

Coin Image of Action of *Atropa belladonna* in Crude and in Homoeopathic Potentised Form

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Abstract

Atropa belladonna is a bifurcating herbaceous plant from Solanaceae natural order. Germination of seeds is difficult. Plant contains various alkaloids with various percentage in plant parts. Alkaloids are as Belladonnaare Atropine, Hyoscine (scopolamine), Hyoscyamine, and Belladonnine having anticholinergic properties. They act through parasympathetic and sympathetic nervous system. Hyoscyamine is an antagonist of muscarinic acetylcholine receptors. Atropine and Hyoscine having anticholinergic properties. By combine action they produce stimulation of higher centers of brain initially and then motor centers. *Atropa belladonna* is recommended in various pharmacological doses for various health disorders. According to Homeopathic fundamental principles homeopathic remedy Belladonna is prepared using entire Belladonna plant and its medication is used to cure a number of health conditions, particularly unexpected onset of infections with inflammation and intense heat. The Belladonna plant is highly noxious. But when is given as a homeopathic medication, it does not preserve the slightest trace of toxicity and become safe for human consumption along with its different indications. Homeopathic Belladonna is completely safe and effective for many health concerns and has different indications than pharmacological suggestions.

Keywords: *Atropa belladonna*; Toxic effects; Pharmacological use; Homoeopathic indications

Introduction

Meaning of Atropa is 'Inflexible'. It is obtained from the Greek word, by Goddess name 'Atropos'. Belladonna is from Italian and has meaning as a 'Beautiful lady'. The extract of *Atropa belladonna* was used as an essence to enhance beauty of face by boosting pale skin and dilating pupils.

Atropa belladonna is a bifurcating herbaceous plant usually growing as a bush with fleshy root. It belongs to natural order of Solanaceae. It grows abundantly in India in the Himalayan ranges at an altitude of 6,000 to 12,000 feet above the sea level. Plants grow up to 2 meters tall with elongated leaves almost 18 centimeters long. The flowers are of bell shaped and dull purple colored with green tinges and mildly scented. The fruits of it are green colored berries, on ripening they become shiny-black, and approximately 1.5 centimeters in diameter. The berries having sweet taste and are eaten by animals and they scatter these seeds in their droppings, though they are having noxious alkaloids (Table 1).

| | |
|---------|----------------------|
| Kingdom | Plant |
| Order | Solanaceae |
| Family | Solanaceae |
| Genus | Atropa |
| Species | <i>A. belladonna</i> |

| | |
|---------------|--------------------------|
| Binomial Name | <i>Atropa belladonna</i> |
|---------------|--------------------------|

Table 1: Taxonomy of *Atropa belladonna*.

Atropa belladonna is sometimes used in gardens for its large straight height and beautiful attractive berries. Germination of its seeds is often difficult, because it has hard seed coating and it produce seed inactivity. Germination usually takes many weeks due to irregular temperature conditions.

The common names of this species of Belladonna are Deadly nightshade, Devil's herb, Death cherries, Devil's berries, Naughty man's cherries, Beautiful death, Great morel (Figure 1).



Figure 1: *Atropa belladonna*.

Alkaloids of *Atropa belladonna*

Atropa belladonna contains various alkaloids. All parts of these plants are poisonous. The active alkaloids in Belladonna are Atropine, Hyoscine (scopolamine), Hyoscyamine, and Belladonine which are having anticholinergic properties, and they cause a peculiar delirium and hallucinations. All parts of this plant contain atropine. Roots have approximately 1.3%, stems 0.65%, leaves 1.2%, flowers 0.6%, ripped berries 0.7%, and seeds has 0.4% atropine alkaloids, leaves reach its highest alkaloid content when the plant is at budding stage with blossoming and roots are most poisonous in the end of plant's vegetation period. The leaves, berries and roots are extremely poisonous [1].

From a long back history, it is used in the form of medicine, cosmetic, and as a poison. Before the middle ages, it was used as a tranquilizing for the purpose of surgery. The most primitive Romans used it as a poison (the wife of Claudius and the wife of Emperor Augustus, both were believed to have used it for murder), and then it was used to make poison-tipped arrows. *Atropa belladonna* is also having poisonous effect to many domestic animals giving rise narcosis and paralysis. Though cattle and rabbits eat the plant, are not suffers from major harmful effects.

Effects of those Alkaloids on Human Beings

Atropine ($C_{17}H_{23}NO_3$) crystallizes in colorless, odorless prismatic needles and having bitter taste. It can be chemically split-up by strong acids and alkalis into tropine and tropic acid and may be reconstructed synthetically from these substances.

Atropine has two isomers. One is Hyoscyamine, which is much more active than atropine. But this substance is unstable and under chemical isolation it turns into atropine.

