EVALUATION ON THE SEED GERMINATION RATE OF ASHOKA (SARACA ASOCA (ROXB.) DE WILDE) WITH SPECIAL REFERENCE TO VRIKSHAYURVEDA

Shahane Prachi1*, Khobragade Pramod2

*1PG Scholar, 2Guide and HOD, Department of Dravyaguna, MGACH & RC, Salod (H.), Wardha (MS), India.

ABSTRACT

Ashoka (Saraca asoca (Roxb.) de Wilde) is one of the most auspicious plant mainly for females belonging to family Fabaceae. The stem bark is the widely used in several Ayurvedic preparations such as ‘Ashokarishta’ which is prescribed in leucorrhea, haematuria, menorrhagia and other gynecological disorders. It is getting “endangered” due to over exploitation and enormous use of its bark. Because of destructive means of extraction and the absence of an organized cultivation programs, the availability of the crude drug is diminishing and this has resulted in substitution and adulteration. It affects the Good Manufacturing Practices and resulting in deprived quality of the product which leads to hamper its efficacy. Subsequently it is a need of hour, to cultivate it in large extent, which is getting deprived because of its slow growth rate, seed dormancy and low germination rate. The present study was conducted to overcome this problem with the help of one of the method described in Vrikshayurveda.

In this study, seed germination of Ashoka is carried out by three different methods i.e., conventional method, H2SO4 method and Vrikshayurveda method. Out of which germination rate of Ashoka seeds was maximum (38%) with conventional method minimum (6%) with Vrikshayurveda method and (24%) with H2SO4 treatment. In view of observations, methods like conventional and H2SO4 are more effective than the Vrikshayurveda for good germination of seeds of Ashoka. The low germination rate in Vrikshayurveda may be due to the limited description of methodology described in Vrikshayurveda with respect to quantity of cow milk, cow dung, honey, and Vidanga powder and time period for soaking seeds in cow milk, rubbing of cow dung and application of Vidanga and honey with respect to procedure. It should be studied in detail so as to get scientific insight of ancient methods of Vrikshayurveda, may prove its important with respect to maximum germination rate and healthy growth of plants.

KEYWORDS: Saraca asoca, Germination rate, Vrikshayurveda.

INTRODUCTION

Ashoka (Saraca asoca(Roxb.) De. Willd.) is an one of the sacred plants of Hindus belongs to family Fabaceae. As we know that Ashoka is the main plant useful in gynecological disorders. The estimated demand of Ashoka bark is in excess of 2000 million tons, however, the availability in the wild is extremely rare. Over exploitation results in vulnerability of Ashoka species. Therefore, the cultivation of Ashoka plants is the key to meeting authentic and genuine raw material. There are various measures for plantation like, plantation through seed, stalk, bulb, etc. can be adopted, and out of which plantation by seed is the reliable and easy method of plantation because seed itself is the cause of perpetuating the continuity of plant kingdom. For healthy and disease free plants, vigorous and phenotypically superior seed with no physical damage and having good viability are required because in the germination of seed various factors affects like moisture, temperature, oxygen, light, substratum, food availability, dormancy, etc. Due to such factors seed germination rate got declined. Out of which seed dormancy is the most critical problem. As it is evident that there is a great scope to integrate traditional practices mentioned in Vrikshayurveda for better productivity of quality plant material.

Vrikshayurveda is the traditional Indian science of plant life that describes theory and practices to generate healthy plants that produce yield of superior quality. It is the way forward for organic production of seedlings as well as large scale cultivation of medicinal plants, horticultural crops, vegetable crops and grains. These will help not only in production of organic and healthy produces, but also in maintaining a healthy environment.

