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Comparative study of *Ashodhita* and *Shodhita* seeds of *Ipomoea carnea* Jacq with respect to level of toxic compound (Swainsonine)

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Abstract

Background: *Ipomoea carnea* Jacq is an extra pharmacopoeal drug used as folk medicine. Swainsonine is the main toxic principle in it. Leaves and flowers of *Ipomoea carnea* contain Swainsonine, Calystegines B1, B2, B3 and C1 along with other phyto constituents. But seeds contain only Swainsonine, Calystegines B1, B2, B3 and C1 and are not used as medicines because of its highly toxic nature. It can be used after *shodhana* methods of purification mentioned in Ayurveda, if *shodhana* could reduce the percentage of Swainsonine present in seeds.

Objectives: To study the effect of *Shodhana* of *Ipomoea carnea* seeds by using common *shodhana* media and to study the physicochemical and phytochemical changes and level of Swainsonine (the toxic principle) present in seeds before and after *shodhana* by HPLC.

Methods: After identification and authentification, seeds of *Ipomoea carnea* will be divided in six groups each containing 10 gms and *shodhana* of seeds will be performed by following method of *swedana* (boiling) in *dolayantra* for three hours using four different *shodhana* media media viz. *Godugdhha* (Cow milk), *Gomutra* (Cow urine), *Kanji* (sour gruel), *Triphala kwatha* and Distilled water for each sample. The purified samples will be compared for the level of Swainsonine estimated with the help of HPLC with unpurified sample of *Ipomoea carnea*.

Result: Physicochemical, pharmacognostic and phytochemical changes and effect on level of toxic principle (Swainsonine) of *Ipomoea carnea* seeds will be interpretated.

Conclusion: Effect of *shodhana* on toxic compound (Swainsonine) level present in *Ipomoea carnea* seeds will be assessed on the basis of result.

Keywords: *Ipomoea carnea* Jacq, folk medicine, Swainsonine, *shodhana*

Introduction

In Ayurved, Acharya have mentioned that any drug can act as medicine, if it is used wisely [1, 2, 3]. In this context; various herbal medicines are used as single or multidrug formulations. Even poisonous plants are also used after *shodhana* (Purification procedures) in appropriate media. The various *shodhana* methods described in Ayurved are *Swedana* (boiling) in *Dolayantra*, *Bhavana* (trituration) in *Khalwayantra* (mortal), *Nimajjana* (Submersion in prescribed liquid media), *Bharjana* (Roasting & Frying), *Paka* (cooking), *Kwathana* (boiling), *Gharshana* (Rubbing), *Dhawana* (washing) etc. The common media used for *shodhana* are *Godugdhha* (Cow milk), *Gomutra* (Cow urine), *Kanji* (sour gruel), *Goghruta* (Ghee prepared from cow milk), *Taila* (oils), *Takra* (buttermilk), *Churnodaka* (lime water), Luke warm water etc.

In India, traditional medicines have been used since long ago. Ethnomedicine is the study or comparison of the traditional medicine based on bioactive compounds in plants and animals and practiced by various ethnic groups. Ethnopharmacology is a study of ethnic groups and their use of plants compounds. It is linked to medicinal plants and ethanobotany. In pharmacopoeia and other scientific databases, all such herbal and toxic medicinal drugs are included with their pharmacokinetic, pharmacodynamic and toxicokinetic information. But some of them are still not included in scientific databases whereas they are used actively for therapeutic purposes as folklore medicine in remote areas. Very few or no scientific research is available exploring their pharmacokinetic, pharmacodynamic and toxicokinetic information. Hence, it is very much essential to study these medicines scientifically.

Ipomoea carnea Jacq is a species of morning glory belonging to Convolvulaceae family and commonly known as *Besharam* meaning shameless due to its rampant spreading. It is a locoweed. It is an extra pharmacopoeal drug and has medicinal value. Leaves are used as purgative. Paste of leaves is applied on a sore known as *Haja* which occurs between toe and fingers due to fungal infection. Roots are boiled and used as laxative and to provoke menstruation. It is used traditionally to heal skin diseases. Leaves are cooked and eaten as a vegetable even though they are slightly purgative. Latex or Milky sap of plant has been traditionally used to treat Leucoderma and other related skin diseases. It is also used as an antiseptic in skin diseases [4]. Traditionally, it is also used as an aphrodisiac agent [5]. It contains a component similar to marsiline which is a sedative and anticonvulsant. Swainsonine is the main toxic principle present in *Ipomoea carnea* and it has antitumor activity in advanced malignancies. It is water

soluble and hence it distributes rapidly in many parts of the body. It is excreted rapidly through urine. The fast excretion rate indicates that occasional consumption of the locoweed for short duration will not produce serious toxic effects but continuous consumption even at low dose causes severe toxicity. Leaves and flowers of *Ipomoea carnea* contain Swainsonine, Calystegines B1, B2, B3 and C1 along with other phyto constituents. But seeds contain only Swainsonine, Calystegines B1, B2, B3 and C1 and are not used as medicines because of its highly toxic nature.[6] It can be used after *shodhana* methods of purification mentioned in Ayurveda, if *shodhana* could reduce the percentage of Swainsonine present in seeds.

