



Toxicological Review On Subtoxins (Upavisha) As Per Ayurveda

¹Dr. HP Joshi, ²Dr. Kavita Sharma, ³Dr. Natasha Yadav, ⁴Dr. Rakesh Sharma

¹MD (Ayu.), Dept. of Rasashastra and Bhaishajya Kalpana,

¹Associate Professor, Dept. of Agad Tantra & Vidhi Vaidhak, Govt. Ayurveda Yoga, & Naturopathy College, Jaipur, India

¹Ex. Associate Professor, Dept. of Rasashastra and Bhaishajya Kalpana, Dr. Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur, India

²Associate Professor, Dept. of Rasashastra and Bhaishajya Kalpana, Govt. Ayurveda Yoga, & Naturopathy College, Jaipur, India

³Assistant Professor, Dept. of Dravyaguna, Govt. Ayurveda Yoga, & Naturopathy College, Jaipur, India

⁴Associate Professor, Dept. of Rachana Sharir, Director of Centre for Human Resource Development, Dr. Sarvepalli Radhakrishnan Rajasthan Ayurveda University, Jodhpur, India

Citation of this Article: Dr. HP Joshi, Dr. Kavita Sharma, Dr. Natasha Yadav, Dr. Rakesh Sharma, “Toxicological Review On Subtoxins (Upavisha) As Per Ayurveda.” IJMSAR – March – 2024, Vol. – 7, Issue - 1, Page No. 51-69.

Copyright: © 2024, Dr. HP Joshi, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License. This allows others to remix, tweak, and build upon the work non commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Corresponding Author: Dr. HP Joshi, MD (Ayu.), Dept. of Rasashastra and Bhaishajya Kalpana, Associate Professor, Dept. of Agad Tantra & Vidhi Vaidhak, Govt. Ayurveda Yoga, & Naturopathy College, Jaipur, India

Type of Publication: A Review Article

Conflicts of Interest: Nil

ABSTRACT

In classical Sanskrit literature, Ayurveda was called "the science of eight components" (Sanskrit aṣṭāṅga) a classification that became canonical for Ayurveda. In Ayurveda literature Upavisha are the group of drugs which were less toxic in nature and not so lethal but produce certain toxic symptoms on consumption or administrations. Our ancient Acharya suggests that the poison can become a very good medicine if it is administered properly. This review is a sincere attempt to summarize the information concerning about semi poisonous drugs described in Indian system of medicine in respect to their literary, pharmacological activity, their toxicological effect, fatal period, fatal dose, treatment, postmortem appearance and medicolegal aspect.

Keywords

Ayurveda, Agadatantra, Upavisha, Poison, Pharmacological Activity.

INTRODUCTION

Ayurveda is the science of health and healing. It deals with positive health and describes the ways of life pertaining to its existence, maintenance, protection from diseases and cure when it is victimized by them. It also teaches how to expand the span of life¹. In classical Sanskrit literature, Ayurveda was called "the science of eight components" (Sanskrit aṣṭāṅga), a classification that became canonical for Ayurveda².

1. Kāya-chikitsā (Internal medicine)
2. Kaumāra-bhṛtya (Pediatrics)
3. Śhalya-chikitsā (Surgery)
4. Śālākya-tantra (Ophthalmology / ENT)
5. Bhūta-vidyā (Demonology/ exorcism/psychiatry)
6. Agada-tantra (Toxicology)
7. Rasayana-tantra (Elixirs)
8. Vājīkaraṇa tantra (Aphrodisiacs)

Agadatantra is one of the incredible branch of indigenous branches derived from the ancient science of Ashtanga Ayurveda. It is still practiced extensively, especially in rural and tribal areas. It is used for diagnosis of poisons and their treatment and also used in medicolegal cases in the court of law for the justice. It has been stated categorically that strong poisons could be the best medicine, if it is used after proper detoxification (Shodhana), in proper therapeutic dose and formulation. On the contrary, a good medicine may affect adversely unless it is used for proper person in proper dose³.

UPAVISHA

Ayurveda has been described eleven number of Upavisha are as follows⁴-

Vishatindikabeejamcha twahiphenascha rechakam |
Dhatturbeejam vijaya gunja bhallatakahyah ||
Arkaksheeram snuhiksheeram langali karavirakam |
Samakhya to ganoayam tu budhairupavisharbhidh: ||

Vishatindikabeeja, ahiphena, rechaka, dhatturbeeja, vijaya, gunja, bhallataka, Arkaksheera, snuhiksheera, langali, karavirakam are the Upavisha described in the literature which can become a very good medicine if it is administered properly. It is a sincere attempt to summarize the information concerning about Upavisha drugs described in Indian system of medicine in respect to their Ayurveda literature, pharmacological activity and their toxicological effect, fatal period, fatal dose, treatment and postmortem appearance and medico legal aspect one by one.

