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REVIEW ARTICLE

A REVIEW ARTICLE ON AYURVEDIC/ HERBAL PLANT “ARUNA” (*ACONITUM HETEROPHYLLUM*).

Debashish Paramanick^{1*}, Neeraj Sharma², Nushrat Parveen¹, Neetu Patel¹ and Monika Keshri¹.

1. Department of Pharmacology Columbia Institute of Pharmacy, Tekari, Near Vidhansabha, Raipur (C.G.).
2. Department of Pharmacognocny College of Pharmacy, IPS Academy, Indore (M.P.).

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Abstract

In modern days there are Allopathic medicines are most widely used for general treatments. Herbal medicine are major remedy of Traditional and Ayurvedic medicine systems. Herbal or Ayurvedic medicine are less toxic or side effects. Medicinal plants are playing an important role in the drug discovery and development of new molecules. There are a number of herbs which are used from ancient time Aruna (*Aconitum heterophyllum*) is important herbs because in this medicinal plant there are a lot off pharmacological activity like Anti-inflammatory, hepatoprotective , Digestive activity. But some species of Aconitum plant is poisons in nature. This review should be of interest to readers in the areas of Pharmacognostical and Pharmacological activity and indication of *Aconitum heterophyllum*. and *Aconitum Heterophyllum* is one of the herbs which are used for its medicinal properties. *Aconitum* species belongs to the family Ranunculaceae .it's about 300 species are found in all over the world but in India, only 24 species are found in the Himalayas sub-alpine and alpine region, suits required about 2400-3600 m altitude above sea level. Seed germination micro propagation method is used for the cultivation of *Aconitum plants*. *Aconitum heterophyllum* has a lot of pharmacological use like in the treatment of urinary infection, diarrhea, as an expectorant, Anti-inflammatory, hepatoprotective activity. It is a good source of diterpene alkaloids, flavonoids. There are some indication occurs in Aconitum heterophyllum roots part: Nausea, Bleeding piles, Periodic fever, Dyspepsia, Diarrhea, Dryness of mouth. When taken in larger doses may cause constipation

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Introduction:-

Aconitum heterophyllum is a herbal medicinal plant .Aconitum species were used as the major component in the Indian Ayurvedic formulation as well as Chinese and Bhutanese herbal medicines. This species content many phytoconstituents having a lot of pharmacological activities like Anti-inflammatory, hepatoprotective activity, Digestive Property. It is known as Asian Monkshood.^{1,2,3} There are many local or traditional name in India it is also known Indian atees ,Atis root (English) Ativisha, Shuklakanda, Aruna (Sanskrit) Vishada (Urdu) Atees (Hindi) Atis and Atvika (Bengali) Ataish (Telugu) Ati Vasa (Gujarati) Ativakhani (Marathi) Ati vish (Kannada) Ati-Vishsa (Malayalam) Ati-Vidayam Atis (Panjabi).^{2,4} *Aconitum heterophyllum* is belonging to family of

Corresponding Author:- Debashish Paramanick.

Address:- Department of Pharmacology Columbia Institute of Pharmacy, Tekari, Near Vidhansabha, Raipur (C.G.).

Ranunculaceae plantae Kingdom 'Magnoliophyta' division, and Aconitum genus.^{3,4} There are Arround 300 species of Aconitum is found in all over the world in which only 24 species found in India. It consists of dried, tuberous roots of *Aconitum heterophyllum* Wall. ex. Royal, a perennial herb, native of western Himalayas and found in Kashmir, Uttarakhand Sikkim and Nepal at altitude between 2,500-4,000 m.^{5,6} Its mostly species are highly toxic in nature Its several species also known as devil's helmet, Queen of all Poisons, or blue rocket.⁴ In ancient time it were used for hunting spiko so it must need to deal with carefully.^{7,8}