Atropine by means of parasympathetic nervous system inhibits salivary glands and mucus glands and through sympathetic nervous system also inhibit sweating. This happens because of atropine's an aggressive, reversible antagonist of the muscarinic acetylcholine receptors quality. It is known as an anticholinergic drug (para sympatholytic). This alkaloid disturbs the conduct of the nerve impulse by blocking the receptors.

Hyoscyamine is also known as levo-atropine. It is an opponent of muscarinic acetylcholine receptors (Antimuscarinic). It prevents the action of acetylcholine at para sympathetic region in sweat glands, stomach secretions, salivary glands, smooth muscle in the gastrointestinal tract, heart muscle specially at sinoatrial node, and at the central nervous system. It increases cardiac output and heart rate, reduces blood pressure and dries up the secretions. It may rouse the serotonin levels.

Hyoscine, also known as scopolamine, is a medicine used to treat motion sickness and postoperative nausea and vomiting. It is sometimes also used before surgery to decrease saliva. Its anticholinergic nature will cause the disruption of intellectual, reasoning and cognitive capacities, in memory and in learning [2].

Toxicological Effects at Lethal Dose

Belladonna's toxic effect depends on the person's age and health condition. Ingestion of one or two fresh Belladonna berries disturbs perception in adults. Such effect starts within one or two hours after consumption of berries. Three to four fresh berries produce

psychoactive aphrodisiac effect, up to three to ten berries gives rise to various hallucinations. The lethal dose for adults is ten to twenty berries, depending on the physiological structure of the consumer. For children two or three berries ingestion can be fatal. A standard internal dose used for medicinal purpose is 0.05 to 0.1 gm. of dried and powdered leaves. 30 to 200 mg of dry leaves or 30 to 120 mg of dry roots if smoked or ingested produces a pleasant psychoactive effect.

The adverse reactions of Atropine include nausea, dry mouth, ventricular fibrillation, tachycardia, blurred vision with dilated pupils and photophobia, loss of steadiness, and theoretically extreme confusion, dizziness, excitement with hallucinations especially among the aged persons.

Hyoscyamine's side effects include dry mouth and throat, pain in eyes, blurred vision, restlessness, dizziness, flushing, and faintness, arrhythmia. An overdose will cause headache, nausea with vomiting, and central nervous system symptoms with temporary memory loss, confusion, hallucinations, exhilaration, sexual excitement, and possible coma in extreme cases. Its euphoric and sexual effects are stronger than those of atropine but weaker than those of scopolamine. It also acts as a diuretic.

Hyoscine's common side effects include sleepiness, blurred vision, dilated pupils, and dry mouth. It is not recommended in people with glaucoma, intestinal obstruction and during pregnancy.

These alkaloids produce combine action by stimulating higher centers of brain initially and then motor centers. They inhibit secretions of saliva, dilate cutaneous blood vessels, dilate pupils, and stimulate heat regulating center situated in the floor of third ventricle. The initial stimulation is followed by depression and paralysis of the vital centers in the medulla. So, its poisoning symptoms describes in a brief as "Dry as a Bone, Red as a Beet, Blind as a Bat, Hot as a Hare and Mad as a Wet Hen" [3].

Effects/Efficacy as Pharmacological Dose

Atropa belladonna is used for various medical conditions. Along with its alkaloids it is recommended in various pharmacological doses for various health conditions.

In cases of Eyes affections, by obstructing contraction of the circular pupillary sphincter muscle Atropine encourages mydriasis. Normally it is stimulated by acetylcholine release. Thus, associate the radial pupillary dilator muscle to dilate and contract the pupil. Cycloplegia is brought by paralyzing the ciliary muscles by Atropine, whereas the action of this is to prevent the accommodation, so to allow accurate refraction in children. It also helps to reduce pain related with iridocyclitis, and helps to treat ciliary block. Atropine is used in ophthalmology as a drug to dilate the pupil for the study of the fundus. Atropine sulphate is used as a mydriatic and cycloplegic during eye examinations.

Belladonna drops used as a muscarinic antagonist, for blocking receptors in the muscles of the eye which constrict size of pupil. Belladonna nowadays rarely used for cosmetic purpose, as it brings the antagonistic effects by initiating minor visual misrepresentations, so causes inability to focus on near objects. Its prolonged use may cause impaired vision.

In cardiac cases, Atropine works as a nonselective muscarinic acetyl cholinergic antagonist. It increases the stimulation of the Sino-Atrial node (SA) and conduction through the Atrio-Ventricular node (AV) of

the heart. It restricts the actions of the vagus nerve, blocks acetylcholine receptor areas, and reduces bronchial excretions. Though atropine use to treats bradycardia (slow heart rate) in emergency situations, it can cause unpredictable slowing of heart rate when given in very low doses (i.e., below 0.5 mg) through central action on the CNS. The mechanism of atropine's conflicting bradycardial effect at low doses acquaintances with impediment of inhibitory presynaptic muscarinic auto-receptors. Thus, blocks an inhibitory parasympathetic response.

