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Review Article

REVIEW OF *LANGALI* (*GLORIOSA SUPERBA* LINN) – AGADA TANTRA PERSPECTIVE

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ABSTRACT

Agadatantra is a branch of Ayurveda which deals with the symptoms and treatment of various animal, plant, artificial and latent poisons. The drug *Langali* (*Gloriosa superb* Linn) is being categorized under *Moolavisha* (poisonous roots) and is also one among the nine *Upavishas* (semi poisonous drugs) by different Ayurvedic pharmacopoeias. Even though it is poisonous it has got *Shothahara* (anti-inflammatory), *Vranahara* (wound healing), *Krimigna* (wormicidal), *Shalyaharana* (removal of foreign substances), *Garbapaatana* (abortificant) properties etc. It is being used by the Ayurvedic physicians in treatment of various ailments after proper purification. But its purificatory methods are not mentioned in Samhitas (treatises). It is mentioned in Ayurveda prakasha and traditional Agadatantra text books of Kerala. Here in this article an attempt is made to collect the information regarding *Langali* in *Agadatantra* perspective.

The article includes both modern and Ayurvedic concepts in regards to its symptoms during poisoning and its treatment. Details regarding its purificatory methods and its therapeutic use in compound formulations as an antidote which has been mentioned in the traditional Agadatantra books which are available in Kerala have also been included.

KEYWORDS: Agadatanta, Ayurveda, *Langali, Upavisha, Moola Visha.*

INTRODUCTION

Agadatantra is a branch of Ayurveda which deals with the symptoms and treatment of various animal, plant, artificial, latent poisons. The drug *Langali* (*Gloriosa superb* Linn) has been categorized as one of the nine *Upavishas* (semipoisonous) of Ayurvedic pharmacopoeias. *Langali* is commonly used as an abortificant. It is used in various compound formulations in the treatment of poisoning. In this article an attempt is made to collect the information regarding its poisonous effects, treatment and its therapeutic usage after purification.

Scientific Classification [1]

Kingdom	Plantae
Subkingdom	Tracheobionta
Division	Spermatophyta
Class	Liliopsida
Subclass	Liliidae
Order	Liliales
Family	Liliaceae
Genus	Gloriosa
Species	Gloriosasuperba Linn.

Botanical Description [1]

A perennial herbaceous climbing herb growing 3.5 to 6.0 meters in length.

Tubers

- V or L-shaped, finger-like that are pure white when young, becoming brown with age.

Leaves

- Pointed, dark green, glossy, each equipped with a tendril by means of which it clings onto other plants.
- Occur in whorls of 3 to 4, opposite or alternate, simple, sessile, ovate to lanceolate ranging from 6 to 20 cm in length and 1.5 to 4 cm wide.

Flowers

- Attractive, borne on long stalks.
- Have six erect petals ranging in colour from bright yellow to bicoloured, red and yellow or purple and yellow.
- The genus derives its name from the Latin word ‘gloriosus’, referring to the flowers.

Fruits

- Capsules that split open to release several smooth red seeds with a spongytest (Maroyi et al., 2011).

Vernacular Names [2]

English	Malabar glory lily
Hindi	*Karihari, Languly*
Kannada	*Kolikuttuma*
Malayalam	*Mentonni, Mettonni, Kantal*
Sanskrit	*Langali, Vishalya*
Tamil	*Kalappaikkilanku, Nabhikkodi*
Telugu	*Adavinabhi*

Habitat of *G. superba* Linn. [1]

Gloriosa is a native of tropical Asia and Africa. Tropical India: North -West Himalayas to Assam and the Deccan peninsula, extending up to an elevation of 2120 M.

South India: In Karnataka, commonly found growing all along the Western Ghats.

Others: Madagascar, Srilanka, Indo-China and on the adjacent island. (Faroogi and Sreeramu, 2001).

