

# A Review on Ancient AGRO Techniques Mentioned in Vrikshayurveda for Conservation and Cultivation of Medicinal Plants

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**Abstract**—Conservation and cultivation of medicinal plants is the need of the hour. The quality of the medicinal plant plays a pivotal role in their therapeutic efficacy. With the advent of new agro techniques using chemical fertilizers, insecticides and pesticides the quality and the therapeutic efficacy of the medicinal herbs are decreasing. Thus, there is a need to adapt and develop the traditional cultivation techniques for the benefit of mankind. In this regard the ancient agro technique methods mentioned in Vrikshayurveda written by Surapala and Parasara becomes relevant. Vrikshayurveda deals with unique horticulture techniques for cultivation and healthy growth of medicinal plants including selection, collection and storage of seeds, sowing, germination techniques, propagation, grafting, water management, soil conservation and usage of organic fertilizers, treatment of various diseases affecting them. The review of research papers in this subject revealed that the 10 agro techniques mentioned in Vrikshayurveda as enlisted in this present work are effective and these ancient agro techniques can be adopted in the healthy cultivation and conservation of medicinal plants using natural resources.

**Index Terms**—Ancient Agro Techniques, Seed Treatment, Soil Preparation, Plant Diseases, Plant Nutrition, Plant Rejuvenation.

## I. INTRODUCTION

Ancient India recognized the importance of conservation, cultivation, collection methods of plant bio resources and their rational use for health promotion & therapeutic purpose, so as like the medicinal science for humans (Ayurveda) similar science Vrikshayurveda was also developed for plant. Vrikshayurveda deals with unique horticulture

techniques for cultivation and healthy growth of medicinal plants including selection, collection and storage of seeds, sowing, germination techniques, propagation, grafting, water management, soil conservation and usage of organic fertilizers, treatment of various diseases affecting them. Increasing demand of medicinal plants leads to scarcity and over exploitation. De-forestation also enhances the depletion of natural resources and extinction of valuable medicinal plants. The therapeutic efficacy of the medicinal herbs is decreasing with the advent of new agro techniques using chemicals. Conservation and cultivation of medicinal plants is the need of the hour. In this regard the ancient agro technique methods mentioned in the Vrikshayurveda written by Surapala and Parasara can be effectively adopted for the conservation and cultivation of the medicinal plants in present scenario.

## II. METHODOLOGY

Classical Ayurvedic books and research articles were reviewed and details collected regarding ancient agro technique methods mentioned in Vrikshayurveda for the conservation and cultivation of medicinal plants.

### A. Results

The review of research papers in this subject revealed that the agro techniques mentioned in Vrikshayurveda can be enlisted as follows

1. (Bhumi Nirupana)
  - Selection of soil
  - Soil Preparation
2. Treatment of seeds for fast and healthy germination (Beejothpathi Vidhi)

3. Methods of planting (Beejaropana Vidhanam)
4. Rules for irrigating the plants (Sechana Vidhi)
5. Examination of soil for indication of water (Koopartham Bhoomi Pariksha)
6. Veneration for tree protection (Druma Raksha)
7. Landscaping and gardening (Upavana Vinoda)
8. Use of Organic manures (Kunapa)
9. Special Nutrition care for plants (Poshana Vidhi)
10. (Taru Chikitsa)
  - Treatment of plant diseases
  - Protection from infestation
  - Rejuvenation of destroyed parts

1. Table one depicts the nature and type of land specific to certain medicinal plants and table two indicates how the soil preparation is done – (Bhumi nirupana)

Table No.1 Selection of soil

| S. N | Type of land (Bhumi)            | Plants to be grown                                                                 |
|------|---------------------------------|------------------------------------------------------------------------------------|
| 1    | Marshy land (Anoopa bhumi)      | Panasa, Tala, Vansha, Jambeera, Vata, Jambu, Kadamba, Kadali, Ketaki, Narikela etc |
| 2    | Arid land (Jangala bhumi)       | Shigru, Bilva, Saptaparna, Ashoka, Shami, Shaka, Nimba and Karira etc              |
| 3    | Ordinary land (Sadharana bhumi) | Bijapuraka, Champaka, Amra, Priyangu, Dadima etc                                   |