Development and Anthology:-

Aconitum heterophyllum is mostly found in sub-alpine and alpine region of the Himalayas. *Aconitum heterophyllum* cultivates in moist soil. Sandy loam and acidic soil is best for seed germination, survival, better growth and yield. In general, having sandy textured soil with rich organic matter is recommended for the cultivation. The cultivation of *Aconitum heterophyllum* suits required about 2400-3600 m altitude above sea level.^{3,6,7} the rain fall required for the cultivation of natural and transplant populations of *Aconitum heterophyllum* is 664.2-1485.7 mm. *Aconitum heterophyllum* plants, grown from seeds and tuberous roots. Seeds Collect and germinated only in the beginning of the spring March-April.^{8,9} generally produce one to two daughter tubers by the end of the growing season. Daughter tubers collected during autumn after the aerial shoots senesces and replanted in the spring. It produced leafy shoots in the first year of the growth , cultivated plants produced flowers in the second year of growth There are about 50-60 percent of seeds cooled for 30-45 days germinated and produced seedling. Seedlings raised from seeds after 120 days highest survival rate, nearly 45 and 29 percent under laboratory and field condition respectively The seedling remained in vegetative phase for at least 2 years It reproduce sexually in the 3rd year. Generally produce one to two daughter tubers by the end of the growing season. Daughter tubers collected during autumn after the aerial shoots senesces and replanted in the spring. It produced leafy shoots in the first year of the growth , cultivated plants produced flowers in the second year of growth There are about 50-60 percent of seeds cooled for 30-45 days germinated and produced seedling. Seedling raised from seeds after 120-days highest survival rate, nearly 45 and 29 percent under laboratory and field conditions, respectively. The seedling remained in vegetative phase for at least 2 years It reproduced by sexually in the 3rd year.^{7,9}



Fig. 2:- Nursery (left) and green house (right) grown plants of:
A - *Aconitum balfourii*
B - *Aconitum heterophyllum*



Fig. 1:- Aconitum heterophyllum Plant



Fig.3:- Dried Root of Aconitum heterophyllum

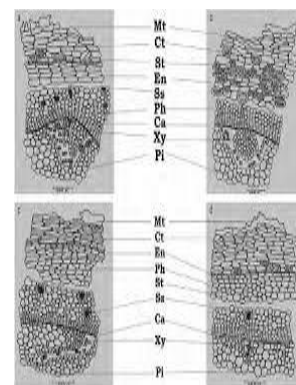


Fig 4:- Diagrammatic histological of transverse section¹⁹

Morphology of Aconitum heterophyllum:-

Roots of *Aconitum heterophyllum* is paired whitish grey in colour 2.0-7.5 cm long, 0.4-1.6 cm or more thick at its upper extremity decreasing in thickness towards tapering end.⁶ Stems of aconitum heterophyllum are simple and branched 15-20 cm high green in colour. It is a tree which has flowers from august to September. The leaves of *Aconitum heterophyllum* heteromorphous in nature dark greenish in color. The upper parts of the leaves are amplexicaul and lowest parts of leaves are long petioles, It's have a spiral (alternate) arrangements.^{6, 1}

Infinitesimal Characters:-

Transverse section of mature root shows, single layered epidermis consisting of light brown tabular cells rupturing on formation of cork It consists of 5-10 rows of tangentially elongated, thin-walled cells, cork cambium single layered consisting of tangentially elongated, thin-walled cells, cortex much wider consisting of tangentially elongated or rounded, thin-walled parenchymatous cells with intercellular spaces, cells.⁶ The structure of the root tubers of *A. heterophyllum* irregular and different from other species of aconitum the tubers have 4-6 "vascular stands". It is identical into pith and cortex these strands occur by the splitting of one vascular stands⁷.

Table 1:- Environmental growth environment for natural and transplant Populations of *Aconitum heterophyllum*⁷

Environmental characteristic	Natural	Transplanted
Altitude (m)	2450	1520
Soil texture	Silty loam	Loam
Soil pH	5.6	7.2
Soil organic carbon (%)	2.2-3.5	2.4-3.3
Soil bulk density (g/m ³)	1.43	1.75
Annual total rainfall (mm)	1485.7	664.2
Minimum temp. (C)	-19.8	-11.8
Maximum temp. (C)	28.4	36.6

Phytochemical Analysis The extracts of *Aconitum heterophyllum* of three different samples Leaf, Root, and Stem were tested for their phytochemical contents were found Alkaloids, Carbohydrate, Protrine & Amino acid, Saponins, Glycosides, Quinones, Flavonoids, Terpenoids by the different type of test.⁷

Aconitum heterophyllum Leaves:-

The methanolic extracts of the *Aconitum heterophyllum* leaf showed the presence of alkaloids, carbohydrates, protein & amino acid, saponins, phenolic compounds and tannins, cardiac glycosides, quinones. Whereas, flavonoids, steroids, glycosides, and terpenoids were found absent in aconitum heterophyllum leaves.¹⁰

Aconitum heterophyllum Roots:-

The phytochemical analysis of the *Aconitum heterophyllum* root extracts showed the presence of alkaloids, carbohydrates, protein & amino acid, saponins, phenolic compounds and tannins, cardiac glycosides, quinones, flavonoids, steroids, terpenoids. Glycosides were not present in *Aconitum heterophyllum* roots.¹⁰