Chemical Constitutes of *G.superba* Linn.[1]

Studies reveal that all parts of the plant, especially the tubers are extremely toxic due to the presence of a highly active alkaloid, Colchicine. The species also contains another toxic alkaloid, Gloriosine. Other compounds which are isolated from the plants are lumicolchicine, 3-demethyl-N-deformyl-N-deacetylcolchicine, 3-demethyl colchicine, N-formyldeacetyl- colchicine (Chulabhorn et al., 1998). The tubers or dried roots contain benzoic and salicylic acid, sterols and resinous substances-colchicines, 3-demethyl colchicine, 1, 2-didemethyl colchicine, 2, 3- didemethyl colchicine, N-formyl, N-deacetylcolchicines, colchicocide, tannins and superbine (Jain and Suryavanshi, 2010). Flower's contain Luteolin, its Glucoside, N-Formyl-de-Me-colchicine, its Glucoside and 2-de-Me-colchicine Content of Colchicine 0.25%.

Metabolism of Colchicine [9]

- Colchicines are rapidly absorbed from the intestine and undergoes significant first –pass hepatic metabolism.
- Excretion is through faeces.
- Renal clearance accounts for about 10-20% of colchicines excretion.
- Colchicines inhibit the polymerization of microtubules and formation of mitotic spindle in cell division. Therefore, the rapidly dividing cells of the intestinal mucosa are severely affected.

Symptoms of poisoning [9]

- Colchicines can cause severe gastroenteritis, shock, multiple organ failure, electrolyte imbalance, metabolic acidosis, pancytopeina, hypotension, rhabdomyolysis, hypocalcaemia, and adult respiratory distress syndrome, ascending polyneuropathy.
- Primary symptoms develop within two to six hours. Intense vomiting, numbness and tingling around the mouth, burning, and rawness of the throat, nausea, abdominal pain and bloody diarrhea leading to dehydration etc.
- Late manifestations that develop about one to two weeks after poisoning are alopecia and dermatitis.

Medico legal importance

Accidental:[31] Mostly, Due to its use in therapeutic medicine.

For criminal abortion it is introduced in vagina.

Homicidal, Suicidal: Rare

Fatal Dose: [21] 60 mg in adults

Fatal Period: [21] 12 to 72 hours

Treatment According to Modern [17]

- The patient requires immediate hospitalization, followed by gastric lavage.
- There is no specific antidote which is available for the treatment.
- Fluid resuscitation and/or ionotropic support for correction of fluid loss.
- Assisted ventilation for patients with respiratory depression.
- Dialysis for patients with renal failure and oliguria.
- Prophylactic antibiotic therapy is advisable if leucopaenia is present.
- Vitamin K and fresh frozen plasma should be given if the clotting time is abnormal.

Ayurvedic concept

Gana

Nighantus (lexicons) and classical texts of Ayurveda details *Langali* under different categories by keeping the drug under various *Vargas* which are listed below.

***Charakacharya* mentioned it under *Moolavisha* (Group of root poisons)** [3]

Bhavaprakasha nigantu	*Guduchyaadi varga*[4]
Raaja nigantu	*Shatahwadi* varga[5]
Kaiyadeva nigantu	*Oshadi varga*[6]
Madanapala nigantu	*Guduchyadi varga*[7]
Dhanwantari nigantu	*Karaveeradi varga*[8]

Ayurvedic texts which have classified *Langali* under *Upavishavarga* (Group of semipoisonous plants) are[30]

- Sharangadara samhita
- Bhava prakasha

- Yoga ratnakara
- Rasarnava
- Rasa ratnasamuchayam
- Rasa tarangini
- Rasa sanketakalika
- Rasendra chuudamani
- Ayurveda prakasha

