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Shodhan (Purification) of Visha Dravya: A Critical Review

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Visha Dravya, often referred to as poisonous substances, has great value in Ayurveda mainly because of their therapeutic potential if processed properly. The plants which possess various classes of phytochemicals are still found either in their crude forms or after proper processing. Thus, to popularize and introduce their use for medicine, such plant drugs need to be detoxified or purified before use. The process of detoxification or purification of any toxic material used for medicinal purposes is known as "Shodhana". Shodhan, the process of purification, will reduce the toxicity but retain its medicinal properties. This review discusses various classical and contemporary methods employed during Shodhan, Samskara (processing), Bhavana (levigation), and Marana (incineration). It elucidates the scientific rationale behind each step in purification and outlines their pharmacological studies and clinical trials where possible. Additionally, challenges and future perspectives in standardizing Shodhan procedures are addressed to make it reproducible and safe in clinical practice. Overall, this review provides insight into traditional wisdom and modern scientific advancements in the purification of research-oriented Ayurvedists, as well as associated professionals.

Keywords: Ayurveda, detoxification, Shodhana, toxicity

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Introduction

In world of *Ayurveda*, ancient system of traditional medicine, concept of *Shodhan*[1] or purification of *Visha Dravya* (toxic substances) holds profound importance. Rooted in centuries-old wisdom, it involves meticulous process of purifying substance that could be toxic to produce its potential healing powers while minimizing harmful effects. This critical review strives to explore intricacies of *Shodhan*[2], covering traditional practices, scientific rationale, and contemporary relevance in context of modern healthcare. Despite fact that most of plant drugs are safe, yet some of these are toxic for human health. Any poison if processed or used properly is potential medicine and any medicine with improper use is fatal poison.[3]

Table 1: *Visha* and *Upavisha*

Visha	Upavisha
Vatsanabha (*Aconitum ferox* Wall.)	*Arka* (*Calotropis procera* (Ait.) R. Br.)
Mustaka	*Snuhi* (*Euphorbia neriifolia* Linn.)
Śrigīvisa (*Aconitum chasmanthum*	*Langalī* (*Gloriosa superba* Linn.)
Stapf ex Holmes.)	*Karavira* (*Nerium indicum* Mill.)
Kālakūta	*Gunja* (*Abrus precatorius* Linn. Family
Saktuka	Fabaceae)
	Ahiphena (*Papaver somniferum* Linn.)
	Dhattura (*Datura metel* Linn.)

Table 2: *Ayurvedic* poisonous plant listed in the schedule E of drugs and cosmetics Act 1940 and rule 1945.

Poisonous plants
▪ Ahiphena (Papaver somniferum)
▪ Arka (Calotropis procera)
▪ Bhallataka (Semecarpus anacardium)
▪ Bhanga (Cannabia eativa Linn.)
▪ Danti (Baliospermum monatanum Mull. Arg)
▪ Dhattura (Datura metel Linn)
▪ Gunja (Abrus precatirius Linn.)
▪ Jayapāla (Croton tiglium)
▪ Karavira (Nerium indicum)
▪ Langalī (Gloriosa superba)
▪ Pārasika Yavānī (Hyoscyamus nibar Linn.)
▪ Snuhi (Euphorbia neriifolia Linn.)
▪ Vatsanabha (Aconitum Chasmanthum)
▪ Viṣamuṣṭi (Strychnos nux-vomica)
▪ Śrigīviṣa (AconitumChasmanthum)

Visha, *Garala*, *Kalkuta* are synonyms of poisons and they are divided in to two categories *Sthavara Visha* & *Jangama Visha.*[4]

Poisons of plant & mineral origin are included in *Sthavara Visha* & poisons of animal origin are included in *Jangama Visha.*[5] *Sthavara Visha* is further divided in two sub types that is *Visha* & *Upavisha.*[6]

These poisonous/toxic plants are categorized as *Viṣa* (poison) and *Upaviṣa* (toxic but not lethal for human health) in *Ayurvedic* text [Table 1] and also listed in the schedule-E of Drugs and Cosmetics Act 1940 [Table 2].