Table 2:- Qualitative phytochemical screening of *Aconitum heterophyllum* Extract (+Positive, - Negative)^[21]

S. No.	Chemical Constituent	Phytochemical test	Leaf	Root	Stem
1	Alkaloids	Mayer's test	+	+	+
		Wagner's test	+	+	+
2	Carbohydrates	Fehling, test	+	+	+
3	Protein & Amino acid	Ninhydrin test	+	+	+
4	Saponins	Salkowask'y test	+	+	+
5	Glycosides	Bromine water test	+	+	+
		Cardiac Glycosides	+	+	+
6	Quinones		-	+	+
7	Flavonoids		+	+	+
8	Terpenoids		-	+	+

Aconitum heterophyllum stem:-

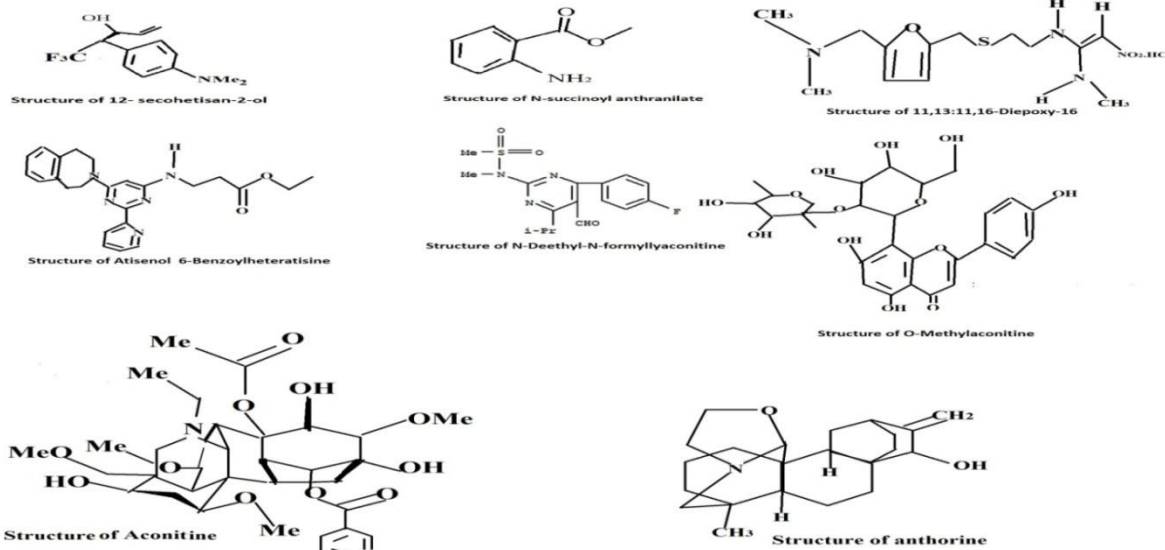
The phytochemical analysis of the *Aconitum heterophyllum* stem extracts showed the presence of alkaloids, carbohydrates, protein & amino acid, saponins, flavonoids, steroids, cardiac glycosides, terpenoids quinones in methanol extract. Absence of phenolic compounds and tannins, glycosides was observed in the *Aconitum heterophyllum* stem.¹⁰

About 54 species of *Aconitum* have been chemically investigated these species are the rich sources of diterpene alkaloids and flavonoids as well as chemotaxonomic markers.¹¹The diterpenoid alkaloids are divided in to two different type according to their substituents which affect the chemical and pharmacological properties of these alkaloids it have highly oxidative property C19-skeleton and C20-skeleton.^{12,13} It Contain Atidine, 11, 13:11, 16-Diepoxy-16, 17-dihydro-11,12-secohetisan-2-ol, Anthorine Atisenol, 6-Benzoylheteratisine.¹⁴ *Aconitum heterophyllum* also content different type of aconitine N-Diethyl-N-formylly aconitine,O-Methyl aconitine,Methyl-N-succinoyl anthranilate.¹⁴

TLC analysis In a qualitative assay, the alkaloid extracts of *Aconitum heterophyllum* turned milky color by the addition reaction with Mayer's reagent which confirmed the presence of alkaloid in the samples.The antibacterial activity of the alkaloid extract from the root of *A. heterophyllum* as well as eluted TLC bands was tested against different bacteria with certain human pathogens The crude alkaloid extract displayed moderate to strong level of antibacterial activity against *S. aureus*, *B. bronchiseptica*, *B. subtilis*, *P. putida* and *X. campestris* at higher concentration of 100 µg/ disc.¹⁵

