



Research Article

VRIKSHAYURVED METHODS FOR DISEASE CONTROL IN PLANTS WITH SPECIAL REFERENCE TO ONION (ALLIUM CEPA)

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ABSTRACT

In today's era due to modernization and civilization people follows modern techniques of cultivation which is starting from seed viability study then for nursery adding fertilizers in land and for treating disease and fulfilling their nutrients value adding or spraying chemical fertilizers which leads to hazards effect in environment on every creature. *Aacharyas* found natural solutions for every plant issue many years back they already mentioned in *Vrikshayurved*, how to diagnose and treat different kind of plant diseases more naturally and authentically.

Objective- This article aims to diagnose and treat plant diseases according to *Vrikshayurved*. Materials and methods- Study performed on Onion seedlings (*Allium cepa*) under the observation of Directorate of Onion and Garlic Research Institute, Rajgurunagar, Pune. Onion seedlings were treated by *Kunap jal* and *Madhuyastyadi Kwath*. Disease of Onion seedlings were diagnosed and treated by *Vrikshayurved* methods using *Kunap jal* and *Madhuyashtyadi Kwath*.

Results- The *Vrikshayurved* methods showed around 80-85% reduction in curling of leaves, 100% reduction in yellowish discoloration, 100% reduction in dryness of leaves.

Vrikshayurved intervention improved growth rate drastically.

Conclusion- *Vrikshayurved* intervention improved curling, dryness and yellowish discoloration of leaves significantly. It also doubled growth rate of the onion seedlings. It indicates that *Vrikshayurved* methods are applicable in today's era.

INTRODUCTION

Ayurveda Science deals with various branches, it mainly divided into 3 branches, ⁽¹⁾

- *Vrukshayurved* (Plant science)
- Pashuayurved (Animal Science)
- Manushyayurved (Human Science)

In that, *Vrikshayurved* (plant science) were introduced by Sage *Parashar* (c.400 BC) wrote *Krishi-Parashar tantra* which is considered as the first written document on agriculture or on plant life.⁽²⁾

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Vrikshayurved mainly emphasis on seed collection, storage, sowing, weeding, irrigation, draining, harvesting, land preparation and plant diseases. Further references were found in various like Kautilya artha shastra, Agnipuran, Vrikshayurved by Surpala, Bruhat samita by Varamihir, Upavan Vinod by Sarangdhar, All textbooks of plant pathology gives credit to the French botanist, Turnefort (1705 AD) for classifying plant diseases into 2 types which is internal and external but In Vrikshayurved by Surpala (c. 1000AD) it's been already mentioned as Abhyantar Vyadhi (internal diseases) and Bahya vyadhi (external diseases). Unlike human being plant diseases also classifieds as a 1. Abhyantar Vyadhi (internal diseases) in which they further divided as Vataj, Pittaj and Kaphaj 2. Bahay (external diseases) due to insects and cold weather. (3) So, in current era of civilization need of an hour to re-evaluate our own science to treating plants and harvesting chemical free

or organic plant which can be more potent to treat human diseases.

MATERIALS AND METHODS

Materials

Study Material- Onion (Allium cepa) seedlings

Study Place- Directorate of Onion and Garlic Research Centre, Rajgurunagar

Treatment Material

- 1. Kunap Jal
- 2. Madhuyastyadi Kwath

Table 1: Materials for Kunap Jala [4]

Sr.No.	Materials	Quantity
1	Flesh, fat, bone marrow of the goat / sheep	1 kg
2	Water for boiling (<i>Tanumamsarasa</i> ref <i>Sharangdhar</i>)	32 lit. /As per requirement
3	Masha (Black gram)	125 gm
4	Krushana Tila (Sesamum)	62.5 gm
5	Chana dal (Bengal gram split), Moong dal (Green gram split), Tuwar dal (pigeon peas)	31.25 gm each
6	Madhu (Honey)	25 gm
7	Go Ghrita	25 gm
8	Go Dugdha (Milk)	250 ml

Table 2: Materials for Madhuyasthyadhi Kwath(5)

Materials	Quantity		
Yasthimadhu Powder (Glycyrrhiza glabra)	125gm		
Madhuk Powder (Madhuca indica)	125gm		
Madhu (Honey)	6.25 gm		
Go Ghrita (Cow's ghee)	6.25 gm		
Go Dugdha (Cow milk)	60ml/appx		
Water	8 lit. /As per requirement		

Methods

- 1. Diagnosis / Identification of disease on Onion seedlings according to *Vrikshayurved*.
- 2. Preparations of *Kunapl Jal* and *Madhuyastyadi Kwath* for treatment.

At starting seedlings was normal and healthy right from germination to one month old. There growth was steady, around 3-4cm per week.