Belladonna has been used as herbal medicine for centuries as a pain reliever, muscle relaxer, anti-inflammatory, and in peptic ulcer disease, for histaminic reaction, and motion sickness, also to treat menstrual problems.

Belladonna concentrations, decoctions and powders, salt mixtures of alkaloid are still manufactured for pharmaceutical uses. These alkaloids are compounded with other constituents like phenobarbital and pectin for use in cases of various functional gastrointestinal disorders.

Scopolamine is used in the form of hydro-bromide salt for complaints of gastro intestinal tract and in motion sickness. It also used to increase the analgesic and anxiolytic effects of opioid analgesics. It was formerly used in a painkiller named "twilight sleep" during childbirth.

Atropine is used as an antidote in cases of organophosphorus poisoning and carbamate poisoning, in overdose of cholinomimetic and anticholinesterase drugs. In cases of a nerve gas attack it uses in an auto-injector. Atropinisation (administration of a sufficient dose of Atropine to block nerve gas effects) effects in 100 percent obstruction of the muscarinic acetylcholine receptors, and Atropine sulphate is consider as a standard for calculating the power of anticholinergic drugs [4].

Hyoscyamine is used in the form of sulphate or hydro-bromide in Gastro Intestinal problems and in Parkinson's disease. It can also be used to treat the toxic effects of organophosphates.

Scientific evidence to praise the practice of *A. belladonna* in its natural form for any condition is insufficient. Purified from Belladonna, predominant component called l-atropine, have accepted for medical uses from the year 1830.

Homeopathic principles

Every science has convinced fundamental philosophies which guides the whole system. Homeopathy as a medical science of treatment has a philosophy of its own and its therapeutics is based on its confident fundamental principles.

One is Law of Similia. Homeopathy has certain law 'Similia Similibus Curantur' that means 'like cures like'. The word 'Homeopathy' has a Greek origin, where 'Homeos' means 'similar' and pathos means 'suffering'. So, Homeopathy is demarcated as the healing method of symptom-similarity [5].

Hippocrates, Paracelus, and ancient Ayurveda have mentioned this law. The awareness of this law was there even earlier than Hahnemann. But it was Hahnemann who documented the universality of this law and raised up it from indistinctness to make it the origin of a complete system of medicine.

According to Homeopathic system, the choice of the medicine is based on the principle that the medicine must have the competency of creating most similar symptoms of the disease to be cured in healthy individuals.

Second key principle is Law of Minimum. Medicine's choice for whichever given case not only depend on precise homeopathic selection, but proper size of dose also affects. According to this principle Homeopath selects medicine for the patients in identical minute doses. The minute dose is the quantity of a medicine in minimum form but arouses the least probable excitation of the vital force and yet adequate to influence the required change in it. The appropriate minimum quantity is selected for a gentle remedial effect. This conception of minimum dose lead to the innovation of an applied process entitled as potentization.

Selection of the minimum dose has advantages as the specific dynamic action of it produces the characteristic, uncommon, distinguished rare symptoms of the drug, and it can have produced only by the minimum amount of potentized drug. The compactness of the dose does not permit the drug to produce organic impairment or any hazard of drug addiction or drugs antagonistic effects or undesirable exacerbation [6].

This theory of minimum dose can be confirmed by Arndt-Schultz law that small doses stimulates, medium doses paralyzes and large doses kills. Small and very large doses of the same constituent has action on living being is opposite.

Further principle is Doctrine of Drug Proving. As Homeopathic science those medicines were only prescribes whose medicinal properties are recognized through 'Drug proving'. Drug proving is an organized exploration of pathogenic (disease-producing) power of medicine on healthy human being at different ages, both sexes and of different constitutions. Such recordings of drug proving provide trustworthy information of medicines which is very necessary to cure disease homeopathically. Medicines need to be proved methodically to achieve most of details of their curative properties and they must be proved on human beings.

Another one of the principle is Doctrine of Drug Dynamization. Dynamization is a process in which the hidden remedial curative properties of natural substances in its crude state gets aroused and established into activity to an unbelievable form.

According to Dr. Stuart Close, "Homeopathic potentization is a mathematical and mechanical process for the reduction, according to scale of crude and inert or poisonous medicinal substances to a state of physical solubility, physiological assimilability and therapeutic activity by harmless way for use as homeopathic healing remedies."

