

Pharmacognostical and phytochemical study of *Shodhana* process of *Raktaganja* (Red variety of *Abrus precatorious*)

Deshmukh Arun Rangrao¹, Kharat Ravindra Sahebrao² Deshpande Manasi M³

^{1*} Department of Dravyagunavigyan, MUPS college of Ayurved, Degaon, Risod, ² Department of Dravyagunavigyan, CSMSS Ayurved Mahavidyalaya, Kanchanwadi, Aurangabad, ³ Bharti Vidyapeeths College of Ayurved, Katraj, Pune

Abstract

The use of plants, animal products and minerals as a source of medicine and food is as old as humanity itself. Ancients discovered medicinal properties of them, developed folk and herbal medicines and finally gave rise to traditional system of herbal medicine such as *Ayurveda*. *Raktaganja* is included in *Upavisha Gana* of *Bhaprakash Nighantu* as it has toxic effect. But if it is used by *Yukti* it is useful in various *Kasthasadhya* diseases like *Mutrakruccha*, *Jwara* and *Vajikaran*. *Shodhana* process is said to be very effective to discard the poisonous effects, but it is necessary to create an evidence by employing modern scientific techniques.

Keywords: *Abrus precatorious*, *Raktaganja*, *Shodhana*, detoxification.

Introduction

The use of plants, animal products and minerals as a source of medicine and food is as old as humanity itself. Ancients discovered medicinal properties of them, developed folk and herbal medicines and finally gave rise to traditional system of herbal medicine such as *Ayurveda*.

Charaka has described *Chikitsa Chatuspad* as *Vaidya*, *Dravya*, *Paricharak* and *Rugna*. he has given prime importance to *Vaidya* followed by *Dravya*. he also quotes that each and every *Dravya* of this universe has its own medicinal properties if administered by *Yukti Pramana*. [1]

Raktaganja is included in *Upavisha Gana* of *Bhaprakash Nighantu* as it has toxic effect. But if it is used by *Yukti* it is useful in various *Kasthasadhya* diseases like *Mutrakruccha*, *Jwara* And *Vajikaran*. [2]

Shodhana process is said to be very effective to discard the poisonous effects, [3] but it is necessary to create an evidence by employing modern scientific techniques.

The study was carried out at *Bharti vidyapeet's* college of *Ayurved* in the year 2002 as his post graduate dissertation.

Aims and Objectives

To evaluate the *Shodhana* process of *Raktaganja*
To make comparison of standardization factors of *Raktaganja* before and after *Shodhana*
To collect and compile, ayurvedic as well as modern literature on *Raktaganja*.

MATERIALS AND METHODS

Type of Study: Experimental Study

Materials:

1. *Raktaganja* seeds
2. Cow Milk
3. Materials required performing analytical tests.
4. Materials required for *Shodhana* Process.

Methodology:

Collection;

Raktaganja seeds were self collected from *Mehekar* which is situated in *Buldhana* District of *Maharashtra*. It is hot tropical area and according to types of *Desha* described in *Ayurved* may be called as *Sadharan Desha*. [4] *Godugdha* was collected from a milkman from *Sinhagarh* to assure quality.

Shodhana Process:

There are two *Shodhana* processes described in *Rasa-Tarangini* for *Raktaganja Shodhana*. in first procedure, fresh seeds of *Raktaganja* were crushed and kept in double layred cloth by making its *Pottali*. this *Pottali* was subjected to *Swedana* in *Dolayantra* with *Godugdha* for six hours. [5]

In second procedure, *Raktaganja* seeds were subject to *Swedana* in *Dolayantra* with *Kanji* for three hours. [6]

As the *Raktaganja* is stated to be taken with milk in various *Kalpas* the first procedure was selected.