1. KUPEELU

It consists of dried seed of *Strychnos nux* - vomica Linn. of family Fabaceae.

Vernacular Names^{5, 24, 25}

Sanskrit: Karaskara, Visatinduka, Kakatinduka

Hindi: Kuchala, Kuchila, Vishtenduka

English: Poison-nut tree, Nux vomica

Description⁵

Macroscopic

Occurrence: Hard, silky to touch with a satiny sheen.

Shape: Disc-shaped, almost flat

Colour: Greenish-grey to grey

Odour: Odourless

Taste: Bitter

Extra features:

Seeds are umbonate but a few seeds somewhat irregularly bent, 10 to 30 mm in diameter, 4 to 6 mm thick, margin rounded or depressed; when cut open, endosperm found to be horny, having a central cavity in which the embryo is situated with two small, thin, cordate, leafy cotyledons with 5 to 7 veins and a terete radical.

Pharmacology:

Antimicrobial activity⁶, antibacterial activity⁷, anticancer, antimicrobial, anti-inflammatory, antioxidant, and anti feederent activity⁸

Ayurvedic Pharmacology^{5,9, 24, 25}:

Guna: Laghu, Ruksha, Tiksna

Rasa: Katu, Tikta

Vipika: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavara visha, Upavisha, phala visha (beeja visha)

Modern Medicine:

Neurotoxic spinal excitant poison

Active principle¹¹:

Strychnine, Brucine, Loganin

Signs and Symptoms¹²:

Bitter taste, twitching and stiffness of muscles of face and neck, convulsions initially clonic and then tonic, ophisthotonus posture, emprosthotonus posture, pleurosthotonus posture, chest becomes fixed, breathing difficult, cyanosis, blood stained froth at nose and mouth, dilated pupils, painful death.

Fatal Period:

1-2 crushed seed (15 - 30 mg of strychnine)

Fatal dose:

1-2 hrs

Treatment:

Shift patient to dark quite room, anaesthetize the patient, gastric lavage with KMnO₄ antidote phenobarbitone sodium IV, mephaneisn as muscle relaxants, artificial respiration.

PM Appearance:

Features of asphyxia, rigor mortis appears early Medico legal Aspect: Death is usually accidental, rarely used as suicidal and homicidal. Used as aphrodisiac, cattle and arrow poison and to kill dogs and rats.

Important Formulations:

Maha Vishagarbha Taila, Ekanggavira Rasa, Vishatinduka Vati, Krimimudgara Rasa, Navajeevanrasa, Agnitundirasa, Laxmivilasarasa, Shulnirmulananarasa, Suptivaatarirasa, Vishatinduka Tail13, 24, 25.

2. AHIPHENA

It is dried juice of Papaver somniferum Linn. Of family Papaveraceae.

Vernacular Names^{24, 25}

Sanskrit: Ahiphena, Aphuka. Tilabheda

Hindi: Afim

English: Opium, Poppy plant.

Description¹⁴

Macroscopic

Occurrence: Dried juice

Colour: White

Odour: Opium

Taste: Bitter

Pharmacology¹⁵: Narcotic, sedative, hypnotic, analgesic, sudorific, anodyne, antispasmodic

Ayurveda Pharmacology^{9, 24, 25}:

Guna: Ruksha, Suksma

Rasa: Tikta, Kashaya

Vipika: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavara visha, Upavisha

Modern Medicine:

Neurotoxic Cerebral Somniferous vegetable poison

Active Principle¹¹:

Morphine, Codeine, Papaverine, Thebaine, Noscapine, Narcine Semi synthetic derivatives – Heroin (brown

sugar) Synthetic derivatives – Pethidine.

Signs and Symptoms¹²:

Coma, typical opium smell, cyanosis. Froath at nose and mouth, pin point pupils, cheyne stroke breathing, slow pulse, moist cold skin, hypothermia.

Fatal Dose:

200 mg as a morphine. 2 gm as an opium. 10 ml of tincture of opium.

Codeine – 500 mg

Heroin – 50 mg.

Pethidine – 1 gm.

Fatal Period:

6 to 12 hours

Treatment:

Gastric lavage, enema and purgatives, high tension oxygen and Coramine, Naloxone 0.4- 2mg IV every 5 min as antidote.