Synonyms

Synonyms	**B.P**[4]	**Ra.Ni**[5]	**K.Ni** [6]	**Ma.Pa**[7]	**Dha.Ni**[8]
Kalihari	+	-	+	-	-
Halini	+	+	+	+	+
Langali	+	-	+	+	+
Shakrapushpi	+	-	-	-	-
Vishalya	+	+	+	+	+
Agnishikha	+	-	+	-	-
Anantha	+	-	-	-	-
Vahnivaktra	+	-	-	-	-
Garbanut	+	-	-	-	-
Kalikaari	-	+	-	+	+
Langalini	-	+	-	-	-
Garbapaatini	-	+	+	+	+
Deepti	-	+	-	-	-
Agnimukhi	-	+	-	-	+
Hali	-	+	-	-	-
Nakta	-	+	-	-	+
Indupushpika	-	+	-	-	+
Vidyujjala	-	+	-	-	-
Agnijihwa	-	+	-	+	-
Vranahrut	-	+	-	-	-
Pushpasaurabha	-	+	-	-	-
Swarnapushpa	-	+	-	-	-
Vahnishikha	-	+	-	+	-
Seeri	-	-	+	+	+
Indrapushpi	-	-	+	-	-
Vahnijihwa	-	-	+	-	-
Pradeepta	-	-	+	-	-
Shikha	-	-	+	-	-
Vahnimukhi	-	-	+	+	-
Prabhata	-	-	+	+	-
Pushpaseekara	-	-	+	-	-
Shuklapushpika	-	-	-	+	-
Vidyud	-	-	-	+	-
Ulka	-	-	-	+	-
Pushpasi	-	-	-	+	-
Bhara	-	-	-	+	-
Agnika	-	-	-	+	-
Nalarandri	-	-	-	+	-
Deepta	-	-	-	-	+

Properties

Properties	B.p [4]	Ra.ni [5]	K.ni [6]	Ma.ni [7]	Dha.ni [8]
Rasa	*Tikta* *Katu* *kashaya*	*Katu*	*Katu* *Tikta*		*Katu* *Tikta*
Guna	*Teekshna* *Laghu* *Kshara*	-	*Kshara* *Sara* *Teekshna* *Laghu*	*Sara* *Teekshna* *Laghu*	*Sara*
Veerya	*Ushna*	*Ushna*	*Ushna*	*Ushna*	*Ushna*
Vipaka					
Doshakarma	*Sleshmajit pittajanaka*	*Kaphavaatahara*	*Pittala*	*Pittala*	*Kaphavata vinashini*
Rogagnata	*Atisara* *Kushta* *Shopha* *Arsha* *Vrana* *Shola* *Krumi*	*Shalyanishkasakarini* *Saarini para*	*Vastishoola* *Balasakushta* *Shopha* *Arsha* *Vrana* *Jantuvinashini*	*Kushta* *Shopha* *Arsha* *Vrana* *Shoola* *Krumi*	*Shwayadhu* *Shalya* *Vrana*
Causes	*Garbapaata*	*Garbanta*	*Garbapaata*	*Garbapaatini*	*Garbapaata*

Shodhana (Purification) of *Ashudha* (Toxic) *Langali.*[12]

1. Soak *Langali* in *Gomootra* (Cow's urine) for 1 day

   or

2. Soak *Langalikanda* in *Gomootra* (cow's urine) for 1 day;

   Then soak in *Kwada* (decoction) of *Amruta* (*Tinospora cordifolia*) and *Tanduleeyakamoola* (Root of *Amaranthus spinosus* L) for 30 nazika (30×24 minutes). Then in *Godugda (cow's milk)* for 1 day.

Symptoms of Intake of *Langali Kanda Visha* According to Ayurveda. [29]

Chardi (vomiting), *Kampa* (tremors), can even lead to death.

Treatment For *Langali Sevana* according to Ayurveda *(Kriya Koumudi*) [10]

1. Intake of *Chanampayar* (*Lens culinaris*), *Bhumyamalaki* (*Phyllanthus niruri*), *Ardraka* (ginger) in equal quantity.
2. *Ardrakasevana* (consumption of ginger) alone cures *Visha.*
3. Intake of *Kwatha* (decoction) of *Bibitakatwak* (*Terminalia bellerica* bark).
4. Intake of *Shigrumoolatwakswarasa* (juice of *Moringa oleifera* root bark) and *Dadhi* (curd) in equal quantity.
5. Intake and external application of *Neelimoola* (root of *Indigofera tinctoria*) and *Maricha* (Piper nigrum).
6. *Haritakikwatha sevana* (intake of *Terminalia chebula* decoction).
7. Intake of *Shigrutwak* (bark of *Moringa oleifera*) with *Madhu* (honey).
8. Intake of *Shuntikalka* (paste of dry ginger) with *Ushnajala* (hot water) or *Sarvangalepa* (whole body application).