Table No.2 Preparation of Soil

| S. N | Soil Preparation |                                                                                                       |
|------|------------------|-------------------------------------------------------------------------------------------------------|
| 1    | Soil softening   | Cultivate Tila (Sesamum indicum) when it flowers, ploughed them in to the soil.                       |
| 2    | Pit making       | Soil bed or pit were seed to be sown must be one foot in depth and filled with milk mixed with water. |

2. Treatment of seeds for fast and healthy germination (Beejothpathi vidhi) Explain as – In Vrishayurveda certain pre- sowing treatments of seeds are mentioned which are beneficial for the germination they are,

- Seeds from dried fruits can be sprinkled with milk & dried for 5 days then smoked with mustard seeds and mixed with Vidanga (Embeliaribes Burm. f)
- For hard seed germination, seeds can be treated with a mixture of Pootimamsa (blood-soaked flesh), vrihi (Paddy Oryiza sativa, Poaceae), Masha, Tila and Saktu and the seeds should be

immersed with dhoopa (smoke) or Haridra (Turmeric-Curcuma longa).

- Seeds soaked in milk, dried well in shade & rolled in the powder of Brihati (Solanum indicum L.), Tila (Sesamum indicum L.) and mixed with mustard are excellent for sowing.

3. Planting season of plants are also specific to specific species. Some of the planting seasons for some species are mentioned in Vrikshayurveda (Beejaropana vidhanam) is given in table no.3

The process of planting different forms of plants is different for example – distance between saplings, the ideal distance between tree/seedling is vimshatihasta (20x25 feet). Trees planted close by will have low productivity and yield

Table No.3 Season of planting

| S.N. | Plant                                                              | Specific planting months             |
|------|--------------------------------------------------------------------|--------------------------------------|
| 1    | Dadima (Punica granatum L.)<br>Bakula (Mimusops elengi L.)         | Shravana (rainy season)              |
| 2    | Aamra (Mangifera indica L.)<br>Lakucha (Artocarpus lakoocha ROXB.) | Bhadrapada (when rains are receding) |
| 3    | Saptaparna (Alstonia scholaris (L.) R. Br.)                        | Kartika (start of the dry season)    |
| 4    | Patola (Trichosanthes cucumerina L.)                               | Phalguna (beginning of spring)       |
| 5    | Kadali (Musa paradisiaca L.)                                       | Vaishakha (beginning of summer)      |

4. Rules for irrigating the plants (Sechana vidhi)

Irrigation according to season is mentioned in Vrikshayurveda related ancient texts. The newly transplanted trees must be watered regularly given in table no.4

Table No.4 Time for irrigating the plants.

| S. N | Ritu (Season)        | Irrigation           |
|------|----------------------|----------------------|
| 1    | Vasanta (Spring)     | Daily in the evening |
| 2    | Hemanta (Pre winter) | Alternate day        |
| 3    | Shishira (Winter)    | Alternate day        |
| 4    | Grishma (summer)     | Thrice in a day      |

5. Examination of soil for indication of water (Koopartham bhoomi pariksha)

In vrikshayurveda, indicator plants for water presence in the soil are reported. Some of the indicator plants are mentioned below

- Jambu (*Eugenia jambolana*)
- Vetasa (*Salix caprea*)
- Kadamba (*Anthocephalus cadamba*)
- Udumbara (*Ficus racemosa*)
- Arjuna (*Terminalia arjuna*)
- Naktamala (*Pongamia pinnata*)

#### 6. Veneration for tree protection (*Druma raksha*)

The idea of divinity in plants and religions sanctions against destruction of plants is considered the most effective and successful method of conserving the plants as per Vrikshayurveda. Examples are

- Neem (*Azadirachta indica*)
- Wood apple (*Feronia elephantum*)
- Tulasi (*Ocimum sanctum*) etc

#### 7. Landscaping and gardening (*Upavana vinoda*)

In Upavana Vinoda of Sarangadhara paddatti and Varahamihira has elaborated account of various horticultural practices. He mentions the plants suitable for gardens are

- Arista (*Sapindus saponifera*),
- Ashoka (*Saraca indica*)
- Punnaga (*Calophyllum inophyllum*)
- Sirisha (*Albezziia lebbeck*)
- Priyangu (*Calicarpa macrophylla*).