The fresh seeds of *Raktaganja* were collected and crushed to form *Yavakuta Churna* of mesh 44. 100 gms of *Bharad Churna* was kept in double layred cotton cloth and *Pottali* was made. *Dolayantra* was prepered. *Pottali* was tied in *Dolayantra* without touching to any side. milk was added in *Dolayantra*

*Corresponding Address:

Email: drarundeshmukh@rediffmail.com

TABLE 1: Organoleptic findings Before Shodhana.

Sr No	Organoleptic Findings	Rakta Raktagunja Before Shodhana	Milk before Shodhana
1	Shabda	Avyakta(none)	Avishesh(Non specific)
2	Sparsha	Kathin,Slakshana(hard)	Snigdha(oily)
3	Roopa(shape)	Raktabha-Krishna(red and Black)	Sweta
4	Rasa (taste)	Tikta-Kashaya	Madhura
5	Gandha(odor)	Typical	Non specific

TABLE 2: Organoleptic findings After Shodhana.

Sr No	Organoleptic Findings	Rakta Raktagunja After Shodhana	Milk After Shodhana
1	Shabda	Avyakta(none)	Avishesh(Non specific)
2	Sparsha	Snigdha,Mridu	Snigdha(oily)
3	Roopa(shape)	Dhusar Krishnabh	Dhusar Krishnabh
4	Rasa (taste)	Tikta-Madhur	-
5	Gandha(odor)	Smell of Ghee	Burnt smell

All



Picture 1 - RaktaGunja (Abrus precatorious)

In such a manner that *Pottali* should lie in between milk level.then *Dolayantra* was kept on *Agni* for next six hours.by keeping caution that the *Pottali* should lie in between milk level till the end of procedure. After six hours *Dolayantra* was removed from *Agni* and *Potalli* was opened to obtain *Shodit Raktagunja* seeds.these *Raktagunja* seeds were washed with warm water and dried in shade before analysis.[7]

Analytical Study

Physical and chemical analysis of following samples was done.

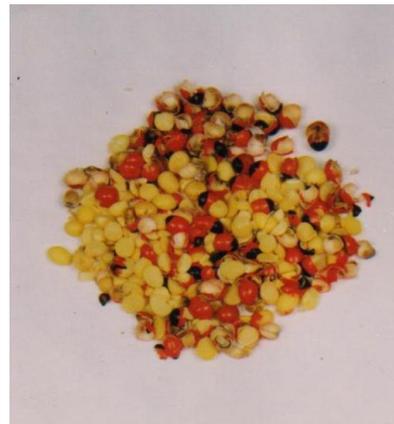
1. *Raktagunja* seeds before *Shodhana*
2. Milk before *Shodhana*
3. *Raktagunja* seeds after *Shodhana*
4. Milk after *Shodhana*

Organoleptic study[8]

Organoleptic Evolution means conclusions drawn from studies resulted due to impressions on organs of senses. *Dwivedi* et al has laid down certain parameters and Performa to identify drugs on the basis of *Panchendriya Pariksha*.

Physical analysis.[9]

% moisture, %total ash, %acid soluble ash, water soluble ash, Extractive values, and pH of all the four samples were performed according to the official methods prescribed in WHO guidelines on quality control methods for medicinal plant materials and *Ayurvedic pharmacopeia* Chemical Analysis.[10]



Picture 2-Raktagunja before Shodhan



Picture 3- RaktaGunja after Shodhan

TABLE 3: Results of % moisture, %total ash, %acid soluble ash, water soluble ash, Extractive values, and pH

Sr No	Parameters	Rakta Raktaganja Before Shodhana	Rakta Raktaganja After Shodhana
1	% Moisture	06.6487	06.9523
2	% Total Ash	02.8700	03.0100
3	% Acid insoluble ash	00.4836	00.4811
4	% water soluble ash	01.4080	01.3852
5	% Ethanol soluble extractive	04.9925	04.9339
6	% benzene soluble extractive	04.5615	04.2935
7	% chloroform Soluble	00.5361	00.4765

the four samples were extracted with different solvents, viz. chloroform, ethanol, benzene and water. The extracts were then subjected to phytochemical screening as per standard methods prescribed in literature. Thin layer chromatography profile TLC of different extracts was carried out as per API guidelines.