Understanding *Visha Dravya*

Visha Dravya is a group of various drugs starting from minerals and metals to some plants that are toxic in nature. Although by their toxic nature, they are so essential in *Ayurveda* because of the medicinal value they carry on purification. Examples of such *Visha* drugs are mercury, lead, arsenic, or poisonous plants like Aconitum and Strychnos species. To harness the therapeutic potential of *Visha* drugs, purification through *Shodhan* is required.

The Process of *Shodhan*

Shodhan involves a series of systematic procedures designed to neutralize the toxic constituents of *Visha Dravya* while preserving their therapeutic efficacy. Traditional texts outline various methods of *Shodhan*, including *Samskara* (processing), *Bhavana*[7] (levigation), and *Marana*[8] (incineration). These techniques aim to remove impurities, enhance bioavailability, and transform the substance into a safer, more potent therapeutic agent.

Scientific Rationale and Efficacy

While rooted in tradition, the efficacy of *Shodhan* is increasingly being validated through scientific inquiry. Pharmacological studies and clinical trials have shed light on the mechanisms underlying the purification process. For instance, *Samskara* techniques such as *Bhavana* are known to enhance solubility and reduce toxicity by promoting chemical transformations. *Marana*, on the other hand, facilitates the conversion of toxic metals into bioavailable forms, rendering them safer for therapeutic use.

Various Toxic Medicinal Plants and their *Shodhana* Process

***Aconitum* species**

Numerous species under the Aconitum genus, such as Aconitum ferox Wall., Aconitum napellus Linn., and *Aconitum chasmanthum* Holmes ex. Stapf., are commonly referred to as "Aconite" in English and "*Vatsanabha*" in *Sanskrit*. All three of the plants' roots are highly toxic, however they may be used to cure a number of illnesses, including fever, rheumatoid arthritis, sciatica, and hypertension. After being detoxified, the roots also function as "*Rasāyana*" (immunomodulators).

At larger concentrations, the majority of the alkaloids found in the root of Aconitum species have been shown to have neurotoxic and cardiotoxic effects. The major causes of severe aconite poisoning are overindulgence in an herbal decoction prepared from the roots of the aconite plant or inadvertent intake of wild plants. A dosage of 2 mg of the isolated chemical aconite from *Vatsanabha* can be deadly, whereas 1 g of *Vatsanabha* is lethal to humans. Tribes utilized the root of *Vatsanabha* as poison in the past to hunt animals. Traditional *Ayurvedic* formulations of *Vatsanabha* when overdosed might result in bidirectional tachycardia, bradycardia, or hypotension. Owing to these factors, the *Ayurvedic* medical system recommends a therapeutic dosage of *Vatsanabha* of 8–16 mg per day. Its purifying procedure is *Svedana***[9]** (boiling) in a *Dola yantra* with *Godugdha* for three hours every day for three consecutive days, followed by three water washes and sun drying.

Gunja

After being processed by *Shodhana*, the roots, seeds, and leaves of *Gunja* (Abrus precatorius Linn., Family: Fabaceae) have been utilized historically for their purgative, emetic, tonic, aphrodisiac, and hair growth encouraging effects. It has been used for poisoning humans and livestock for illicit purposes, as well as fish and arrow poisoning, from ancient times. Abrus seeds contain a number of substances that might cause abortion, including a poisonous lectin, an albumotoxin called abrin, an enzyme that splits fat, a glucoside called abrussic acid, urease, abarnin, trigonelline, choline, hypaphorine, and steroidal oil. Boiling the seed is said to make it innocuous, however 0.1–1 µg/kg of abrin is deadly for humans.

When *Gunja* seeds are *Shodhana*, they undergo a 3-to-6-hour *Svedana* in a *Dolā yantra* with *Godugdha* or *Kāñji*[10]. After that, the *Shodhita* material is washed in hot water and allowed to dry in the shade.