Need of the study

Many claims have been made by traditional healers for ethanomedicine. But there is lack of evidences; hence there is need of validation and to generate the evidences regarding claims. Due to the deforestation and changing climatic conditions, a wide number of species of medicinal plants are getting endangered whereas in India, *Ipomoea carnea* grows naturally in waste lands, wet land, roadside, canals and drain banks abundantly. Though the species is used as folk medicine in traditional medicinal systems comprising Ayurveda, Siddha and Unani, no scientific work has been conducted to evaluate the efficacy or to evaluate the toxic potential of *Ipomoea carnea* seeds. The drug is toxic but no antidote is available for its toxicity. Hence, the only thing is to reduce its toxic effect to use it in the treatment. Moreover, the medicinal utility of leaves is known but no information is available regarding medicinal uses of seeds. In further research, if its therapeutic utility is proved, it can be included in pharmacopoeia.

Hence, an attempt has been made to observe the effect *shodhana* on Swainsonine (the toxic principle) present in seeds of *Ipomoea carnea* using common *shodhana* media with the help of advanced techniques so that the drug can be used without any toxic effect.

Aim

Assessment of effect of *shodhana* on toxic compound (Swainsonine) level present in *Ipomoea carnea* seeds.

Objectives

1. To study the effect of *Shodhana* of *Ipomoea carnea* seeds by using common *shodhana* media viz. *Godugdhha* (Cow milk), *Gomutra* (Cow urine), *Kanji* (sour gruel), *Triphala Kwatha* and Distilled water.
2. To study the physicochemical and phytochemical changes and level of Swainsonine (the toxic principle) present in seeds after *shodhana* by HPLC.
3. To compare the physicochemical and phytochemical changes before and after *shodhana* in different media.

Research Question

Whether *shodhana* has effect on level of toxic principle (Swainsonine) present in *Ipomoea carnea* seeds?

Hypothesis: *Shodhana* has effect on level of toxic principle (Swainsonine) present in *Ipomoea carnea* seeds.

Null Hypothesis: *Shodhana* has no effect on level of toxic principle (Swainsonine) present in *Ipomoea carnea* seeds.

Ethical statements: Institutional Ethical Committee Approval Received.

Study Design

Study design: Experimental Analytical study

Study Duration: 6 months

PICO Format:

P-Problem: Level of Toxic principle (Swainsonine) of *Ipomoea carnea* seeds.

I-Intervention: *Shodhana* of *Ipomoea carnea* seeds

C-Comparison: Between *Ashodhta* and *shodhita Ipomoea carnea* seeds.

O-Outcome: Physicochemical, pharmacognostic and phytochemical changes and effect on level of toxic principle (Swainsonine) of *Ipomoea carnea* seeds will be found.

Experimental procedures

Material Requirement

Table 1

S.N.	Material	Quantity
1	Seeds of *Ipomoea carnea*	60 gm
2	*Godugdhha (Cow milk)*	1 litres
3	*Gomutra (Cow urine)*	1 litres
4	*Kanji* (sour gruel)	1 litres
5	*Triphala Kwatha*	1 litres
6	Distilled water.	1 litres

Methods

1. Identification, Collection and Authentication of study drug

Seeds of *Ipomoea carnea* will be identified and collected from nearby field areas of Wardha District and authenticated by FRLHT, Bangalore.

2. *Shodhana* of Seeds of *Ipomoea carnea*

Seeds of *Ipomoea carnea* will be divided in six groups each containing 10 gms and *shodhana* of seeds will be performed by following method of *swedana* (boiling) in *dolayantra* for three hours using four different *shodhana* media media viz. *Godugdhha* (Cow milk), *Gomutra* (Cow urine), *Kanji* (sour gruel), *Triphala kwatha* and Distilled water.

