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Role Of *Kunapa Jala* For The Overall Enhancement And Growth Of *Prishnaparni*

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Abstract

Vrikshayurveda is a traditional branch of botany that studies plant growth and development. This science mostly recommends using Kunapa jala and Pancha gavya to increase crop output. This idea is around using organic farming to grow plants effectively. Kunapajala, is an organic liquid manure that is a by-product of fermentation and serves as a source of plant nutrients, was stated by Vrikshayurveda. The two main forms of Kunapajala used in practises are herbal and non-herbal, and both are made in accordance with the steps outlined in Vrikshayurvedha. Given its significance, we designed a study to examine the contribution of the Vrikshayurvedha idea to the evolution of medicinal plants; Prishniparni. Present study evaluated role of Kunapajala in the growth and % yield of plant Prishniparni. This study observed that Kunapajala treatment provides best response with respect to root yield and soil physico-chemical parameters. The yield of plant improved quantitatively as well as qualitatively after the use of Kunapajala.

***Keywords:** Botany, Ayurveda, Kunapajala, Vrikshayurvedha, Prishniparni.*

Introduction

The nutrients *Kunapa Jala* and *Pancha Gavya*, which have N, P, and K contents, are used in plant research. The research shows that both herbal and non-herbal *Kunapajala* have a significant impact on the

development and growth of plant materials. For the growth and production of plants, *Kunapajala* serves as potential organic manure. The fermentation of animal remnants, such as meat and marrow, utilizes to makes *Kunapajala* [1-4].

Kunapajala is made by combining water with animal parts such as flesh, bone marrow and blood, etc. In this process together with other components, the flesh of sheep, cows, fish and goats, etc. can be used. *Kunapajala* enhanced plant growth, soil fertility and physico-chemical parameters, etc. This natural nutrient boosts plant material yield in terms of biomass, root length and overall yield. *Kunapajala* increases the capacity of surfaces to hold nutrients, accelerates plant growth and alters soil fertility [4-7].

Plant Descriptions:

Uraria picta (Jacq.) Desv.ex DC. (Prishnaparni) belongs to Family- Fabaceae, an erect, under shrub up-to 90 cm high, distributed throughout the country.

Root occur in varying size, gradually tapering, tough, thickness of 1 to 2 cm, woody, externally light yellow to buff, internally pale yellow; surface bearing fine longitudinal striations; fracture and splintery or fibrous.

Stem about 8.0 to 16.0 cm long, 0.2 to 0.4 cm in diameter, cylindrical, branched, external surface light yellow to brown; pubescent, transversely cut and smoothened surface shows buff-white colour, mature stem longitudinally wrinkled, fibrous and leaf scarw present at nodes.

Leaf is variable size up-to 20 cm or more long, up to 2 cm wide; leaflets on the upper part of the stem 5 to 7, rigidly sub-coriaceous, linear-oblong, acute, blotched with white; glabrous above, finely reticulately veined and minutely pubescent beneath, base rounded; leaflets on the lower part of the stem 1 to 3, sub-orbicular or oblong [8, 9].

Aim & Objective:

- To observe the effect of *Kunapajal* on the growth and yield of *Prishnaparni*.

Materials and Methods:

The 250 gm seeds of medicinal plant, *Prishnaparni* collected from the Institute Garden in the month of October, 2019. Seeds were kept in air tight container with proper labelling.

Preparation of *Kunap-Jala* [5, 10, 11]**:**

1. Initial ingredients required for formulation washed and dried.
2. For decoction purpose water was added, heated up to boil and reduced the volume to one-eighth and transferred the flesh decoction to an earthen pot.
3. While adding the *Go-dugdha*, stirred thoroughly.Powder of the sesame cake and honey in specified ratio to the prepared decoction of flesh was added.
4. Added separately boiled black gram (*Masha*), *Ghrita* and sufficient quantity of hot water to the earthen pot.
5. Kept in warm place for 15 days after sealing the mouth of the earthen pot and
6. The fermented material was filtered through muslin cloth, packed in air tight container and allowed for nourishing.

Table 1: Formulation composition:

S. No.	Sanskrit or Local Name	Botanical /English Name	Part used	Quantity
1.	Kiti (Suvar)	Domestic pig (*Sus scrofado mesticus*)	Flesh	1 kg
2.	Matsya (Machhli)	Indian mackerel fish(*Rastrelliger kanagurta*)	Flesh	1kg
3.	Mesh (Bheda)	Domestic sheep (*Ovisaries*)	Flesh	1 kg
4.	Chhag (Bakari)	Domestic goat (*Capra aegagrushircus*)	Flesh	1 kg
5.	Neera (Water)	Portable water	-	64 lit
Reduced to				8 lit
6.	Go-dugdha	Cow's Milk	-	1 lit
7.	Khali	Sesamum cake (*Sesamum indicum* L.)	by-product of sesame oil extraction	500 gm

8.	Makshika (Madhu)	Honey	-	500gm
9.	Masha	Black gram (*Vigna mungo* (L.) Hepper)	Seed	500gm
10.	Go-ghrita	Ghee prepared from Cow's milk	-	250 gm
11.	Hot water			Qs

Sowing of Seeds (Germination):
Seeds of the plant (*Prishnaparni*) had sown in 15 kg capacity pots. Seed germination of the test plant was under observation during the period of growth of seeds.