On 35^{th} day, yellowish discoloration and curling of leaves at tip region were observed in onion seedlings first. Few days later, seedlings turned dry.

These findings were compared with *Vrikshayurved* disease diagnostic methods and diagnosis was confirmed. Then accordingly treatment was decided.

Table 3: Diagnosis/ Identification of *Vruksha Vyadhi* (*Plant* disease) & its treatment according to *Vrikshayurved*

Sr. No	Condition	Causes/ Reason ⁽⁶⁾	Sign & Symptoms ⁽⁶⁾	Treatment ⁽⁷⁾
1	Vataj	a) The land that becomes arid on account of excessive supply of dry and pungent matter.	 a) Karshyata (Thinning/ Atrophy of leaves, trunk, stem, branches. b) Granthi (Glandular formations on fruits and leaves. c) Gutikaarudha Patra (curling/ pipe formation of leaves. d) Karkashatva (roughness of parts). e) Aswadhuphalata (Deficiency in pulp/ juice, distastefulness of fruits. 	a) Mamsa (flesh), Meda (fat), Ghruta (ghee) Should give to plants. b) Kunap Jal (fermented fertilizer) – Made with flesh of goat, Mash (black gram), Krushna Tila (black seasme), Tuwar Dal (pigeon peas), Moong Dal (green gram split), Chana Dal (bengal gram split), honey, Desi Gir cow milk and Ghee, water.
2	Pittaj	a) Due to summer season. b) Excessively watered with bitter, sour, salty materials	 a) Pitapatrata (yellowness of leaves). b) Padavishoshana (drying of plant). c) Phalastrav (drooping of fruits). d) Patra/Pushpa/Phala mlanavta (leaves/flower/fruit loosing natural appearance) 	a) Madhuyastyadi Kwath- Yastimadhu (Glycyrrhiza glabra) powder, Madhuk (Madhuca indica) powder, honey, Desi Gir cow milk and ghee, water b) Phaladi Kwath Triphala (Three myrobalan, viz. Amalaki (Emblic officinalis), Haritaki (Terminalia Chebula), Bibhitaki (Terminali bellirica), Ghee, honey Water
3	Kaphaj	a) Occur in winter and spring. b) Excessively watered with sweet, oily, sour and cold materials.	 a) Atikalaphalata (late/delaying in fruiting). b) Pandutva (paleness of leaves, fruits etc). c) Kubjata (dwarfing of leaves). d) Akalaphalita (fruiting not at proper time). e) Nirasata (tastelessness) 	a) Bruhatpanchamool Kwath- Decoction made from roots of five plant species viz. Bilwa (Aegle marmelos), Agnimantha (Clerodendrum phlomoides), Shyonak (Oroxylum indicum), Patala (Sterospermum suaveloens), Gambhari (Gmelina arborea). b) Paste and Spray i) Shwet Sarshap Kalka (White mustard paste application) – Externally on roots. ii) Tilabhuti Jala- Ash of sesame seeds mixed in water should be sprayed.

Thus Onion seedlings had *Vata- Pittaj* plant diseases. (For reference table no 3) According to the diagnosis *Kunap Jal* and *Madhuyastyadi Kwath* were selected as an intervention.

Sop For Kunap Jal & Madhuyastyadi Kwath preparation

Table 4: SOP for Kunap Jal

SOP for *Kunap Jala*

Prepare first *Mamasarasa* (meat soup) with *Mamasa* (meat) and water

Then add previously made *Chana dal* (bengal gram split), *Moong dal* (green gram split), *Tuwar dal* (pigeon peas) and *Krushana tila* (black sesame) *Kwath* (decoction)

Cook *Masha* (black gram) in milk prepare sticky cake and add into above liquid material

Then add honey and milk in above liquid mixture and pour this into mud pot and place that mud pot in pit for 14 days, after that remove that pot and strain it the liquid material which obtained end of the procedure called as *Kunap Jala*

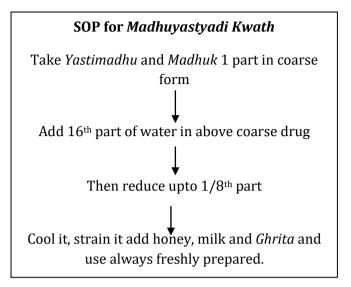
Treatment- (Sop for preparation refer table 4, 5)

- 1. *Kunap Jal* Sprinkling of *Kunap jal* over Onion seedlings each group approximately 2lt once in week this is for curling of leaves, dryness and growth hampers due to excessive *Vata Dosha* in plants.
- 2. *Madhuyastyadi Kwath* Decoction of *Madhuyastyadi* sprinkle over onion seedlings each group approximately 2lit once in week this for yellowing of leaves due to excessive *Pitta dosha* in plants.