As there are some problems found in cultivation of Ashoka are, it has a very low germination rate, slow growth rate, the thin seed coat which many times results in separation of cotyledons. To overcome the above problems and to find an amicable solution, the present study was conducted by comparing conventional methods with that of Vrikshayurveda. In this study is based on one of the formula given in the book of Vrikshayurveda for good sprouting, germination and vigor, which is as follows “Seeds to be sprinkled with milk, smeared with cow dung, dried smeared profusely with Vidanga and honey. Such seeds definitely sprout.”
Collection of seeds

Fresh seeds of Ashoka were collected from Pune (Maharashtra) and Mangalore (Karnataka) in the month of July, the rainy season of 2015.

Collection of Godugha, Gomaya, Madhu, and Vidanga

Fresh Godugha (cow dung) and fresh Gomay (cow dung) were collected from nearer sources, Madhu (Honey) was collected from forest of Gadchiroli, due to unavailability of Embelia ribes Burm. f., fruits of Embelia robusta Roxb. was taken as a substitute. The original sample of Embelia robusta Roxb.) was collected as a field sample from Joginder Nagar of Himachal Pradesh. Fruit powder of Vidanga was made in pharmacy.

Other Materials

Black polythene bags filled with soil, various glass wares like conical flasks, test tubes, measuring flasks, pipettes, petri dishes, clay pots, distilled water, filter paper.

Identification and Authentication of Ashoka

The plants were identified and authenticated from FRLH (Foundation of revitalization of local Health Traditions, Banglore). The herbarium specimen [FRLH 119704] is confirmed as Saraca asoca (Roxb.) Willd. of family Leguminosae.

Method used for formation of 0.1N Sulfuric acid by Conc. H2SO4

3 ml of Conc H2SO4 was mixed with 500 ml of distilled water, after shaking well 447 ml of distilled water was added to it to form 1000 ml of H2SO4 of (0.1N) strength. After preparing 0.1N of H2SO4, the pretreatment was given to Ashoka seeds.

Sample size of seeds for germination rate

50 seeds of Ashoka in each group respectively were taken to access the germination rate and growth performance up-to 2 months. The seed treatment of Ashoka was divided into following three groups-

Group A - Conventional Method
Group B - H2SO4 treated Method
Group C - Vrikshyurveda Method

Procedures for selection of Ashoka seeds

Observation and Results

Germination Period

<table>
<thead>
<tr>
<th>Ashoka seeds</th>
<th>Floated seeds out of 50</th>
<th>Seeds remaining at the base out of 50</th>
<th>Number of replaced seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>4</td>
<td>46</td>
<td>4</td>
</tr>
<tr>
<td>(B)</td>
<td>6</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>(C)</td>
<td>4</td>
<td>46</td>
<td>4</td>
</tr>
</tbody>
</table>

Germination Period

Table 2: Time to germinate: i.e. the time for the first germination to appear

<table>
<thead>
<tr>
<th>Ashoka</th>
<th>No. of days to germinate 1st seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>15</td>
</tr>
<tr>
<td>Group B</td>
<td>15</td>
</tr>
<tr>
<td>Group C</td>
<td>52</td>
</tr>
</tbody>
</table>

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Germination rate

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Treatment</th>
<th>Ashoka (Group)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(A)</td>
</tr>
<tr>
<td>1.</td>
<td>No. of seeds planted</td>
<td>50</td>
</tr>
<tr>
<td>2.</td>
<td>No. of seeds that germinated</td>
<td>19</td>
</tr>
<tr>
<td>3.</td>
<td>Fraction of seeds that germinated</td>
<td>19/50</td>
</tr>
<tr>
<td>4.</td>
<td>Fraction with denominator of 100</td>
<td>38/100</td>
</tr>
<tr>
<td>5.</td>
<td>Percentage of seeds that germinated</td>
<td>38%</td>
</tr>
</tbody>
</table>

DISCUSSION

Availability of authenticated crude drug is a big challenge today. More than 90% of the species used in trade continue to be sourced from the wild of which about 2/3rd are harvested by destructive means. Therefore the cultivation of medicinal plants is the key to meeting the raw material needs of the Ayurvedic pharma-industry. With this view of organic cultivation to grow healthy and numerous plants, there are various methods given in Vrikshayurveda. For healthy and fast germination, one of the method from Vrikshayurveda was chosen. The main reason behind selection of this method is availability of ingredients and its beneficial effects on growth of plants.