Homeopathy faiths that vital force is dynamic in nature and when it is affected by disease force, it can be cured only by the dynamic power of functional medicine, irrespective of its material quantity. By this process of dynamization the most active and deadly poisonous substances are not only become harmless, but also transformed into advantageous therapeutic beneficial healing remedies. Medicinally inactive substances in their crude natural state thus become active and effective for healing the sick. The medicinal therapeutic qualities of the drugs thus get enhanced and their sphere of action is expanded by this process. The action of such potentized medicines is longer, deeper and more wide-spread [7].

Use in Potencies Form

To prepare the homeopathic remedy Belladonna entire Belladonna plant is used. Its prepared medication is used to cure a various health conditions, predominantly sudden onset of infections supplemented by inflammation and intense high temperature.

The discovery of Belladonna moves around the homeopathic principle "Like cures like" means a substance which causes an illness can also supports to the cure when administered in highly diluted form. Centuries ago it was well-known that Belladonna poisoning closely resembles with scarlet fever symptoms. Homeopathy founder Dr. Samuel Hahnemann introduced Belladonna in homeopathic form.

Over the time, homeopathic Belladonna was also noticed achievement in treatment of the common cold or flu symptoms, acute inflammation with pain, arthritis, red and swollen joints with osteoarthritis which become shiny and agonizingly painful, sinusitis, inflammation of kidneys, sunstroke, carbuncle, measles, ear affections, inflammation of eyes, gallbladder disorders, convulsions, cystitis, high blood pressure, dysmenorrhea, inflammation of breast, especially during breast feeding period and female's other health problems. Belladonna was discovered a good remedy for the unexpected onset of a fever after overheated or getting chilled.

Complementary symptoms include flushed bright red face, glassy eyes with dilated pupils, tongue is red, and skin become dry hot. An inflamed part looks red along with burning sensation in inflamed part. With this there is swelling and throbbing stinging pains.

People who have need of the homeopathic remedy Belladonna generally having symptoms like acute infection with fever, agonizing pain, and intense headache due to rapid blood circulation. He has dilated pupils, congested red face and flushed dry skin.

Some patients feel hands and feet getting cold due to inadequate blood circulation. Many a times, these people develop hypersensitiveness to light, noise and touch when they fall sick or ill. They become extremely sensitive to rapid changes in the temperature. Generally, Belladonna can get prescribe for people who are having persistent severe soreness, infection along with any inflammation, especially of the upper part of the respiratory tract.

It is also known as medication for dysmenorrhea with excessive menstrual flow. The sufferings of Belladonna initiates suddenly, runs consistent course, and diminishes suddenly. The painful anguish comes rapidly with great violence and subside abruptly.

Belladonna is specified to treat pediatric febrile convulsions.

Homeopathic Belladonna is also used to treat cardiac complaints and of blood vessels. Its action on the circulatory system reveals its practicality in treating increased blood pressure with hard throbbing pulse. Most commonly indignation and anger will lead to hypertension of Belladonna. Flushing and vascular congestion are the trademarks of this remedy, with engorgement of blood vessels and throbbing, pulsating pains. It is also useful in the nervous system affection which includes different types of neuralgia like infra-orbital neuralgia, in prosopalgia where the face is swollen, become bright red and with severe pain. Also used for jerking and twitching of the muscles [8].

As mentioned, the Belladonna plant is highly noxious. But when given in a homeopathic medication form, it does not hold the least trace of toxicity and become nontoxic and harmless for human use.

Homeopathic Belladonna is indicated for the heart, the whole vascular system, lungs and brain and nervous system affections.

It is necessary to recognize the dissimilarity between availability of homeopathic Belladonna and herbal Belladonna. Herbal Belladonna preparations are sold in several forms like essences, tablets, ointments and pump sprays. Homeopathic Belladonna can get in liquids, tinctures, gels, pellets and teething tablets form [9].

In the controversy to conservative medicines which many time causes some supplementary side effects, whereas Homeopathic Belladonna is completely safe, harmless and effective for many health disorders.

Conclusion

Atropa belladonna contains various alkaloids which are combinedly having anticholinergic properties, and they cause a peculiar delirium and hallucinations. Belladonna's toxic effect in crude form depends on the person's age and health condition. *Atropa belladonna* is used with its alkaloids and is recommended in various pharmacological doses for various health conditions.

Homeopathically prepared remedy *Atropa belladonna* is also used to cure a various health conditions, predominantly when there is sudden onset of infections supplemented by inflammation with intense high temperature.

The sufferings of Belladonna initiates suddenly, runs consistent course, and diminishes suddenly. As mentioned, the Belladonna plant is highly noxious. But when given in a homeopathic medication form, it does not hold the least trace of toxicity and become nontoxic and harmless for human use.

Thus, it shows the different action of same drug substance, *Atropa belladonna* in crude form, in toxicological dose, in pharmacological dose and totally different reflection of action when used in Homeopathic potentized form. It seems as if coin is showing its different sides.

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