OBSERVATIONS (explain in table no 6).

Observations were taken on 0, 7 & 14th day. On the 0 day curling of leaves at tip region of onion leaves,

Table 5: SOP for Madhuyastyadi Kwath



dryness of leaves, yellowish discoloration were moderate to severe. On the 7th day, curling was reduced to some extent whereas yellowish discoloration of leaves, dryness of leaves was improved fairly. On the 14th day, curling improved very much, dryness and yellowish discoloration were totally diminished.

Although seedlings were diseased, average growth rate was normal i.e., 3-4cm/week. After intervention, growth rate was same for next week but it was doubled in further next week. Thus very rapid growth rate was observed.

Table 6: Study observation

S.no	Observation	0 day	7 th day	14 th day
1	Curling of leaves at tip region of onion leaves	+++	++	+
2	Yellowish discoloration of leaves	++	+	0
3	Dryness	+++	+	0

(For mild symptoms '+', moderate '+ +', severe '+ + +' and no symptoms '0')



Before- Yellowing and curling of Onion seedling tip region



After treatment- Yellowish discoloration reduces completely plants look healthy also curling of tip also reduce moderately

RESULTS

- 1. Curling of leaves improved steadily from day 1 to day 14. At 14th day, minimal curling of leaves was observed.
- 2. Yellowish discoloration of leaves showed steady changes in recovery. Leaves became normal in second week.
- 3. Dryness of leaves improved very fast after intervention and leaves appeared an unctuous after 14 days.
- 4. The *Vrikshayurved* methods showed around 80-85% reduction in curling of leaves, 100% reduction in yellowish discoloration, 100% reduction in dryness of leaves.
- 5. *Vrikshayurved* intervention improved growth rate drastically.

DISCUSSION

We need to confirm the relevance of our previous precious knowledge of Vrikshayurved (plant science) in today's era. So data was collected from Vrikshavurved related ancient Granthas like Atharvaveda, Kautilya Arthashastra, Agnipuran, Krushiparashar Tantra, Bruhat samhit by Varamihir, Vrikshayurved by Surpala, Upvan Vinod by Sarangdhar. Detailed methods to improve plant nutrition and to keep plants disease free were compiled. Kunap jal and Madhuyastyadi Kwath were used as intervention to treat Abhyantar Vyadhi (Internal diseases) of plant.

Normal Onion *(Allium cepa)* needs various nutrients for their growth - Nitrogen, Phosphorus, Potassium in more quantity whereas Sulphur, Iron, Calcium, and Zinc in minimal quantity. Due to the deficiency of NPK i.e. (Nitrogen, Phosphorus, Potassium) leaves become uniformly yellow⁽⁸⁾ (there may be so many reasons of yellowish discoloration in plant like, moisture stress, temperature changes, heavy manuring and absence of sunlight, but the most common reason in Onion seedlings is NPK deficiency)⁽⁹⁾ leaves get dried, dull and become smaller in size. Calcium and sulphur deficiency cause necrosis or curling of leaves⁽¹⁰⁾ (there may be so many reasons

for curling like due to excessive use of pesticides, overwatering, exposure to excessive sunlight, chemical damage, viral infection, and nutrient deficiency in onion seedlings is due to Nitrogen, Calcium and Sulphur deficiency)⁽¹¹⁾.

Vrikshayurved considers curling and dryness of leaves as a Vataj disease. Vata has predominance of Vayu and Aakash Mahabhutas⁽¹²⁾ so it is Ruksha (dry) in nature. When Vata increases in plant, leaves become dry. This Rukshta also leads Sankoch (contraction) in the plant tissues, so curling in plants were observed.

Vrikshayurved considers yellow discoloration of leaves as a Pittaj disease. Pitta has predominance of Agni Mahabuta so it is Ushana, Tikshna (tissue disturbing) in nature. When Pitta increases in plant, it disturbs normal physiology of leaf tissue thereby reducing chlorophyll content and hampers nutrition of leaves then leaves become yellowish in color.

Kunap Jal was used as first intervention to combat Vataj diseases. So, it causes mild improvement in curling and yellowish discoloration but it shows marked improvement in dryness of leaves. As per modern science, It must have increased NPK, calcium and sulphur in optimum quantity in plant tissue of Onion seedlings the reason is still unknown.

Kunap Jala shows following pharmcodynamic effects.⁽¹³⁾

- 1. Aja mamsa (goat meat) has Rasa Madhur, Virya Natiushana, Vipak Madhur and Doshaghanta Tridoshshamak, Karma Bruhan also it comes under Aagrey sangraha "Mamsam Bruhananam"⁽¹⁴⁾ 2) Cow's milk (Godugdha) shows Rasa Madhur, Virya Sheeta, Vipak Madhur, Guna Guru-Snighdha, Karma Jivaniya (enlivening), Bruhan, Balya (strengthening) and Doshaghanta reduces Vata-Pitta and alleviate Kapha Dosha.
- 2. Honey (Madhu) shows Rasa Madhur, Kashaya, Virya Ushana, Vipak Madhur, Guna Laghu Ruksha it pacifies alleviated Kapha Dosha and increases Vata-Pitta Dosha.

