> L. (Loganiaceae) 'KUCHILA'	Tree	Whole plant	Strychnine, brucine and strychnicine	Large doses produce titanic convulsions and death while less amount it may result mental dearrangement.
36.	<i>Thevetia peruviana</i> (Pers.) K. Schum. (Apocynaceae) 'KANER'	Shrub	Whole plant	Thevetin	In some place seed eaten for committing suicide.

37. <i>Trichosanthes bracteata</i> (Lam.) Voigt (Cucurbitaceae) 'INDRAYNE' (Fig.8)	Climber	Fruits & root	Trichosanthin	Cattle poison
38. <i>Trichosanthes dioica</i> Roxb. (Cucurbitaceae) 'PARORA'	Climber	Roots	Trichosanthin & Colosynthin	It is hydragogue and cathartic root causes fatal poisoning.
39. <i>Tylophora indica</i> (Burm.) Merr. (Asclepiadaceae) 'ANTMOOL'	Climber	Juice of plant	Tylophorine	Intake of plant causes nausea, vomiting, purging & collapse.
40. <i>Zanthoxylum armatum</i> DC. (Rutaceae) 'TEJBAL'	Shrub	Stem bark & fruits	Berberine, zanthoplanine, sikkimianie	Stem bark powder used for poisoning arrow.

Result and discussion

A total number of 40 plant species belonging to 33 genera and 20 families are used as poisonous plants for man and livestock in Bilaspur district. Out of these, 7 are herbs, 14 shrub, 9 trees and 10 climbers. Euphorbiaceae is the largest family having 7 poisonous plants, followed by Apocynaceae having 6, Fabaceae and Asclepiadaceae having 3 each, Anacardiaceae, Dioscoriaceae, Cucurbitaceae, Ranunculaceae and Solanaceae have 2 each and rest 10 families having single each. *Euphorbia* is the largest genus having 3 species, this is followed by *Calotropis*, *Catharanthus*, *Datura*, *Dioscorea*, *Jatropha* and *Trichosanthes* 2 species each and 26 genera have single species each.

Common toxic plants belong to the families like Solanaceae, Euphorbiaceae and Poaceae. Hyoscine is major constituent found in Solanaceae family. These chemical directly affect the nervous system, digestive and respiratory system. Likewise, *Dioscorea pentaphylla* is used as fodder while the higher amount causes irritation in mucous membrane of mouth. This means any medicinal plants is taken more than its desired amount which starts irregularities in our body system, because in small amounts plant showed their theraupitic value while higher quantity show the harmful effects for both human as well as livestock population (Katewa et al., 2008). Maximum toxicity was shown in latex and seeds, which directly and indirectly affect working system of body. This

is because many people lived in study area completely depending on plants for their primary health care as well as food. Every year more than 100 persons are reported to go to the clinics due to poisoning from plant taxa. There is scarcity of knowledge about the identification of poisonous plants. Identifying plants that are poisonous is difficult since poisonous plants do not appear distinctly different from their nontoxic plants. So proper identification of poisonous plants is a necessary step and it will help to minimize the incidents of poisoning. As such, there is a great need to learn to identify the poisonous plants and the conditions under which they can be dangerous to us.

Interest in medicinal and poisonous plants is increasing because it is recognized that plants are still a vast source of novel chemical compounds and starting points for herbal drug development. Synthetic drugs often produce serious side effects; moreover pesticides of plant origin are usually environmentally benign. These poisonous plants produced secondary metabolites or by-products which release from the several pathways work inside the plants. These are compounds that aren't considered fundamental to the life of a plant. Although there are many theories as to why plants produce these non essential compounds. One of the key theories maintains that plants have evolved to produce these compounds in order to deter animals from grazing on them and to keep insects from eating them.

The significances of poisonous plants show their economic, toxicological and therapeutical value since Vedic Period (Kaushik, 1988; Kaushik and Dhiman, 1997). On the basis of these findings we have reported those plants which are having medicinal as well as toxic potential. If it is somehow possible to separate out the toxic constituent from the plants then can be used as therapeutical. Proper guideline and necessary requirement of pharmacological industries for phytochemical investigation and biological

screening of above mentioned chemical found in the plants is needed. This paper provides valuable information for local people to be aware of harmful plants of their surrounding.

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