PM Appearance:

Smell of opium, face deeply cyanosed, black PM lividity, froth at nose and mouth, viscera congested, signs of coma or comato-asphyxia.

Medicolegal Aspects:

Opium is the ideal suicidal poison, commonly used for suicidal, homicidal and accidental poisoning is common in infants and children. Morphine is a drug of addiction, it considered an aphrodisiac.

Important Formulations:

Vedanantakrasa, Nidrodayarasa, Ahiphenasava, Harsodayavati, Mangalodayavati^{13, 24, 25}.

3. JAYAPALA

It consists of dried seed of Croton tiglium Linn. of family Euphorbiaceae. Vernacular names¹⁶

Classical Name:

Sanskrit: Jayapal, Dravanti, Mukula, Tintidiphala

Hindi: Jamalgota

English: Croton

Description¹⁶

Macroscopic

Occurrence: Seed albuminous, ovate, oblong, slightly quadrangular, convex on dorsal and somewhat flattened on ventral surface

Colour: Brown

Odour: Odourless

Taste: Sweet

Extra features:

Seeds are about 12 mm in length and resemble castor seed in shape, dull cinnamon-brown, often mottled with black due to abrasion in testa, caruncle easily detached and usually absent, hilum on ventral side less distinct than that of castor seed, raphe runs along ventral surface of seed, terminating in a dark chalaza at opposite extremity, kernel yellowish and oily, consisting of a large endosperm, enclosing papery cotyledons and a small radicle, no marked odour; kernel gives at first oily taste followed by an unpleasant acidity.

Pharmacology:

Cathartic, rubefacient, irritant, purgative, analgesic, antimicrobial, antileukemic action, Antinociceptive and Smooth Muscle relaxant action^{15, 17-20}.

Ayurveda Pharmacology^{9, 16, 24, 25}:

Guna: Guru, SnigdhaRasa: Madhura

Vipaka: Madhura

Virya: Shita

Classification¹⁰:

Ayurveda:

Sthavar visha, beejvisha, upavisha

Modern science:

Irritant vegetable poison

Active principle¹¹:

Fixed oil, Resins & Phorbol esters, Croton, Crotonocide

Signs and Symptoms¹²:

GIT irritation, salivation, bloody stools, tachycardia, vertigo, collapse and death, locally vesication, burning and redness of skin

Fatal dose:

4-5 crushed seeds, 20 drops of oil

Fatal period:

Variable

Treatment:

Warm water for drink, general lines of treatment.

PM Appearance:

Signs of gastroenteritis.

Medicolegal Aspects:

Poisoning is commonly accidental and rarely suicidal or homicidal, sometimes used as abortifacient.

Important formulations:

Ichhabhedi Rasa, Avakancuk Rasa, Jalodari Rasa^{13,24,25}.

4. DHATURA

It consists of dried seeds of Datura mete Linn. syn. D. fastuosa L., D. alba Ramph; D. cornucopaea Hort. of family Solanaceae.

Vernacular Names²¹

Sanskrit: Kanaka, Dhustura, Ummatta

Hindi: Dhatura

English: White Thorn Apple

Description²¹

Macroscopic

Occurrence: Seed reniform, compressed, flattened, surface finely pitted.

Colour: Light brown

Odour: Odourless

Taste: Bitter

Extra features:

Seeds are about 0.6 cm long, 0.4 cm wide; light brown to yellowish-brown in colour; thicker towards the curved edge, which is rugose; large, pale strophiole near micropyle.

Pharmacology:

Anticatarrhal, febrifuge, antidiarrhoeal, antidermatosis, narcotic, analgesic and CNS depressant action^{15, 22, 23}

Ayurveda Pharmacology^{9, 21, 24, 25}:

Guna: Tikta, Ruksha, Guru

Rasa: Madhura, Katu,

Kashaya, Tikta

Vipika: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavar visha, Beejvisha, upavisha

Modern science:

Neurotoxic, Cerebral, Deliriant, Stupefying poison

Active principles¹¹:

Alkaloids - Tropane

Alkaloids – Hyoscyamine, Hyosine, Atropine etc. and Fixed Oil

Sign and Symptoms¹²:

The feature are classically described as dry as bone, red as a beet, blind as a bat, hot as a hare and mad as a wet hen. Dryness of mouth, dysphagia, unquenchable thirst, dilated pupils, skin dry and hot, delirium, Carphologia, drowsiness, death.