- 3. Sesame (Krushana Tila) shows Rasa Madhur, Kashaya & Tikta, Virya Ushana, Vipak Madhur, Guna Laghu Ruksha, Doshaghanta Vata Kaphahara and Pittakara.
- 4. Black gram (Masha) shows Rasa Madhur, Virya Ushana, Vipak Madhur, Guna Guru- Snigdha, Doshaghanta increases Kapha-Pitta and decreases Vata, Karma Bruhan, Balya (improves strength).
- 5. Moong Dal (split green gram) Rasa Kashay, Madhur, Virya Sheeta, Vipak Madhur, Guna Laghu- Ruksha, Doshaghanta decreases Kapha-Pitta. All the materials in Kunap Jal contain mostly Rasa Madhur, Guna Guru- Snigdha, Virya Sheeta, Vipak Madhur and also shows Balya, Bruhaniya Karma i.e. gives strength.
- 6. All these *Dravyas* are *Vata Shamak* in nature (to pacify the aggravated *Vata*) so useful in *Vataj* disease.
- 7. These *Dravyas* are processed together to form *Kunap Jala*. The resultant *Kunap Jala* becomes separate *Dravya* and it may show different efficacy than individual *Dravyas* (Ref- "Samyogvat Prabhav" by *Aacharya Chakrapani*).

According to modern point of view

- 1. Meat having rich properties with high contain of Proteins, phosphorus, triglycerides, phospholipids, vitamins A, D and E (15).
- 2. Cow's milk is rich in Proteins (40% total amino acids), calcium it provides nutrient values to plant, fats also in a recent report claimed that milk sprays induced systemically acquired resistance in curling of leaves, a viral disease. (16).
- 3. Honey is rich in Calcium, potassium, phosphorus, iron, zinc and vitamin B also it shows antimicrobial and anti-bacterial properties. (17).
- 4. Sesame seeds contain fixed oils, glycosides, fat, and carbohydrates useful in nutrition and to treat dryness.
- 5. Black grams are rich in protein, fat, starch, potassium which gives nourishment to plants.
- 6. Lentil decoction is rich in protein and helps in growth. (18)

In recent study of *Kunap Jala* A liquid organic manure: Preparation and its quality parameters done by Dr. Switu Jain in 2017 at Jamnagar shows *Kunap Jala* contains Nitrogen 0.37%, Phosphorus 0.042%, Potassium 0.050%, Sulphur 123.61% and Iron 44.53ppm which is useful in growth, nourishment and treating plant diseases according to point of view⁽¹⁹⁾. So, our *Aacharyas* already had given this knowledge many years back how to prepare and used it.

Madhuyastyadi Kwath was used as second intervention to combat *Pittaj* diseases.

Madhuyastyadi Kwath shows following pharmcodynamic effects main contains are;

- 1. Yastimadhu (Glycyrrhiza glabra) which shows following properties Rasa Madhur, Virya Sheeta, Vipak Madhur, Guna Guru- Snigdha, Karma Tridoshahara (pacify all three aggravated Doshas), Rasyan (rejuvenating), Balavarnakrut (enhances strength, complexion).⁽²⁰⁾
- 2. Madhuk (Madhuca indica) having following properties Rasa Madhur, Kashay, Virya Sheeta, Vipak Madhur, Guna Guru- Snigdha, Doshaghanta Vata-Pitta Shamak, Karma Balya, Bruhana (improves strength). Due to excessive Pitta Dosha Ushanta (heat) increases also shows Pitavabhasta (yellowish discoloration) Balahani (loss of strength) so Yasthimadhu and Madhuk show exactly opposite properties of increased Pitta. Hence we can use Madhuyastyadi Kwath to treat Pittaj Vyadhi (diseases) of plant. (21)

Kunap Jala and Madhuyastyadi Kwath increased NPK, calcium and sulphur in plant tissue of Onion seedlings in optimum quantity the reason is still unknown. Excessive nutrient value and deficiency both leads to same problems so we have to provide everything in optimum level which can happen only due to *Vrikshayurved* method because our *Aacharyas* mentioned that very peculiarly.

CONCLUSION

Vrikshayurved intervention improved curling, dryness and yellowish discoloration of leaves significantly. It also doubled growth rate of the onion seedlings. It indicates that Vrikshayurved methods are applicable in today's era.

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