



PHARMACOLOGY AND TOXICOLOGY OF ACONITUM FEROX

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ABSTRACT

Toxicology is the branch which deals with study, diagnosis and treatment of poisoning such as snake bites, insects, spiders, rats, poisonous plant and mineral. *Aconitum ferox* (Vatsnabh) is very toxic plant described in Ayurveda as a *Mahavish* popularly known as sweet poison. It acts as very poisonous in small amount doses. It is described as cardiac poison. It is species of monk's hood. It is very toxic in nature but acts as excellent drug if given in proper doses and detoxifying. Due to having some active compound it has some pharmacological properties such as analgesic, anti-inflammatory, antimicrobial, anaesthetic, antiarthritic, diuretic, stimulant, anti-helminthic, anti-carcinogenic, hepatoprotective activities. This review article suggests that various pharmacological activities and toxicological aspects of *aconitum ferox*.

KEYWORDS: toxicology, Ayurveda, cardiac, pharmacological, etc.

INTRODUCTION

Aconitum ferox is a member of the monkshood genus *aconitum* of the *ranunculaceae* family. The common name known in English is *Indian Aconite*.^[1] All the parts of *aconitum* are poisonous but root is most potent, dry root is usually shriveled, tapering, slightly arched and longitudinal, it is white internally, when exposed to air it becomes pink, it has a sweetish-acrid taste that's why given the name *mitha vish*, it is soluble in water.^[2] It is a tuberous rooted and herbaceous shrub, grows up to 3 feet in height. Leaves are cleft or lobed, simple, alternate, oval in shape. Tuberous roots are dark brown in color from outside and are yellow in color from inner side. Fruits are tube-like capsules that open at the top. It bears blue, yellow and pink zygomorphic flowers with numerous stamens. It appears in the month of July to November.^[3] It is also known as 'the king of poisons' due to the presence of highly poisonous alkaloids in its roots. In India, there were 27 species, mainly distributed in regions of Himalayas, it is classified into three main sections viz annual, biennial and perennial. Consumption of roots is very dangerous due to the alkaloids present in the roots, which depresses the central nervous system of our body.^[4] In foreign countries there are several names

for *aconitum ferox*, such as Mouse bane, blue rocket, women bone, Wolf's bane, Leopard's bane, monk's hood, devil's helmet and "queen of all poisons".^[5] By detoxifying it can be used for cholera, fever, leprosy, gastric disorder, debility, sore throat, sedative, tonsillitis.^[6] *Aconitum ferox* is not in use as an alterative, but it is effective in conditions such as diuretic, neurology, rheumatism, anaesthetic, antiarthritic, deobstruent, diaphoretic, sedative, stimulant, leprosy, fevers, cholera. So by detoxifying it is very important for herbal plant uses in medicine as standard medical treatment.

Toxicity

Toxicology is a branch which deals with poison with their source, mode of action, properties, signs and symptoms which they produced, fatal dose, fatal periods, method of their detection, estimation and autopsy finding. Forensic toxicology is the branch which deals with medico-legal aspects of the harmful effects of poisonous substances on the human nature. Poison is a toxic substance which when administered, inhaled, or ingested, is capable of acting with a hazardous effect on the human body.^[7] Aconite contains chief active principles which are alkaloids: aconitine, strong potent ingredient, others are picroaconitine,