Fatal dose:

100-125 seeds

Fatal period:

24 hrs

Treatment:

Stomach wash, pilocarpine 15mg or prostigmine 1mg S.C., Barbiturates or ether inhalation, purgatives and systematic.

PM Appearance:

Congestion of stomach and all other viscera.

Medicolegal Aspects:

It commonly known as road side poison, since it is used for road side crimes like robbery, theft, kidnapping and rape. Sometime used for suicide or homicide, accidental poisoning is common.

Important formulations:

Kanakasava, Kanakasundara Rasa, Unmadgajankush rasa, Prataplankeshwara rasa^{13, 24, 25.}

5. BHANGA (VIJAYA)

It consists of dried leaves of cultivated or wild plants of Cannabis sativa Linn. Of family Cannabinaceae.

Vernacular Names²⁶

Sanskrit: Bhang, Madani

Hindi: Bhang, Bhang

English: Indian Hemp

Description²⁶

Macroscopic

Occurrence: Leaves palmately compound, leaflets linear, lanceolate with serrate margins

Colour: Dark green

Odour: Strong odour

Taste: Bitter

Extra features:

Leaves are about 5-20 cm long, pointed, narrow at base, upper green and rough, lower pale, downy, leaves of female plants longer than the male, odour, strong and characteristic, taste, slightly acid.

Pharmacology:

Hallucinogenic, hypnotic, sedative, analgesic, antiinflammatory¹⁵

Ayurveda Pharmacology^{9, 24-26}:

Guna: Laghu, Tikta

Rasa: Tikta

Vipaka: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Stavara visha, Upavish, Mulavish

Modern Science:

Neurotoxic, Cerebral, Deliriant, Stupefying poison

Active principles¹¹:

Resin (Cannabinols, particularly tetrahydrocannabinol)

Signs and Symptoms¹²:

1. Stage of Excitement- person is pleased, cheerful, well talkative though rarely running amok, increased appetite, loss of perception of time and space, hallucinations, smell is like burnt rope. 2. Stage of Narcosis- giddiness, confusion, drowsiness, dilated pupils, tingling and numbness, coma.

Fatal Dose:

- 1) Bhang – 10 gm/kg body wt.
- 2) Ganja – 8 gm/kg body wt.
- 3) Charas – 2 gm/kg Abody wt.

Fatal Period: Approximately 12 hours.

Treatment:

Stomach wash, symptomatic treatment.

PM Appearance:

Featur of asphyxia.

Medicolegal Aspects:

Is a drug of addiction, rarely used for homicide, commonly used as stupefying poison, accidental poisoning is common, may be running amoke.

Important formulations:

Tryalokyavijaya vati, Madanodaya Modaka^{13, 24-25}

6. GUNJA

It consists of seeds of Abrus precatorius Linn. of family Leguminosae

Vernacular names^{24,25}

Sanskrit: Raktika, Kakananti

Hindi: Ratti, Ghungchi

English: Indian liquorice, Jeurity, gunchi, rati, Rosary Pea

Description⁵

Macroscopic

Occurrence: Characterised by smooth, glossy surface and bright scarlet.

Colour: Black

Taste: Sweet

Odour: Odourless

Extra features:

Patch hilum, ovoid or sub-globular, 5-8 mm long, 4-5 mm broad. Pharmacology: Uterine stimulant, abortifacient, toxic, teratogenic¹⁵

Ayurveda pharmacology^{9, 24, 25}:

Rasa: Tikta, Kashaya

Guna: Ruksha, Laghu, Tikta

Vipika: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavara visha, Upavish, mulavisha, beejvisha

Modern science:

Irritant organic vegetable poison.

Active Principle¹¹:

An albuminous substance (abrine and abralin).

Signs and Symptoms¹²:

On ingestion GIT irritation, nausea, vomiting, abdominal pain and diarrhoea, on injection painful swelling, necrosis, vertigo, arrhythmias, convulsions, death. Symptoms resemble viper snake bite.

Fatal Dose:

1 – 2 seeds if ingested. Tinture by parental root 90 to 120 mg. Abrin – 0.0001 mg – 0.0002 mg/kg body wt.

Fatal Period:

3 – 5 days.

Treatment:

Injection of Antiabrin and symptomatic treatment.

PM Appearance:

Petechial haemorrhages under skin, pleura, pericardium and peritoneum, internal organ congested, local necrosis.

Medicolegal Aspects:

Commonly used as cattle poison, used as homicidal, used as arrow poison.

Important formulations:

Mritsanjeevani gutika, Gunjabhadra Rasa^{13, 24, 25}

7. BHALLATAKA

It consists of mature fruit of *Semecarpus anacardium* Linn. of family Anacardiaceae.