Kupilu

After appropriate *Shodhana*, *Kupilu* (Strychnos nux-vomica Linn., Family: Loganiaceae) is widely utilized in a variety of ailments, including nervous debility, paralysis, limb weakness, sexual weakness, dyspepsia, diarrhea, and rheumatism. It is a powerful *Rasāyana* medication for issues related to aging. It has been stated that *Kupilu* contains very dangerous active alkaloids, including strychnine and brucine. Various methods have been employed to analyze and measure the amounts of brucine and strychnine present in both raw and processed seeds. To remove the harmful elements from *Kupilu* seeds, a number of distinct *Shodhana* techniques have been used. *Kupilu***[11]** seeds are traditionally purified by soaking them in liquid medium (one after another) for three to twenty days. The liquid media consist of *Kāñji* (soaking for three days), *Godugdha* (boiling for three hours), *Gomutra* (soaking for seven days), and *Goghṛta* (frying until brownish red in color and swollen). On the other hand, traditional practitioners fry or immerse the seeds in the exudates scraped from the fresh leaves and stems of Aloe vera (*Ghṛtakumārī*) for fifteen days, and then follow up with ginger juice (*Ārdrakasvarasa*) for seven days. This process is done in place of using *Grita*. in order to cleanse. Following the *Shodhana* procedure, the seeds are rinsed in lukewarm water to remove the embryo and outer seed coat from the cotyledons.

Dhattura

The seeds of *Dhattura***[12]** (Datura metel Linn., Family: Solanaceae) contain alkaloids, which make them very poisonous and potentially lethal. The majority of the adverse symptoms, which include giddiness, cramps, extreme thirst, dry mouth, and unconsciousness, are brought on by the plant's alkaloids' anti cholinergic properties. Freshly gathered *Gomutra* is used to immerse seeds in *Dhattura* purification, and they are left for 12 hours. Following washing, the seeds are placed in the *Dolā yantra* to undergo a three-hour *Svedana* procedure. Seeds' teats are extracted after they are once again cleaned with lukewarm water & allowed to dry.

Bhallataka

The fruit of *Bhallataka* (*Semecarpus anacardium* Linn., Family: Anacardiaceae) is an effective medication for rheumatism, asthma, sciatica, epilepsy, and a host of other conditions. The fruit's pericarp is filled with tarry oil that is 90% anacardic acid and 10% cardol. Semecarpol, anacardol, and bhilawanols (also known as urushiols) are other identified chemical components. The phytoconstituents bhilawanol and anacardic acids are in charge of causing irritation, blisters, toxicity, and contact dermatitis. The *Shodhana* process of *Bhallataka***[13]** involves rubbing the fruits on brick gravel after soaking them in *Gomutra*, *Godugdha*. The fruits are stored in either *Gomutra* or *Godugdha* for seven days after the thalamus sections are removed, and then they are finally cleaned with water. oravels (for three days), scrubbed well, and let to dry. After three days, the seeds are moved to a bag filled with brick gravel, properly cleaned, and allowed to dry. In order to lower the risk of dermatitis, coconut oil is applied to the exposed body areas of those participating in the *Shodhana* of *Bhāllataka* procedure. The observed decrease in weight following *Shodhana* might perhaps be attributed to the fruits' decreased oil content. Soaking the fruits in the *Gomutra* or *Godugdha* may result in a higher proportion of oil being decreased. Brick powder absorbs irritating oils from fruit due to its adsorbent properties.

Karavira

The plant *Karavira* (Nerium indicum; Family: Apocynaceae) possesses properties that include anti-inflammatory, antifungal, cardiotonic, neuroprotective, and anti-stress effects. The cardenolides, namely neriine and oleandrin, are among the harmful cardiac glycosides present in this plant. *Godugdha* is used in the *Svedana* method for three hours to purify the roots of N. indicum in the *Dolā Yantra*. The roots are dried after being *Shodhana* and cleaned with water.