Results

Organoleptic Study:

Organoleptic findings Before and after *Shodhana* process of all samples have been described in Table 1 and Table 2

Physical analysis:

Results of % moisture, %total ash, %acid soluble ash, water soluble ash, Extractive values, and pH are given in table 3

Chemical analysis

In the preliminary phytochemical screening for commonly occurring plant constituents was carried using the maceration procedure. The testing was carried out on residue obtained by evaporation of water extract of drug. Results of phytochemical screening are listed in the table 4.

Test for Toxic albumin and globulin:

TABLE 4: Results of phytochemical screening

Sr No	Constituents	Rakta Raktaganja Before Shodhana	Rakta Raktaganja After Shodhana
1	Test for Alkaloids	Present	Present
2	Test for Sugar	Present	Present
3	Test for Amino acid	Present	Present
4	Test for Flavonoids	Present	Present
5	Test for Calcium	Present	Present
6	Test for Nitrogen	Present	Present
7	Test for steroids	Present	Present
8	Test for tannins	Absent	Absent
9	Test for	Present	Present

Heat coagulation test was performed to detect toxic albumin and globulin before and after *Shodhana* the results are tabulated in table no.5

Thin layer chromatography profile

Methanol extract of *Raktaganja* and milk ,before and after *shodhana* were subjected to TLC analysis using Tolune: Ethyle acetate (8:2) and Methanol:Chloroform(1:9) as a solvent system. The Rf values of the resolved components were determined and detailed results of number of components present are given in table 6

Discussion:

To get a genuine sample the market drug was not used for the experiment but the seeds of *Raktaganja*

Were collected personally to assure genuine quality and mature sample also the *Godugdha* was collected from one milkman *Sinhgarh* road *Pune* personally to assure genuinity.

In organoleptic study *Raktaganja* and milk has shown significant difference in *Sparsh*, *Roopa*, *Rasa* and *Gandha* after *Shodhana*.

There was no significant difference in physical

TABLE 5: Results of Heat coagulation test was performed to detect toxic albumin and globulin before and after Shodhana

Sr No	Test	Rakta Raktaganja Before Shodhana	Rakta Raktaganja After Shodhana
1	Test for toxic albumin and globulin	Present	Absent

TABLE 6: Rf values of the resolved components

Sample	Extract	Adsorbant	Solvent system	No of Spots			Rf Values	
				254 nm	365 nm	Iodine vapour		
<i>Raktagunj</i> <i>a</i> Before <i>Shodhana</i>	Methanol	Silica gel "G"	Toluene: acetate (8:2)	Ethyle	1	1	2	0.98(blue),0.45(blue), 0.98(yellow),0.77 (blue)
<i>Raktagunj</i> <i>a</i> After <i>Shodhana</i>	Methanol	Silica gel "G"	Toluene: acetate (8:2)	Ethyle	1	1	4	0.97(blue), 0.77(blue), 0.1,0.45, 0.56,0.97(yellow)
Milk Before <i>Shodhana</i>	Methanol	Silica gel 60F 254	Methanol:Chloroform (1:9)		1	2	2	0.05(violet),0.05(blue) ,0.13(pink)
Milk After <i>Shodhana</i>	Methanol	Silica gel 60F 254	Methanol:Chloroform (1:9)		1	2	2	0.05(violet), 0.05(pink),0.1(pink)

TABLE 7: Protein content

Sr.No	Particular	% protein
1	Protein content of <i>Raktagunj</i> Before <i>Shodhana</i>	8.73
2	Protein content of Milk Before <i>Shodhana</i>	4.76
3	Protein content of <i>Raktagunj</i> after <i>Shodhana</i>	6.51
4	Protein content of Milk after <i>Shodhana</i>	7.99

analysis of *Raktagunj* seeds before and after *Shodhana* in terms of moisture value, ash value, acid insoluble ash, water soluble ash, water soluble extractive, benzene soluble extractive, ethanol soluble extractive, chloroform soluble extractive. so we elucidated that there was no effect on inorganic contents of seeds after *Shodhana* process.

pH of milk was decreased after *Shodhana* which indicates change in physical properties of milk due to *Shodhana*.