I also mention vegetative propagation (*kandaropana*) for certain trees like Ashoka (*Saraca indica*), Jambu (*Eugenia jambolana*), Lakucha (*Artocarpus lakucha*), Dadima (*Punica granatum*), Bijapuraka (*Citrus medica*).

#### 8. Use of organic manures (*Kunapa*)

Special liquid manure named Kunapa Jala is mentioned in Surapala Vrikshayurveda which enhances growth and development of plants.

- Preparation of Kunapa jala: - The excreta, marrow of bones, flesh, brain & head of boar mixed with water & stored underground. Then It is boiled with water & mixture stored in an oiled pot after adding sufficient quantity of husk. After roasting it in an iron pot, sesame oil cake, honey, soaked black gram should be added & then little ghee is poured.
- Preparation of Kunapa jala (*upavanavinoda*):- Flesh of deer, fish, sheep, goat and some insects are boiled in water. After cooling, powder of black gram and Sesame seeds are mixed. Later milk, honey and water is added. The whole mixture is kept in Sunlight for 15 days. The liquid manure thus prepared is called Kunapa-jala.

- New method of Kunapa jala with substitutes has been developed by YL Nene and S L Choudhary of Asian Agri – History Foundation (AAHF), Secunderabad which has been given in table no. 5

Table No.5 Substitute for traditional Kunapa jala preparation

| Ingredient                                    | Substitute                                                                                     | Quantity                          |
|-----------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------------------|
| 1. Animal flesh (fresh or stale, not rotting) | Eggs (fresh or old)<br>or Soyabean meal<br>or Nuggets plus Paneer<br>or Fish meal<br>or Paneer | 25<br><br>1kg + 1kg<br>2kg<br>2kg |
| 2. Marrow (Crushed bones)                     | Tofu from soyabean                                                                             | 0.5/1kg                           |
| 3. Rice husk                                  | Any grain husk                                                                                 | 1kg                               |
| 4. Available oil cake                         | -                                                                                              | 1kg                               |
| 5. Cattle dung                                | -                                                                                              | 10kg                              |
| 6. Cattle urine                               | -                                                                                              | 15L                               |
| 7. Black gram                                 | -                                                                                              | 0.5kg                             |
| 8. Honey                                      | -                                                                                              | 0.25kg                            |
| 9. Ghee                                       | -                                                                                              | 0.25kg                            |
| 10. Milk                                      | -                                                                                              | 1L                                |

#### 9. Special nutrition care for plants (*Poshana vidhi*)

Various cultivation & special techniques for increasing the yield are mentioned in Vrikshayurveda texts which are given below

- Pouring of cold fish washing is beneficial for Mango.
- Bilva & kapitha bear plenty of juicy fruits when sprinkled with mixture of jaggery, ghee, milk, & honey.
- Panasa (Jack fruit) which will be watered with Triphala decoction & covered immediately with husk, bears big size fruits.
- Orange tree bears good quality of fruits when treated with water mixed with flesh, jaggery & milk.
- For increasing the yield of grapes its roots are nourished with powdered excreta of cocks & sprinkle with water mixed with fish fat.
- Tree when smoked with plantain leaves, white mustard seeds and fish, yield fruits & flowers in a very short period.

#### 10. Treatment of plant diseases, protection from infestation, rejuvenation of destroyed parts (*Taruchikitsa*)

##### a) Treatment of plant diseases (*Taru chikitsa*)

Surpala, for the first time in the history of world agriculture classified plant disorders into two types:

internal and external. External means heat, frost, stormy wind, excess water and fire.

Internal disorders based on an Ayurvedic concept given below are

- Vata type of diseases of plants are due to land that becomes arid on account of excessive supply of dry and astringent matters, this can be identified by thickness, crookedness of trunk, appearance of knot on the trunk and leaves. The fruits are hard with less juice and less in sweet taste.
- Pitta type of diseases arises due to excessive watering of plant materials containing pungent, sour, salty and penetrating properties. This type of diseases occurs at the end of summer if the clouds disappears and it can be identified by the characterised yellowness of leaves, untimely drooping of fruits, dryness and decay of leaves, flowers and fruits.
- Kapha types of diseases arise due to the trees that are excessively watered with materials which are sweet, unctuous, sour, and cold. This type of diseases occurs in winter season and spring season and the plants affected with kapha type of disease, may take long time to bear fruits, paleness and dwarfness of leaves, tasteless and prematurity of fruits.