Vernacular Names^{24,25}

Sanskrit: Aruskara, Bhallata

Hindi: Bhilawa

English: Marking Nut

Description⁵:

Macroscopic

Occurrence: Fruit laterally flattened, drupaceous.

Colour: Dark brown/black

Taste: -

Odour: Odourless

Extra features:

Nut 2.5-3 cm long, obliquely ovoid, smooth, shining with residual receptacle.

Pharmacology:

Anti-inflammatory, antitumour¹⁵, antiarthritic, anthelmintic, antioxidative and anticancer activity^{27,28}

Ayurveda pharmacology⁹:

Guan: Laghu, Tikta, Snigdha

Rasa: Madhura, Katu, Tikta, Kashaya

Valpak: Madhura

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavar visha, Beejvisha, upavisha

Modern Science:

Irritant organic vegetable poison

Active principle¹¹:

Semicarbol, bhilawanol.

Signs and symptoms¹²:

Black vesicles on skin and itching, blisters in throat, GIT irritation, dyspnoea, tachycardia, hypotension, are flexia, delirium, coma, cyanosis, death.

Fatal dose:

5-10gm

Fatal period:

12-24 hrs

Treatment:

General line of treatment.

PM Appearances:

Blisters seen in the mouth, throat and stomach, features of gastroenteritis.

Medicolegal Aspects:

Used for vitriolage, used as abortifacient, applied on skin to put an allegation of assault.

Important formulations:

Bhallataka Rasayana, Bhallatakadi Modaka, Amrita Bhallataka Leha, Sanjeevani vati^{13,24,25}.

8. Arka

It consists of dried roots of *Calotropis procera* (Ait.) R. Br. of family Asclepiadaceae.

Vernacular Names^{24,25}

Sanskrit: Ravi, Bhanu, Tapana

Hindi: Aak, Madar, Akavana

English: Madar Tree

Description⁵

Macroscopic

Occurrence: Root: Rough, fissured longitudinally and soft.

Colour: Yellowish-Grey

Taste: Bitter and acrid

Odour: Acrid

Extra Features:

Roots externally yellowish-grey while internally white, central core cream coloured, bark easily separated from xylem, odour, characteristic:

Pharmacology:

Ascaricidal, schizonticidal, nematocidal, anti- microbial, antihelmintic, molluscicidal, insecticidal, anti-inflammatory, anti- diarrhoeal, larvicidal, anticancer²⁹⁻³⁹

Ayurveda pharmacology^{9,24,25}:

Guna: Laghu

Rasa: Katu, Tikta

Vipika: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavara Visha, Upvisha

Modern Science:

Irritant, Organic Vegetative poison.

Active Principles¹¹:

Calotropin. Calotoxin, Uscharin, Calactin.

Signs and symptoms¹²:

External vesication and redness, in eyes conjunctivitis, internally act as GIT and cerebrospinal poison, bitter taste, burning pain in GIT, stomatitis, vomiting, diarrhoea, dilated pupils, convulsions, collapse and death.

Fatal Dose:

Uncertain.

Fatal Period:

About 12 hours.

Treatment:

Stomach wash, demulcents and symptomatic treatment.

PM Appearances:

Dilated pupils, froth at the nostrils, stomatitis and inflammation of GIT, viscera and brain are congested.

Medicolegal Aspects:

Used as infanticide, cattle poison, arrow poison, used for criminal abortion, rarely used for suicide.

Important formulations:

Mahavishagarbha Taila, Dhanvantara Ghrita^{13,24,25}

9. SNUHI

It consists of stem of *Euphorbia neriifolia* Linn. of family Euphorbiaceae.

Vernacular names^{24,25}

Sanskrit: Sudha Vajradruma, Snuk

English: Milk hedge

Hindi: Thuhar, Sehunda

Description⁵:

Macroscopic

Occurrence: Stem cylindrical, showing, spiral ridge portion only

Colour: Green

Taste: Acrid

Odour: Odourless

Extra Features:

Dried stem, tough with pairs of sharp stipular thorns, with hollow space in centre containing white reticulate mass, taste, acrid.

Pharmacology:

Hepatoprotective⁴⁰, anti-inflammatory, analgesic⁴¹, antioxidant⁴², immunomodulatory activity⁴³

Ayurveda pharmacology⁹:

Guna: Guru, Tikshna

Rasa: Katu, Tikta

Vipaka: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavara, Upavish Modern Science: Irritant Organic vegetable poison

Active Principle^{5,10}:

Euphorbine, Euphol, Euphorbol, taraxerol. Resin, gum and Triterpenes

Signs and symptoms¹²:

Ingestion of latex could be fatal, burning of skin, inflammation of the eyes and may be temporally blindness resulting from contact.