pseudoaconitine, aconine, it acts direct on heart stimulates and depress the myocardium smooth muscle central nervous system, skeletal muscles, peripheral nerves.^[8] Tingling numbness in whole body, giddiness, burning sensation when orally taken, unable to swallowing, profuse sweating, patient unable to walk, stand, slurred speech occur, twitching of the muscles, cramps convulsion, pupils are in contraction and dilatation, cardiac arrhythmia, AV-block, at first tachy-cardia, in later brady-cardia hypotension, hallucination, muscular weakness, oppression of chest, death occurs from paralysis of heart or respiratory center or both.^[9] It affects cardio-toxicity and neurotoxic and it contain alkaloids, due to their harmful actions on the voltage-sensitive sodium channels of the cell membranes of excitable tissues, aconitine have arrhythmogenic properties, due to its cholinolytic effects mediated by the vagus nerve. Aconitine has a positive inotropic effect by prolonging sodium influx during the action of potential, aconitine has bradycardic and hypotensive actions due to activation of ventromedial nucleus of the hypothalamus, it blocks neuromuscular transmission by decreasing the evoked quantal release of acetylcholine, due to various ingradient it can induce contractions of the ileum by acetylcholine release from the postganglionic cholinergic nerves.^[10] The tuber of aconitine contains 0.4–0.8% diterpene alkaloids and the concentration is between 0.3% and 2.0%, in plant, 0.2% and 1.2% in the leaves. The highest concentration of aconite is in winter. the major alkaloids are aconine, pseudoaconitine aconitine, bikhacoinitine, diacetyl, veratryl gama acoine picro-acoinine, veratry pseudoaconitine, chamaconitine and di-Ac-Y-aconitine.^[11] Aconitine and mesaconitine can be absorbed through the skin dur to this ffect severe respiratory and cardiac problems, common problems are tingling, nausea with vomiting, breathing becomes harder and labored, pulse- heartbeat become weak and irregular, skin becomes cold and clammy, pain, convulsions, paralysis, nausea and vomiting and confusion and mania can occur if the alkaloids reach the brain. Multiple organ failure highest aconitum alkaloid levels are found in the liver and kidneys and lower in the heart and cerebrum.^[12]

Pharmacological activity

Aconitum has anti-pyretic, analgesic, antirhumatic appetizer, digestive properties used for all types fever. It is used in respiratory disorders, as it expel out extra phlegm and gives relief and also used in treatment of asthma and COPD, aconitine act as heart and nerve sedative and used to reduce palpitation. it is used a aphrodisiac, treating urinary disorders and very effective in seminal ejaculations. It is an anti-inflammatory in nature and used in the treatment of neuralgia and rheumatism and reduce inflammation and joint pains. Fruits are bronco-dilator, anti-asthmatic and anti-inflammatory in nature. Due to hot in potency it works to stimulate digestive system.^[13]

Systemic effect^[14]

1. Nervous system: It tingles the sensory nerve fibres, on being massaged in along with some oil, nerve fibres become numb and pain is reduced. The reactive agents are delivered through the mucous membrane. There is little effect of the extract on the brain. However, it becomes effective vasoconstrictor used in Vagus as well as the respiratory system.
2. Respiratory system: small doses of medicines made from the extract to treat pneumonitis as well as pleurisies.
3. Urinary system: used as diuretic and decrease urinary calculi.
4. Digestive system: used as Hepatostimulant, gastric secretions reduction, pain relief, appetizer.
5. Cardiovascular system: Impure variety can slow down the system, by detoxifying it can stimulate the system.
6. Reproductive system: It is used for treating amenorrhea.
7. Temperature also leave the body easily through sweat, saliva, urine, or bile.that's why act as antipyretic in action
- 8 Skin: used to increase sweating.

Alkaloids with arrhythmogenic activity and antimicrobial activity.

It induces their effect by delaying the final repolarization phase of action potential in cardiac cells, which initiates excitations. The final inexcitability-heart arrest.

One of the most active is AC. These alkaloids are toxic, They have high affinity for the open state channels at neurotoxin binding site-2. in-vitro anti proliferative effects of several atisine-type diterpene alkaloids against *Leishmania infantum*, the antiprotozoal activity of 43 C-19 there were tested on both extracellular and intracellular stages of the parasite. From among the tested compounds, three atisine-type *Aconitum* it inhibited the growth of *leishmania infantum*, without being toxic to the host cells.

In in-vitro culture system infected with *Trypanosoma cruzi*, 64 C-19 and C-20 alkaloids were tested. Two atisine-type C-20 diterpene alkaloids inhibited the growth of trypanosome *cruzi* epimastigotes.^[15]

CONCLUSION

Aconitum ferox is the most poisonous plant among all the poisonous herbal plant due to its direct effect on central nervous system and heart. Generally it is well absorbed through the skin so it should not be handled with open hand. While being very toxic effect on the body various therapeutic uses are concerned. According to Ayurveda the poison may works as medicine if it is used in a proper manner. After the process of purification, it has a tremendous or miracle effect on the human body, consequentially physician should have the sound knowledge about toxic effect of every poisonous plants as well as its therapeutic uses. so this study

elaborate both aspects of the plant that is generally used as medicine.

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