HPLC Analysis:-

For the estimation of bioactive compound of *Aconitum heterophyllum* using a simple reversed phase HPLC-UV-DAD method. Peak heights were linear with relation to aconitine concentration with correlation coefficient >0.999. This assay is rapid, and highly reproducible and also found though a number of HPLC methods are used but the following assay system, comprising an acidic mobile phase, was found most suitable for the typical chromatogram development By optimize the extraction, separation and analytical conditions, a reliable and accurate high-performance liquid chromatography (HPLC) method coupled with photodiode array detector (DAD) was developed for simultaneous quantitative determination of six *Aconitum* alkaloids, i.e., aconitine, mesaconitine, hyaconitine, benzoylaconine, benzoylmesaconine, and benzoylhyaconine.^{16,17}



Chemical Structure of Some phytochemicals

Pharmacological Use:-

Aconitum heterophyllum has been used from centaury for the treatment and cure of many diseases externally and internally. Its juice of roots is used as an expectorant along with milk. Leaves and seeds are used for the treatment of tonsillitis. *Aconitum heterophyllum* seeds and roots are helpful in making a strong digestive system. Seeds have also diuretic properties which increase the intensity of urine and alleviate the burning sensation in the urine tract.^{18,19}

Digestive System- In a diarrhea condition, fine powder of root with dry ginger, Beel fruits, (Bellpetra in India) Nutmeg (jaiphal in India) and (Atvika in India) mixed together in equal quantity and take two pinches with water three times a day.¹⁸

Respiratory System- The juice of *aconitum heterophyllum* root along with milk is given as an expectorant. Root powder is given orally in cervical lymphadenitis condition of patients.^[1]

Urinary System- The seeds and roots of *Aconitum heterophyllum* have diuretic property, increase urine volume and reduce urinary tract burning.^[1]

Reproductive System- The root of *Aconitum heterophyllum* is used for spermatorrhoea, and its root is also used in burning of vagina.^[1]

Hepatoprotective Activity- *Aconitum heterophyllum* roots have hepatoprotective activity. This activity is due to the presence of antioxidants and others.¹⁷ The *Aconitum* are also used as antipyretic and analgesic in the far western Nepal. Modern pharmacological study finds Caffeic acid of *A. koreanum* is anti-oxidative and anti-inflammatory. *Aconitum* is mixed with 2 spoon of ghee and taken two times in a day for fever and jaundice until recovery.²⁴ The *Aconitum* are also used as antipyretic and analgesic in the far western Nepal. Modern pharmacological study finds Caffeic acid of *A. koreanum* is anti-oxidative and anti-inflammatory. *Aconitum* is mixed with 2 spoon of ghee and taken two times in a day for fever and jaundice until recovery.²⁰ The root powder of *Ativihsa* with honey is prescribed for cough irritations and bronchitis. It is an anti-helminthic and in action it is effective against guinea-worms. It is also effective in blood pressure.²¹ *Aconitum heterophyllum* roots have alexipharmic, anodyne, anti-atrabilious, anti-flatulent, anti-periodic, anti-phlegmatic, carminative property.^{22,18}

Suggestion:-

There are some indications that occur in *Aconitum heterophyllum* roots part: Nausea, Bleeding piles, Periodic fever, Dyspepsia, Diarrhea, Dryness of mouth. When taken in larger doses may cause constipation.¹⁸ Its some species are most poisons in nature.¹ In ancient time it is used as spike hunting so it must be handled with care.^{23,24}

Conclusion:-

In the present review we have made an attempt to assemble the all information on *Aconitum heterophyllum* such as botanical, Photochemical, pharmacological, toxicological. *Aconitum heterophyllum* is a medicinal herb which is used in Indian medicine system, ayurvedic system. It is a important ingredient of Krsnadi Churna in Ayurvedic formulation this formulation are used for the baby sickness where as they are most sensitive so it must need to proof toxicity of this plant there are so many research are going on this plant till now no any toxicity related data available. It has many pharmacological property such as Alexipharmic, Anodyne, Anti-atrabilius, Anti-flatulent, Anti-periodic, Anti-phlegmatic, Carminative property, anti-oxidative and anti-inflammatory, expectorant but most species of aconitum are extremely toxic in nature.for the presence of some phytoconstituents. *Aconitum heterophyllum* is the intoxicating source of phytochemical constituents that are responsible for its pharmacological activities. This plant own medicinal value that was proved from the history of ancient-formulations.

Conflict of interest:-

The authors declare that there are no conflict of interest.

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