3. Analytical Study of all the five samples

a. Pharmacognostical study

1. Transverse section
2. Powder microscopy

b. Physicochemical analysis

1. Loss on drying
2. Total Ash Value
3. Acid insoluble ash value
4. Water extractive values
5. Alcohol extractive values
6. pH
7. Microbial examination

Phytochemical analysis: HPLC

Experimental animals: NA

Housing and husbandry: NA

Sample size: Six (06)

Table 2

S.N.	Groups	Explanation
1	ASIC	*Ashodhita* seeds of *Ipomoea carnea*
2	GDSIC	*Godugdhha* (Cow milk) *shodhita* seeds of *Ipomoea carnea*
3	GMSIC	*Gomutra* (Cow urine) *shodhita* seeds of *Ipomoea carnea*
4	KASIC	*Kanji* (sour gruel) *shodhita* seeds of *Ipomoea carnea*
5	TKSIC	*Triphala Kwatha shodhita* seeds of *Ipomoea carnea*
6	DWSIC	Distilled water *shodhita Ipomoea carnea*

Experimental outcomes: Physicochemical, pharmacognostic and phytochemical changes and effect on level of toxic principle (Swainsonine) of *Ipomoea carnea* seeds will be found.

Statistical methods: NA

Expected Result

Physicochemical, pharmacognostic and phytochemical changes and effect on level of toxic principle (Swainsonine) of *Ipomoea carnea* seeds will be found.

Discussion

It is expected that the *shodhana* may reduce the level of toxic principle (Swainsonine) of *Ipomoea carnea* seeds. If it happens so, there may be possibility of using seeds of *Ipomoea carnea* for therapeutic purposes. Phytochemical constituents present in *Shodhana* media may have synergistic or antagonistic effect, both of which may be beneficial. Antagonistic effect may reduce toxicity of *Ipomoea carnea* seed. Hence, it may be further used as antidote for it. If the drugs in *shodhana* media have synergistic effect, they may improve the pharmacological activity of the seeds. The results of *shodhana* with different *shodhan* media can be compared to identify the best antidote. With the help of phytochemical techniques, any new phytoconstituent can be found out which may be a significant achievement in the world of phytochemistry. Studies on Phytochemical and Pharmacological investigations of drugs have been reported by Gupta *et al*. [7, 8, 9]. Also studies have been reported on Ethnomedicinal qualities of Leaf drugs [10, 11].

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References

1. Tripathi B. (editor). Charaka Samhita of Agnivesha, Sutrasthana 26/12, Choukhambha Surbharti Prakashana, Varanasi, 2006, 471.
2. Shastri Ambikadatta. (editor). Sushruta Samhita of Sushruta, Sutrasthana 41/9, Choukhambha Sanskrita Sansthana, Varanasi, 2010, 199.
3. Paradakara Harishstri Vaidya. (editor). Ashtanga Hridaya of Vagbhata, Sutrasthana Dravyadivigyaniya 9/10, Choukhambha Orientalia, Varanasi, 2011, 166.
4. Bhalerao SA, Teli NC. Ipomoea carnea Jacq. Ethnobotany, Phytochemistry and Pharmacological Potential. Int. J. Curr. Res. Biosci. Plant Biol. 2016, 3(8):138-144.
5. Ved GA, Kinhal K, Ravikumar MK, Vijaya S, Indresha JH. Threat Assessment and Management Prioritization for Medicinal Plants of Chattisgarh and Madhya Pradesh, FRLHT, Bangalore, India, 2014, pp.418.
6. Balogh KK, Dimande AP, Van der Lugt JJ, Molyneux RJ, Naude TW, Welman WG, *et al*. Lysosomal storage disease induced by Ipomoea carnea in goats in Mozambique Journal of Veterinary Diagnostic Investigation. 1999; 11:266-273.
7. Gupta, Rahul Kumar, Meena Deogade. "A Critical Review on Ethnobotanical, Phytochemical and Pharmacological Investigations of Martynia Annua Linn." International Journal of Ayurvedic Medicine. 2018; 9(3):136-43.
8. Gupta Rahul Kumar, Meena Shamrao Deogade. "Antioxidant Activities of Martynia Annua Linn. Root Extract." International Journal of Ayurvedic Medicine. 2019; 10(4):326-28.
9. Gupta Karan R, Gaurav Sawarkar, Ulhas Jadhav. "Critical Appraisal of Pipasa in Chronic Obstructive Pulmonary Disease." International Journal of Ayurvedic Medicine. 2020; 11(1):44-49.
10. Sharma Tarun, Bhargav Bhide, Rabinarayan Acharya. "Ethnomedicinal Claims on Wound Healing Activity of Certain Leaf Drugs - A Review." International Journal of Ayurvedic Medicine. 2018; 9(2):42-78.
11. Deogade Meena Shamrao, Prasad KSR. "Standardization of Wild Krushnatulasi (Ocimum Tenuiflorum Linn) Leaf." International Journal of Ayurvedic Medicine. 2019; 10(1):52-61.