For exploring facts and factual, Ashoka (Saraca asoca (Roxb.) De.Willd.) with very low germination and slow growth rate was selected and experiment was designed. This plant has immense potential and medicinal properties but it is always short of supply. This leads to its adulteration and hence is not suitable for human consumption. Present study hence will prove a boon to enhance their growth. So that ample, authentic material is made available for his usage for mankind.

As Ashoka is having very thin seed coat, but there is an unknown dormancy and the seeds remain viable only for 2 months which results in 58 to 100 % germination in humid or coastal area. In other regions of India the germination percentage is declined.

To overcome this problem the present study was conducted to evaluate the germination rate of Ashoka. It was studied on the basis of following points:

Seed Dormancy

Seed dormancy means where the embryo remains dormant for a temporary period. This stage is necessary for maturation of embryo and also for preservation. This is one of the significant features of dormancy. The seeds with a thick, hard seed coat required special treatment to break dormancy. In general, plants with tree habitat produce seeds during late spring and germinate only on onset of rainy season. But in case of Ashoka seeds are having very thin and not so hard seed coat, still it requires minimum 15 days and maximum 3 months after ripening effect.

Germination Percentage

There was a significant difference in germination rate with different treatments. However, the maximum germination percentage of Ashoka seeds (38%) was noticed in seeds germinated by conventional method. On the contrary, the minimum germination percentage (6%) was recorded by Vrikshayurveda method. Whereas the (24%) of germination rate was found in seeds treated with H2SO4(0.1 N).

Germination period

After careful observation it was seen that the germination period for the germination of first seed was 15 days in conventional group of Ashoka from the date of sowing. The last seed of Ashoka was germinated in conventional group and Vrikshayurveda group around 90 days after sowing.

Seedling Vigor Index

In Ashoka, the highest seedling vigor index (10.26) was recorded in seeds treated with conventional method while the lowest seedling vigor index (0.78) was found in Vrikshayurveda method. The seedling vigor index (4.2) was found in conventional group of Ashoka.

CONCLUSION

The lower germination rate in Ashoka seen in Vrikshayurveda method as compared to conventional and H2SO4 method, may be due to the limited description of methodology in the book of Vrikshayurveda with respect to quantity of cow milk, cow dung, honey, and Vidanga powder and time period for soaking seeds in cow milk. The following were problems faced during the research work which may lead to deprived results as compared to conventional and H2SO4 methods.

The seeds of Ashoka collected from Pune (Maharashtra) were small and not viable due to improper habitat, which may be the reason for difference in result. The seeds from Mangalore (Karnataka) were big and having more viability but some seeds were damaged due to high moisture content and physical trauma.

Treatment of cow milk to both type of seeds resulted in souring of milk which may be one of the major reason for very low germination rate as the proper quantity of cow milk and exact time period for retaining of seeds in cow milk was not mentioned in Vrikshayurveda. Similarly sprinkling of milk is mentioned but the rationality behind this procedure is not clear, therefore it was decided to place Ashoka seeds in cow milk for 24 hours which may affect the germination of seeds probably.

Hence prior to studying the methods enumerated in Vrikshayurveda regarding germination, it is our duty and need to develop its standard operating procedures for sprinkling, rubbing and application with respect to procedure, quantity and time should be studied in detail so as to get scientific insight of ancient methods this may prove to be important in contemporary era.

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*Address for correspondence
Dr Shahane Prachi
PG Scholar,
Department of Dravyaguna,
MGACH & RC, Salod (H.),
Wardha (MS), India.
Email: prachi3.shahane@gmail.com
Mob: 08551815100