Fatal Dose:

Uncertain (25 to 30 ml of latex).

Fatal Period:

Uncertain (3 days).

Treatment:

Wash contact part with running water and symptomatic treatment.

PM Appearances:

Signs of inflammation of contact part.

Medicolegal Aspects:

Commonly accidental poisoning.

Important formulations:

Citrakadi Taila, Abhaya Lavana, Avittoladi Bhasma, Vajrakshara^{13, 24,25}

10. LANGALI

It consists of dried tuberous root of *Gloriosa superba* Linn. of family Liliaceae.

Vernacular Names^{24,25}

Sanskrit: Kalihari, Garbhanut, Halini, Agnisikha

Hindi: Kalihari

English: Glory Lily

Description⁵

Macroscopic

Occurrence: Tuberous roots thick, almost cylindrical or slightly laterally flattened

Colour: Brownish

Taste: Acrid and bitter

Odour: Acrid

Extra Features:

Roots occurring in pieces of 15-30 cm long and 2.5 - 3.8 cm thick, often bifurcated with tapering ends, resembling a plough- share, one arm generally more than double the length of the other.

Pharmacology:

Anti-inflammatory, alterative, anthelmintic, antileprotic¹⁵, antifungal activity, antitumor/cytogenic activity, antipoxviral activity, anticoagulant activity⁴⁴⁻⁴⁸

Ayurveda pharmacology⁹:

Guna: Sara, Tikta

Rasa: Tikta, Kashaya, Katu

Vipaka: Katu

Virya: Ushna

Classification¹⁰:

Ayurveda:

Sthavara visha, Kandavisha, Upavish

Modern Science:

Irritant organic Vegetable poison.

Active Principle^{5,10}:

Superbicine, Gloriosine, Colchicine, Alkaloids and Resins.

Signs and symptoms¹²:

Burning pain in mouth, throat and stomach, nausea, vomiting, diarrhea, sweating and death.

Fatal Dose:

Uncertain (more than 750 mg)

Fatal period:

Uncertain.

Treatment:

Stomach wash, demulcent and symptomatic treatment.

PM Appearances:

Petechial haemorrhages on heart, congestion of viscera.

Medicolegal Aspects:

Commonly used for suicide and abortion, used as cattle poison, rarely used for homicide, sometimes accidental poisoning.

Important formulations:

Karviradi Taila^{13, 24,25}

CONCLUSION

Ayurveda has considered the mental and physical diseases as two separate specialized subjects. Agadatantra is one of the incredible branch of indigenous branches derived from the ancient sciences of Ashtanga Ayurveda. Upavisha are described in Agadatantra and Rasashastra being used as medicine. All Upavisha are reviewed briefly with its macroscopic characters, medico legal aspects and toxicological effects. All the drugs are showed their significant pharmacological activities even they are semi poisonous drugs. Toxicological effect, fatal period, fatal dose, treatment, postmortem appearance and medico legal aspect are the main features of this review. The information available in this review could be helpful to scientist, drug designers, forensic experts, and other scientific bodies related to Ayurveda research. More research is needed in on these medicinal plants to establish their claimed therapeutic potential.