Langali

The semi-woody herbaceous climber *Gloriosa superba* Linn. (family Liliaceae) is used to treat fever, rheumatoid arthritis, gonorrhea, inflammations, and labor pains. There have been reports of the harmful consequences, particularly cardiotoxicity, of colchicine found in this plant. Gloriosine is another poisonous alkaloid found in the species.

Roots and seeds are soaked in *Gomutra***[15]** for whole day as part of *Shodhana* /detoxification process & then they are washed with warm water.

Citraka

*Citraka***[16]**, or *Plumbago zeylanica* Linn., belongs to the Plumbagi-naceae family and is frequently used as an appetizer, digestive aid, pain reliever, and treatment for piles. *Citraka* undergoes a 24-hour soak in a solution of lime and water for purification. For a whole day, the identical process is carried out again.

Ahiphena

Papaver somniferum Linn. fruits are used to make opium, which has several properties such as bitterness, astringency, sweetness, constipation, aphrodisiac, sedative, somniferous, narcotic, myotic, and antispasmodic. Cough, fever, inflammatory diseases of the eyes, migraine, malaria, dysmenorrhea, cystitis, menorrhagia, proctalgia, and low back pain resulting from diarrhea and dysentery are among the unpleasant ailments that it is used to treat. Two main ingredients in opium are papavarine and morphine. A large amount of opium can provide euphoria, induce sleep, ease pain, and have lethal effects on the central nervous system. Opium's toxic effects can be mitigated by steeping it in cold water for five to six hours. The resultant insoluble brown latex is employed in *Ayurvedic* medicine after this procedure. Ginger juice**[17]** can also be used to triturate opium to lessen its extreme toxicity. There are 21 iterations of this technique.

Bhanga

Cannabis seativa Linn. leaves have a variety of medicinal properties, including being stomachic, analgesic, abortifacient, aphrodisiac, bitter, astringent, tonic, and alterative. Convulsions, otalgia, stomach issues, malaria, diarrhea, skin conditions, hysteria, sleeplessness, gonorrhea, colic, tetanus, and hydrophobia are among the conditions it is used to treat. Dyspepsia, coughing, impotence, depression, dropsy, restlessness, and insanity are all brought on by overuse. *Bhanga* is cooked with *Babbula Tvak Kvātha***[18]** for three hours in order to lessen its poisonous effects. The resulting powder is then triturated with *Godugdha*. Another way to lessen the toxic effects of *Bhanga* is to triturate it with *Babbula Tvak kvātha* and then cook the resulting powder in cow ghee.

Conclusion

According to *Ayurvedic* philosophy, "if processed and administered properly, even a strong poison can be converted into an excellent medicine." However, if used improperly, even the most beneficial medication might turn toxic. *Ayurvedic* practitioners have worked to create a variety of age-old techniques over time to transform hazardous medicinal herbs into beneficial medications. It's likely that ancient healers were unaware of the chemical makeup of the therapeutic plants they used to create concoctions. *Ayurveda* treats human problems with a variety of hazardous natural medications, either in their raw form or via *Shodhana* procedures. It is possible to draw the conclusion that the traditional purification method (*Shodhana*) can affect the phytochemical, pharmacological, and toxicological profiles of plant-based medications, which can help to improve the medications' effectiveness and safety profile. Adopting the *Shodhana* techniques from the Indian medical system is beneficial for creating herbal compositions and using contemporary technologies to evaluate their safety and effectiveness. Research has indicated that the harmful ingredients are incorporated into the medium, making the medication non-toxic. Undoubtedly, certain media plays a significant part in ensuring that a medicine acts without producing negative side effects.

This critical review serves as a testament to the enduring legacy of *Ayurveda* and the ongoing evolution of its pharmacological principles, offering insights into the purification of *Visha Dravya* and its implications for *Ayurveda* healthcare practices.

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