**A Comparative Study of Abrus Precatorius by Three Different Methods of Shodhana**

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**Abstract** - *Gunja* (Abrus precatorius linn.) described under the category of *apavisha*, a sub-poisonous drug in *Ayurveda*. Seeds of *gunja* have active principle Abrin, which is said to have toxic properties, which can cause severe nausea, vomiting, convulsions, liver failure, severe purgation and death. Also no antidote exists for abrin, the most important factor is avoiding abrin. There are many *Ayurvedic* medicines which contain *gunja* as a key ingredient. *Gunja* seeds are used only after processing in certain media, known as *shodhana* process. In the present study, *rakta gunja* seeds were processed in three medias *godugdha*, *kanji* and water at same temperature and evaluated against the raw sample for its abrin content. The study was conducted to evaluate which media reduces abrin to its maximum. Abrin is a protein, which is denatured when subjected to high temperature and removes its toxicity.

**Index Terms** - Abrus precatorius, Abrin, Shodhana, godugdha, kanji and water.

I. INTRODUCTION

*Ayurveda* is an Indian traditional system of medicine. Some *Ayurvedic* medicine contains *visha dravya* as key ingredients. Though *visha dravya* are toxic in nature, but they are used in medicine. Because they have properties like *ushna*, *teeksha*, *vyavayi*, *vikashi*, *asshukaritwa*, they spreads and act all over the body quickly.[1] So, the demand of using such medicines are increased. Before using these *visha dravya*, they should undergoes into some procedures which denatures the toxic effects and enhances the efficacy of drugs. This procedure is called as *shodhana*. The concept of *shodhana* is not a purification or detoxification (removing toxic substances), but it reduces the toxic effects and enhances the therapeutics benefits of drugs ( in relation to *visha dravya shodhana*). *Shodhana* procedures includes *nirvapana* (cooling), *dhalaana* (melting and dipping into liquid media), *bharjana* (roasting), *swedana* (steaming), etc. [2] The term *visha* is named from *vishada*. Substances that enters and vitiates the healthy *dhatu* (structural components, tissues) of the body and may or may not manifest with lethal signs and symptoms, is termed as *visha*. [3] Major classification of *visha dravya* are into two, (based on their strength) *visha* (*mahavisha*) and *upvisha*. [4] Other classification include *akritim* (nature) and *kritim* (artificial) or *sthavara visha*, *jangam visha* and *samyojana visha*. Author of *Rasatarangini* has enumerated and considered *gunja* (*Abrus precatorius*) as one of the *upvisha* or sub-poisonous drugs.[5] Fruits, roots and seeds are the parts which are used in the medicines. Only seeds are toxic in nature.

Abras precatorius is a slender, perennial climbers that twines around trees, shrubs and hedges. It is a legume with long, pinnate-leafleted leaves. *Gunja* seeds are commonly used as cattle poison, arrow poison or sometimes used as birth control pills.[6] The major active principle of *gunja* seeds is Abrin, a toxalbumin (or protein). Ingestion of raw crushed seeds ( or improper *shodhita*) causes severe purgation and vomiting leading to toxic symptoms in the body.[7] also GI irritation, nausea, abdominal pain. Therefore *shodhana* of *gunja* seeds were done. *Swedana* process is described for the *shodhana* of *gunja* seeds by *dolayantra* method.[8] Present study deals with comparative study, by *shodhana* process of *rakta gunja* seeds in three different medias.

II. AIM

To study and compare the level of Abrin content in *gunja* seeds at before and after *shodhana* process in three different medias i.e. *godugdha*, *kanji* and water by analytical techniques.

III. OBJECTIVES

1) To perform the *shodhana* of *gunja* seeds in three different medias.
2) Analyse the *shuddha gunja* seeds with their respective medias.

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3) Evaluate and compare the Abrin content of ashuddha gunja seeds and shodhita gunja seeds with their respective medias by using analytical tools.

IV. METHODOLOGY

A. Type of study
Experimental study.

B. Materials
Raw material: Ashuddha rakta gunja seeds (Abrus Precatorius Linn.)
Other materials: Gudugdha (cow milk), Kanji (sour gruel), water.

Equipment: Weighing machine, measuring cylinder, muslin cloth, vessel, spatula, rod, gas stove, match stick, cotton thread.