Treatment According to *Prayoga Samuchayam and Vishavaidya Jyotsnika.*[11]

1. *Neelimoola* (root of *Indigofera tinctoria*) with *Maricha* (*Piper nigrum*).

Kodashery Margam[29]- Intake of *Shunti* (dry ginger) in boiled water.

Use of *Langali in Agada prayoga*

1. *Saarvakarmikaagada - Karaveera, Arkakusuma, Langalimoola, Kakana, Pata, Maricha*made into *Kalka* (paste) with *Aranala* - for *Vyantaradashta (Vyantara* type of snake). [13]
2. To prevent spread of *Visha- Langalikanda, Madhuka, Ashwaganda, Nimbatwak, Draksha, Karam, Hingu, Chitraka, Shunti, Haridra, Mayakku, Chandana, Devadaruchurna* triturated in *Jambeera swarasa* is made into *Gutika* (pills) and used for external application. [14]
3. *Peetanetramandali* (variety of viper) *Kattuchanakam, Langali, Kakanasa.*[15]
4. *Raga mandali* (viper variety)- *Langali, Shireesha pushpa, moola* - external application.[16]
5. *Swedana* of *Visharta* (to induce sweating of poison inflicted person).

a) *Langalipatra* alone or with combination of any drugs like *Erandapatra, Nimbapatra, Karanga patra* or *Shireeshapatra* boil in *Tandulodaka* and reduce to 1/4th and is used for *Swedana.*[18]

b) *Bakula, Langali, Musali, Shireesha, Nimbapatra* in *Tandulodaka.*[25]

6. For all *Sarpavisha* (snake bites)– Root of *Langali* with *Maricha* (*Piper nigrum*) in equal quantity with pure water.[22]
7. For *Nasya* (nasal instillation) and *Lepa* (external application) to cure *Moha* (unconsciousness) and *Visha* (poison)- *Kupilumajja* resin is extracted and kept in sunlight for 7 days; *Vacha, Hingu, Langalikanda* is taken in half quantity and *Mardana* (triturated) for 3 days; ¼ th *Somnadihingu* is added and triturated with *Snuhiksheera* for 3 days and store in coconut shell. [23]
8. *Vishamoha* (to cure confused state due to *Visha*) - *Langalimoola* with *Maricha* made into *Gutika* (pills) and intake in pure water.[24]
9. *Visha, Vatavyadinashana*- Intake of *Ankola, Eranda, Langali, Ishwaramooli, Nimba, Snuhi, Neeli, Shirisha, Arka, Dhatura, Bakula patras, Musali, Mundi* with *Tandulodaka* boiled and reduced to 1/4th.[26]
10. *Mooshikavishakarnikapatana* (growth like pericarp of lotus in rat poisoning) - External application of *Langali, Alabumoola, Trivrut, Snuhi, Neelimoola, Apamarga* made into *Kalka* with *Tila*.[27]

Neutralization effect against the venoms of Naja nigricollis venom

Evaluated the antivenom properties displayed by the alcoholic extracts of *Andrographis paniculata*, *Crateva magna*, *Gloriosa superba* and *Hydrocotyle javanica*. Extracts of *H. javanica* and *G. superba* gave 80 % and 90 % protection to mice treated with minimum lethal dose of venom (LD99). These two plants showed significant neutralization effect against the venoms of *Naja nigricollis* venom. *H. javanica* and *G. superba* (25-100 mg/mL) produced significant changes of membrane stabilization of human red blood cells (HRBC) exposed to hyposaline-induced haemolysis.[19]

Antioxidant Activity and Anticancer Study against Human Cancer Cell (Hep-G2)