For controlling Vata dosha trees can be Sprinkled with kunapa Jala and fumigation with mixture of fat of hog, ghee, hemp, hair of horses and cow's horn. For Pitta dosha, treat trees with cool and sweet substances. Watering can be done with decoctions of Triphala, ghee & honey and watering with decoction of milk, honey, yashtimadhu (*Glycyrrhiza glabra* L.) Madhuka (*Madhuka indica*) helps in controlling pitta dosha. For the management of kapaha dosha, decoction made out of Panchamula & paste of white mustard is deposited at the root and trees watered with a mixture of sesame and ashes and remove the soil around the roots & replace it with fresh, dry earth will produce good results.

b) Protection from infestation (Taru chikitsa)  
Panchamula is the combination of powdered mixture from dried roots of 5 plants used for pest control & bio fertilizer to enhance plant yield in Vrikshayurveda.

Table No.6 Plants used for the protection against disease

| SN | Plant Name | Latin Name                                 | Properties                                                |
|----|------------|--------------------------------------------|-----------------------------------------------------------|
| 1  | Bilva      | <i>Aegle marmelos</i> L.                   | Antifungal, nematocidal, insect anti-feedant              |
| 2  | Agnimantha | <i>Clerodendrum phlomides</i> L.f          | Antifungal, antiviral, antibacterial, insect anti-feedant |
| 3  | Shyonaka   | <i>Oroxylum indicum</i> L                  | Antimicrobial                                             |
| 4  | Patala     | <i>Stereospermum suaveolens</i> (Roxb.) DC | Antifungal, antibacterial                                 |
| 5  | Gambari    | <i>Gmelina arborea</i> Roxb.               | Antiviral                                                 |

c) Methods mentioned in Vrikshayurveda for the Rejuvenation of destroyed parts (taruchikitsa) are given below

- 1) Besmear the tree with paste of bark of Plaksha (*Ficus lacor* Buch- Ham) & Udumbara (*Ficus glomerata* Roxb) mixed with ghee, honey, wine & milk, then broken part is tied firmly together with rope of a rice stalk.
- 2) Unproductive trees- treated with cold mixture of sesame, barley, Kulatha (*Dolichos biflorus*. L) Green gram & black gram.
- 3) Prepare paste by pounding the barks of Karanja (*Pongamia pinnata*), Aragwadha (*Cassia fistula*), Arishta (*Sapindus saponifere*), Saptaparna (*Alistonia scholaris*), Vidanga (*Embelia ribes*) and Musta (*Cyperus rotundus*) with gomutra and applied to the roots of the infected part of trees which are not producing flowers & fruits.
- 4) To treat the infected part, Vidanga (*Embelia ribes*) and Silt (Mud mixed with plenty of water) should be applied. Then milk mixed with water should be sprinkled on the infected parts subsequently.

### III. DISCUSSION

Day by day demand of medicinal plants is increasing exponentially, causing depletion of naturally occurring resources. Today we are facing a lot of health hazards due to chemical fertilizers and pesticides in human beings like Digestive ailments, cancer, physical & mental deformities, immune suppression, hormone disruption, reproductive abnormalities etc. similarly these chemical fertilizers and pesticides are causing destructive effects on

environment like contamination of air, soil, ground water, effect on soil fertility ie, declining of beneficial soil organisms. Therefore, it is an urgent need to focus on conservation of medicinal plants using sustainable agro-techniques of Vrikshayurveda. Researches carried out on these techniques have produced ample proof that methods mentioned in Vrikshayurveda are effective not in only the cultivation but also in the conservation of medicinal plants.

#### IV. CONCLUSION

Vrikshayurveda deals with unique horticulture techniques for cultivation and healthy growth of medicinal plants including selection, collection, storage of seeds, sowing, germination techniques, propagation, grafting, water management, soil conservation and usage of organic fertilizers, treatment of various diseases affecting them. The review of research papers in this subject revealed that the 10 agro techniques mentioned in Vrikshayurveda as enlisted in this present work are effective as natural growth enhancers, plant protectors, rejuvenators and horticulture methods with added advantages in both cultivation and conservation of medicinal plants. The review concludes that these ancient agro techniques can be adopted in the healthy cultivation and conservation of medicinal plants using natural resources. "If conservation of natural resources goes wrong, nothing else will go right".

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