C. Method
Collection: The raw gunja seeds were procured from local market.
Identification: Gunja seeds were identified by dravyaguna department of our institute.
Standardisation: Raw gunja seeds were powdered and analysed. The findings were compared with monographs mentioned in API.
Shodhana procedure:
1. Required quantity of raw gunja seeds were weighed with the help of weighing machine.
2. Raw gunja seeds were placed in muslin cloth and all four corners were tied with thread in such a way that it form a pottali.
3. This pottali was hanged upon a rod in a vessel containing Gudugdha in such a way that it completely immersed in it. (like Dolayantra) (image no.3)
4. This vessel is kept upon gas stove and turned on with matchstick.
5. Six hours of continuous heat was given to it. During process, stirring was done with spatula so that liquid doesn’t comes out from vessel while boiling.
6. When level of the liquid media decreases, liquid were poured into it, so that pottali is completely immersed in the media.
7. After self cooling, pottali was removed and shodhita gunja seeds was washed with luke warm water and kept for drying.
8. Likewise, shodhana of gunja seeds were done in kanji media and water media for 3 hours.

<table>
<thead>
<tr>
<th>Liquid media for shodhana</th>
<th>Godugdha</th>
<th>Kanji</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method used for shodhana</td>
<td>Swedana in Dolayantra</td>
<td>Swedana in Dolayantra</td>
<td>Swedana in Dolayantra</td>
</tr>
<tr>
<td>Heat given in hrs</td>
<td>6 hrs (2 yaam)</td>
<td>3 hrs (1 yaam)</td>
<td>3 hrs (1 yaam)</td>
</tr>
</tbody>
</table>

Table no. 1 showing shodhana process.

Precautions:
Pottali was not touched at base of the vessel during the procedure. Pottali was completely and continuously immersed in the media. Mandagni was given throughout the procedure. (About temperature of 100 degree was maintained throughout the process) (image no.4)

Analytical study:
Organoleptic characteristics, physico-chemical analysis and TLC of ashuddha gunja, shuddha gunja and media in which shodhana has done.

Method applied for TLC analysis:
Methanolic extract of gunja seeds and liquid media were used.
Mobile phase – Toluene : Ethyl acetate : Glacial acetic acid = (6 : 3.5 : 0.5) v/v/v
Reagent – Spray with vanilline (H₂SO₄)

V. RESULTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>A.G.</th>
<th>G.S.G.</th>
<th>K.S.G.</th>
<th>W.S.G.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shabdha</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sparsha</td>
<td>Smooth</td>
<td>Smooth</td>
<td>Smooth</td>
<td>Smooth</td>
</tr>
<tr>
<td>Roopa</td>
<td>Black spot on reddish colour</td>
<td>Black spot on dull yellow colour</td>
<td>Black spot on dull yellow colour</td>
<td>Black spot on light creamish yellow colour</td>
</tr>
<tr>
<td>Rasa</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gandha</td>
<td>Not specific</td>
<td>characterstics</td>
<td>characterstics</td>
<td>Not specific</td>
</tr>
<tr>
<td>Wight</td>
<td>100 gm</td>
<td>95 gm</td>
<td>94 gm</td>
<td>96 gm</td>
</tr>
</tbody>
</table>

Table no.2 showing organoleptic charateristics of ashuddha and shuddha gunja seeds.
A.G. – Ashuddha Gunja seeds, G.S.G. – Godudgha Shodhita Gunja seeds.


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Godudgha media</th>
<th>Kanji media</th>
<th>Water media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shabdha</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Sparsha</td>
<td>Semisolid</td>
<td>Semisolid</td>
<td>watery</td>
</tr>
<tr>
<td>Roopa</td>
<td>Creamish yellow</td>
<td>Light yellow</td>
<td>Blackish</td>
</tr>
<tr>
<td>Rasa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gandha</td>
<td>Not specific</td>
<td>Not specific</td>
<td>Not specific</td>
</tr>
</tbody>
</table>

Table no.3 showing organoleptic characteristics of liquid media in which shodhana has done.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal range</th>
<th>A.G.</th>
<th>G.S.G.</th>
<th>K.S.G.</th>
<th>W.S.G.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign matter</td>
<td>NMT 2%</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Ash value</td>
<td>NMT 3%</td>
<td>2.92</td>
<td>2.48 %</td>
<td>2.32 %</td>
<td>2.84 %</td>
</tr>
<tr>
<td>Acid insoluble ash</td>
<td>NMT 0.5%</td>
<td>0.47</td>
<td>0.27 %</td>
<td>0.35 %</td>
<td>0.41 %</td>
</tr>
<tr>
<td>Alcohol soluble extract</td>
<td>NLT 3%</td>
<td>3.29</td>
<td>3.86 %</td>
<td>3.16 %</td>
<td>3.12 %</td>
</tr>
<tr>
<td>Water soluble extract</td>
<td>NLT 15%</td>
<td>17.75</td>
<td>17.11 %</td>
<td>16.97 %</td>
<td>16.05 %</td>
</tr>
</tbody>
</table>

Table no.4 showing physico-chemical of ashuddha and shuddha gunja seeds.