The *G. superba* methanolic extracts by In vitro Assay for Cytotoxicity Activity (MTT Assay) reveals the presence of different types of phyto constituents which has the capacity of anti-oxidant and cytotoxicity effect on Hep-G2 cells. Thus *G. superba* has the potentiality to inhibit the human carcinoma cell line growth.[20]

Inhibition of the toxic effect of rattle snake venom

Traditional approach was evaluated scientifically with some selected plant extracts (7.2 mg/kg bw) and partially purified fractions (2.4 mg/kg bw) were orally administered to mice experimentally envenomed with rattlesnake venom S.C. injection (2.5–15µg/kg bw). The purified fractions (2.4mg/kg bw) produced significant protection against venom induced changes in serum SOD and LPx levels. The isolated fractions effectively inhibited the toxic effect of snake venoms in vitro than in vivo. The above observations confirmed the protective activity of plants- *Aristolochia indica, Hemidesmus indicus, Gloriosa superba, Strychnos nux-vomica, Eclipta prostrata,* and *Andrographis paniculata* against the lethal action of snake venom.[28]

Shodana* (purification) of *Langali

Purificatory measures are mentioned in other *Grandas* in which *Takra* and *Saindhava* are made into solution and pieces of *Langali* are immersed in it for 3 days or 7 days.[33]

UV spectroscopy method was used to analyze the media (*Takra* and *Saindhava*) before and after *Shodhana* to provide objectiveness to the process of *Shodhana* and role of media in the process. Loss on drying, total ash, water soluble extractive and alcohol soluble extractive were found to be increased in the samples after *Shodhana* with the media as compared to the samples before *Shodhana*, while acid insoluble ash was found to be decreased after *Shodhana* procedure. Qualitative analysis shows presence of alkaloids, saponins, tannins and carbohydrates in the samples before and after *Shodhana* although their quantification was not done. The article suggest further studies in the purification using different media.[34]

Abortificant property and Cardiovascular effects

Phytochemical analysis as well as toxicity (in mice) and antifertility studies, uterotrophic assay, duciduomamodel, uterotonic assessment in-vitro and in-vivo of aqueous extract was carried out in rats. Oxytocin was used as the uterotonic reference standard. The effect of the extract on cardiovascular parameters was also evaluated. Phytochemical analysis shows presence of flavonoids, tannins, alkaloids, and glycosides in the aqueous extract of *Gloriosa superba*. The aqueous extract of *Gloriosa superba* showed oxytocic activity and early abortifIcant activity which may be due to the presence of alkaloids such as colchicine. Both the reference (oxytocin) and the extract produced dose dependent contractions but the extract had no effect on heart parameters and blood pressure.[35]

DISCUSSION

Even an acute poison can become an excellent drug if it is properly administered. On the other hand even a drug if not properly administered, becomes an acute poison.[32] This same principle applies in case of *Langali* also. Properly used *Langali* acts as medicine, while improper use may even lead to death. It is being categorized under *Moolavisha* (poisonous roots) and one among the nine *Upavishas* (semi poisonous drugs) by different Ayurvedic pharmacopoeias. *Langali* is used in Ayurveda for curing many diseases. *Langali* is having *Katu, Tikta rasa* (pungent, bitter); *Ksharaguna* (alkaline property), *Ushnaveerya* (hot in potency), *Teekshna* (sharp), *Laghu* (lightness), *Sara* (moving) *Guna* (property). It is having *Vatakaphashamana property* (pacifies *Vatakaphadosha*) and is *Pittavardaka* (increases *Pitta*). It is used for curing *Shotha* (inflammation), *Vrana* (wounds), *Krumi* (anti-microbial), *Kushta* (skin disorders) etc. *Keraleeyavisha Vaidya granthas* (toxicological texts) have given the details of the purificatory measures to be adopted for *Langali* and treatment that has to be given in case of its poisoning.

CONCLUSION

Researchers have shown the antivenom potential of gloriosa against cobra venom and also its anti-oxidant property. It is the need for the hour to carry out further researches regarding the toxic and anti-toxic properties of the drug.

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