REFERENCES

1. RR Pathak, Therapeutic guide to Ayurvedic Medicine, Shree Baidyanath Ayurved Bhawan Pvt. Ltd., Patna, 1970.
2. Sushrit Samhita, Ayurvedtatvasandipika hindi Vyakhya Part 1, edited by Kaviraj Dr. Ambikadattashastri, Chaukhambha Sanskrit Sansthan, Varanasi, 2012.
3. Agnivesh, Charak Samhita, edited by Vaidya Yadavji Trikamji Acharya, Chaukhambha surabharti Prakashan, Varanasi 2008.
4. Rasatarangini edited by Pandit Kashinath Shasti, Motilal Banarasidas, 41 U.A. Banglo Road, Jawahar Nagar, Delhi 110007, 11th edition 2012.
5. The Ayurvedic Pharmacopoeia of India. Part I, Vol IV. Govt. of India, Ministry of Health and Family Welfare, Dept. of AYUSH, New Delhi, 2004.
6. S Gnanavel, R Bharathidasan, R mahalingam, P Madhanraj and A Panneerselvam Antimicrobial Activity of Strychnos nux-vomica L. and Cassia angustifolia L., Asian J. Pharm. Tech 2012; 2(1): 08-11.
7. Bharat B Aggarwal et. al, From traditional Ayurvedic medicine to modern medicine: identification of therapeutic targets for suppression of inflammation and cancer. Expert opinion on therapeutic target 2006; 10(1): 87-118.
8. Morton AL, Faber. Principal Drugs and Their Uses, London; 1934.
9. Dravyaguna Vijnana by Dr. Gyanendra Pandey, Krishnadas Academy Varanasi, 1st edition 2001
10. Textbook of Agadatantra Editor in chief Professor Dr. S. G. Huparikar, A Rashtriya Shikshan Mandal Publication, 201Singhal;s Toxicology by S.K.
11. Singhal, The National Book Depot, Mumbai 400012, Fourth edition 2009
12. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine & Toxicology, CBS publisher & distributors, New Delhi 100002, sixth edition 1999
13. Rasatarangini edited by Pandit Kashinath Shasti, Motilal Banarasidas, 41 U.A. Banglo Road, Jawahar Nagar, Delhi 110007, 11th edition 2012
14. Dr. K. S. Narayan Reddy The Essentials of Forensic Medicine and Toxicology sixteenth edition 1997.

15. CP Khare, Indian Medicinal Plants, Springer Science, Business Media, LLC, New York,
16. The Ayurvedic Pharmacopoeia of India. Part I, Vol II. Govt. of India, Ministry of Health and Family Welfare, DISM & H, New Delhi, 1999.
17. Qiu HX. Era of China. Science Press, Beijing (1996) 133 Tsai JC, Tsai S and Chang WC. Effect of ethanol extracts of three Chinese' medicinal plants with laxative properties on ion transport of the rat intestinal epithelia. Biol. Pharm. Bull 2004; 27: 162-165.
18. Wang X, Lan M, Wu HP, Shi YQ, Lu J, Ding J, Wu KC, Jin JP and Fan OM. Direct effect of croton oil on intestinal epithelial cells and colonic smooth muscle cells. World J Gastroenterol 2002; 8: 103-107.
19. Clemens MJ, Trayner I and Menaya J. The role of protein kinase C iso enzymes in the regulation of cell proliferation and differentiation. J Cell Sci 1992; 103: 881-887.
20. SK Jain, SK B othakar. Solanaceae: Biology and systematic, New York Columbia University press; 1986. p. 577-83.
21. The Ayurvedic Pharmacopoeia of India. Part I, Vol III. Govt. of India, Ministry of Health and Family Welfare, DISM & H, New Delhi, 2001.
22. RH C hopra, Indigenous Drugs of India: Their medical and economical aspect, Calcutta, The Art press; 1933. p. 213-214.
23. Rabinarayan Acharya, Sudipta Roy. A Review on Therapeutic Utilities and Purificatory Procedure of Gunja (*Abrus precatorius* Linn.) described in Ayurveda, Journal of AYUSH: Ayurveda, Yoga, Unani, Siddha and Homeopathy; 2(1).
24. JLN Sastry, Dravyguna Vijnana, Chaukhambha Orientalia, Varanasi, Third ed. 2008.
25. PV Sharma, Dravyguna Vijnana Vol. II, Chaukhambha Bharati Academy, Varanasi, 16th ed. 1995.
26. The Ayurvedic Pharmacopoeia of India. Part I, Vol I. Govt. of India, Ministry of Health and Family Welfare, DISM & H, New Delhi, 2001.
27. Smit HF, Woerdenbag HJ, Singh RH, Meulenbeld GJ, Labadie RP, and Zwaving JH, "Ayurvedic herbal drugs with possible cytostatic activity," J Ethnopharmacol., Vol 47, 1995, pp.75-84.
28. A. K. Sharma and R. H. Singh, "Clinical and biological studies on Amrita Bhallatak in management of Rheumatoid Arthritis," Journal of Research in Ayurveda & Siddha, vol. 2, 1981.
29. Chungsamarnyart N, Ratanakreetakul C, Jansawan W. Acaricidal activity of the combination of plant crude extracts to tropical cattle ticks. Kasetsart Journal, Natural Sciences 1994; 28(4):649-660.
30. Nandal SN, Bhatti DS. Preliminary Screening of Some Weeds Shrubs for Their Nematocidal Activity against *Meloidogyne-Javanica*. Indian Journal of Nematology 1983; 13:123-127
31. Rakesh P, Alok K, Neetu K. Nematicidal activity in flowers of some medicinal and aromatic plants. Indian J Nematol 2001; 31:96-98.
32. Malik NN, Chughtai MID. Antimicrobial activity of *Calotropis procera*. A preliminary study. Pakistan J Sci 1979; 31:127-129.