In chemical analysis, preliminary phytochemical screening for commonly occurring constituents was carried out using the aqueous extract of the seeds before and after *Shodhana* process. Qualitative analysis for alkaloids, amino acids, flavonoids, proteins, calcium, nitrogen and steroids were carried out. Both before and after *Shodhana* extracts showed the presence of these

constituents while tannins were absent in seeds. *Raktagunj* showed presence of sugar.

In the test for toxic albumins and globulins *Raktagunj* showed presence before *Shodhana* and absence after *Shodhana*.

The quantitative estimation of proteins of seed extract and milk before and after *Shodhana* and after *Shodhana* was carried out. *Abrin* is one of the major chemical constituents of *Raktagunj* seeds which makes highly toxic to *Raktagunj* seeds. It is type of toxalbumin (protein).

The protein content was estimated by nitrogen content estimation. There was significant decrease in protein content of seeds from 6.73% to 6.51% in *Raktagunj*.

The protein content of *Godugdha* was increased after *Shodhan* from 4.76% to 7.99% in milk used for *Shodhana* of *Raktagunj*.

We concluded that the proteins might have infiltrated from seeds into the milk also due to heating, there might be evaporation of water from milk and thus relatively concentrating the proteins in the milk.

In the thin layer chromatography *raktagunj* seeds before and after *Shodhana* were much identical and thin layer chromatography of milk which were also identical before *Shodhana* gave an additional spot at Rf 0.01, indicating there is addition of some chemical constituents of *Raktagunj* after *Shodhana*.

From above studies and observations we concluded that the seeds of *Abrus precatorius* has detoxified from toxic albumin and globulin after *Shodhana*.

CONCLUSION

In this study following conclusions can be drawn

There is change in organoleptic characters of both type of *Raktagunja* and milk due to *Shodhana*.change in physical characters of both type of *Raktagunja* and milk due to *Shodhana*

Toxic albumins and globulins were present before *Shodhana* but they are absent after *Shodhana*.in quantitative analysis of protein content of seeds were decreased after *Shodhan* suggesting loss of some proteins from the seeds due to *Shodhana*

In quantitative analysis of protein content of milk were increased after *Shodhan* suggesting addition of some proteins from the seeds due to *Shodhana* in it.

In thin layer chromatography of milk there was additional spot present after *Shodhana* as compare to before *Shodhana* which indicates addition of any chemical constituent of *Raktagunja* in it.

References:

1. Joshi YG, editor. Charaksamhita. In Ayurveddipikavyakhya. Pune: Vaidyamitra Prakashan; 2003. p. 133.
2. Chuneekar KC, Pandey GS, editors. Bhavaprakasha nighantu. In. Varanasi: Chaukhamba vishvabharti; 2010. p. 339.
3. Sharma PV. Dravyagunavigyan vol 1 Varanasi: Chaukhamba Vishvabharti; 1995.p.341
4. Dwivedi V, Tripathi I, editors. Rajnighantu. In Dravyagunaprakashika. Varanasi: Krishnadas Academy; 1982. p. 8.
5. Shastri K, editor. Rasatarangini. In. New Delhi: Motilal Banvaridas; 1969. p. 729.
6. Shastri K, editor. Rasatarangini. In. New Delhi: Motilal Banvaridas; 1969. p. 730.
7. Shastri K, editor. Rasatarangini. In. New Delhi: Motilal Banvaridas; 1969. p. 731.
8. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. In. Pune: Nirali Prakashan; 2008. p. 6.3.
9. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. In. Pune: Nirali Prakashan; 2008. p. 6.14.
10. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. In. Pune: Nirali Prakashan; 2008. p. 6.11.