<table>
<thead>
<tr>
<th>Rf value of abrin</th>
<th>A.G.</th>
<th>G.S.G.</th>
<th>K.S.G.</th>
<th>W.S.G.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.60 &amp; 0.70</td>
<td>0.60</td>
<td>0.40 &amp;</td>
<td>0.70</td>
<td>0.50 &amp;</td>
</tr>
</tbody>
</table>

Table no.5 showing TLC of gunja seeds before and after shodhana.

<table>
<thead>
<tr>
<th>Rf value of abrin</th>
<th>Godudgha media</th>
<th>Kanji media</th>
<th>Water media</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>0.30</td>
<td>0.40</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Table no.6 showing TLC of liquid media

VI. DISCUSSION

The concept of shodhana is to denature the toxicity and enhance the therapeutic effects. In this study, three media were used to do shodhana of rakta gunja seeds. Godudgha and kanji are the medias described in text for the shodhana of gunja. A new media was used to verify whether it can alter or reduces the toxic effects. The reason behind this is that, if water soluble extract causes toxicity then it can replace the godudgha or kanji media for shodhana process. On analysing the raw gunja seeds, it found that the values were in the limit as mentioned in the monographs in API. On comparing all shodhita gunja seeds, it found that water soluble extract and alcohol soluble extract was found higher in godudgha shodhita gunja seeds and lesser in water shodhita gunja seeds. This may be due the presence of protein content in gunja seeds are more soluble in milk than kanji and water and also milk has higher affinity to dissolve the protein content. Ash value and acid insoluble ash was found lesser in godudgha shodhita gunja seeds than kanji and water shodhita gunja seeds. Colour and weight of gunja seeds were changed after shodhana process. TLC of ashuddha gunja seeds shows presence of Abrin content with rf value 0.30 and abrusogenin with rf value 0.60 and 0.70. On comparing TLC of all shodhita gunja seeds, rf values of Abrin was found different in godudgha and kanji shodhita gunja seeds (conversion of 0.30 into 0.25) whereas rf value remain same in water shodhita gunja seeds and also rf values of abrusogenin was found different in godudgha and water shodhita gunja seeds (conversion of 0.60 and 0.70 into 0.40 and 0.70, 0.50 and 0.70 respectively) with disappearance of one of rf value in kanji shodhita gunja seeds. Reason behind may be that structure of Abrin content containing rf value is converted into some other component of Abrin having different rf value which may shows less toxicity. On analysing the TLC of all liquid medias in which shodhana was performed, it found that media show same rf value of Abrin (0.30) which was seen in ashuddha gunja seeds. Reason may be that some of Abrin content having rf value from ashuddha gunja seeds was dissolve or transferred into liquid godudgha media thereby reducing the toxic effects of gunja seeds. Also found that kanji media and water media shows different rf value of Abrin content (conversion of 0.30 into 0.40). This may be due to commencement of chemical reaction between media and gunja seeds in heating process thereby leading to formation of new component or structure of Abrin.

VII. CONCLUSION

On performing the shodhana of gunja seeds in all three different medias, there was increase in alcohol soluble extract and water soluble extract, and also decrease in ash value and acid insoluble ash of all shodhita gunja when compared to ashuddha gunja seeds. TLC of Abrin content was altered in godudgha shodhita gunja seeds after shodhana. TLC of Abrin content was altered in all liquid medias in which shodhana of gunja seeds has done whereas the presence of same rf value (0.30) of ashuddha gunja seeds in godudgha media indicating some ofAbrin content is

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transported in it. So, study concluded that shodhana of gunja seeds in godugdha is more effective than kanji and water.

REFERENCES


AUTHORS

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Image no.1 showing TLC of ashuddha gunja seeds and shuddha gunja seeds.

| Ashuddha gunja seeds | G.S.G. | K.S.G. | W.A.G. |

Image no.2 showing TLC of liquid media.

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Image no.3 showing dolayantra method used for shodhana process (W.S.G.).

Image no.4 showing agni (heat)(low flame) used for shodhana.
Image no.5 showing *shodhana* of *gunja* seeds in *godugdha* media.

Image no.6 showing in-process *shodhana* of *gunja* seeds in *godugdha* media.

Image no.7 showing *shuddha gunja* seeds.