33. Hussein HI, Kamel A, Abou-Zeid M, El-Sebae A-KH, Saleh MA. Uscharin, the most potent molluscicidal compound tested against land snails. J Chem Ecol 1994; 20:135- 140.
34. Girdhar G, Deval K, Mittal PK, Vasudevan P. Mosquito Control by Calotropis-Procera Latex. Pesticides 1984;18:26-29.
35. Jacob S, Sheila M.K. A note on the protection of stored rice from the lesser grain borer, *Rhizopertha dominica* Fabr. By indigenous plant products. Indian J Entomol 1993;55 (3):337-339.
36. Khan SM, Siddiqui MN. Potential of some indigenous plants as pesticides against the larvae of cabbage butterfly *Pieris brassicae* L. Sarhad Journal of Agriculture 1994; 10:291-297.
37. Moursey LE. Insecticidal activity of *Calotropis procera* extracts of the flesh fly, *Sarcophaga haemorrhoidalis* fallen. J Egypt Soc Parasitol 1997;27:505-514.
38. Smit HF, Woerdenbag HJ, Singh RH, Meulenbeld GJ, Labadie RP, Zwaving JH. Ayurvedic herbal drugs with possible cytostatic activity. J Ethnopharmacol 1995;47:75- 84.
39. Choedon T, Mathan G, Arya S, Kumar VL, Kumar V. Anticancer and cytotoxic properties of the latex of *Calotropis procera* in a transgenic mouse model of hepatocellular carcinoma World J Gastroentero 2006;12:2517-2522.
40. Bigoniya P and Rana AC. Protective effect of *Euphorbia neriifolia* saponin Fraction on CCl₄-induced acute hepatotoxicity African Journal of Biotechnology 2010; 9(42):7148-7156.
41. Saligrama Krishna Ramachandra Rao. Encyclopaedia of Indian Medicine: Materia medica - herbal drugs Dr. Parameshvara Charitable Trust Bangalore 2005; 251.
42. Bigoniya P and Rana AC. Sub acute Effect of *Euphorbia neriifolia* Linn. On Hematological, Biochemical and Antioxidant Enzyme Parameters of Rat. Academic Journal of Plant Sciences, 2009; 2 (4): 252-259.
43. Wagner H, Proksch A. Economic and medicinal plant research. London: Academic Press 1985.
44. Khan, H. et.al., Enzyme inhibition activity of extract from rhizomes of *Gloriosa superba* Linn. Journal of Enzyme inhibition and medicinal chemistry. 6; 2007:722-725
45. Subhasni R. et. al.,Antimicrobial activity of aqueous and alcoholic extract of *Gloriosa superba* Linn., Proc Int. Congress on "Ayurveda-2000":216.
46. Kumar, L.S., Doubling of chromosomes induced by gloriosine isolated from *G. superba* Linn., Nature . 171; 1953:791-792.
47. Amandeep K. et. al.,Purification of 3 monomeric monocot mannose-binding lectins and their evaluation for antipoxviral activity: potential applications in multiple viral diseases caused by enveloped viruses. Biochemistry and cell biology Biochimie et biologie cellulaire . 85(1); 2007: 88-95.
48. Stitaya S, Porntipa P, Biodiversity and natural product drug discovery. Pure Appl. Chem. 70(11); 1988: 2065-2072.
49. Patel Govind, Nayak Satish, Shrivastava Shobhit, Antiulcer Activity of Methanolic Leaves of *Nerium Indicum* Mill., International journal of biomedical Research, 2010, 55-61.

50. A. Vinayagam and P. N. Sudha Antioxidant activity of methanolic extract of leaves and flowers of Nerium indicum, International journal of Pharmaceutical science and research, 2(6), 2011, 1548-1553.
51. Shafi Uddin Ahmed, Mohammad Shawkat Ali, Farida Begum and Md. Alimuzzaman, Analgesic Activity of Methanolic Extract of Nerium indicum Mill., Dhaka University Journal of Pharmaceutical Sciences, 5(1-2), 2006, 85-87.
52. Shashi Chauhan, Manjeet Singh, Amit Thakur and Manjeet Singh Dogra, Antibacterial activity of Nerium indicum against some Gram positive bacterial species, International Journal of Drug Research and Technology, 3(1), 2013, 8-11.