Treatment by Manures:
Kunapajal treatment was given to the experimental group of *Prishniparni* after 60 days of plantation. Pots containing medicinal plant *Prishniparni* grouped into three categories as follows:
a. Control Group (Not received any nutrient)
b. *Kunapajal* Group (Received *Kunapajal* 50 ml/pot)
c. Farm yard Manure (These plant received FYM 5 gm/pot)

HPTLC ANALYSIS:
Test Solution
Coarsely powdered plant material was dissolved in 10 ml of methanol, and then centrifuged. The supernatant was then used for HPTLC examination.
Mobile Phase
Toluene: Ethyl acetate: Methanol: Formic acid (6:4:2:1)
Marker compound present
Stigma sterol
Procedure
Using the applicator, 10 µl bands of test solutions were put in various tracks on a pre-coated silica gel 60F254 TLC plate with a uniform thickness of 0.2 mm. In a pre-saturated, twin-trough glass chamber, plates were produced at a distance of 8 cm with an ideal mobile phase.

The details of samples spotted on different tracks are as follows:
- Track 1: Stigmasterol (Marker)
- Track 2: *Prishniparni* (group -*Kunapajal*)
- Track 3: *Prishniparni* (group -FYM)
- Track 4: *Prishniparni* (group -Control)

KUNAP JAL ANALYSIS:
The 250 ml sample of *Kunapajal* was sent to the "Eko pro Engineers Pvt. Ltd." Laboratory, Ghaziabad, for the micronutrient analysis.

Results and Discussion:

The germination of seeds was depicted in **Figure :1** which was found to be satisfactory.

Figure 1: Developing seeds of *Prishnaparni*

Inference of HPTLC Analysis:
The HPTLC data revealed presence of stigmasterol as chief phytoconstituents in *Prishnaparni* (**Figure: 2**). Stigmasterol was visualized after derivatization with Anisaldehyde-Sulfuric acid reagent in the specified mobile phase. It is evident from the R_f values and densitograms of derivatized plate that stigmasterol is present in all three samples of *Prishnaparni* i.e.; Control Group, *Kunapjal* Group and Farm yard Manure Group.

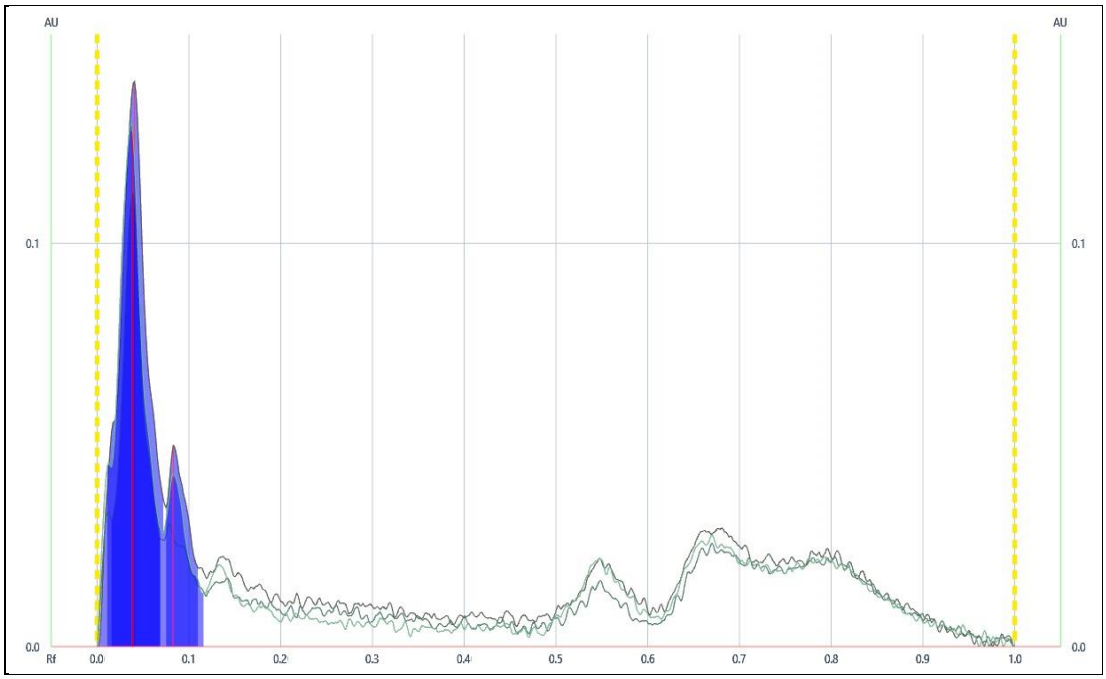


Figure 2: HPTLC 2D densitogarm of *Prishniparni* at 254 nm.

Results of *Kunapajal* & Soil Analysis:
As shown below in Figure:3, the results of the analysis indicated the existence of nitrogen, phosphorus, sulphur, calcium, magnesium, zinc, and copper in percentage among other elements, in *Kunapajal*. These elements help *Kunapajal* to fertilize more effectively. Similar to how *Kunapajal* changes soil physico-chemical characteristics, Figure: 4 shows what was seen during a soil analysis.

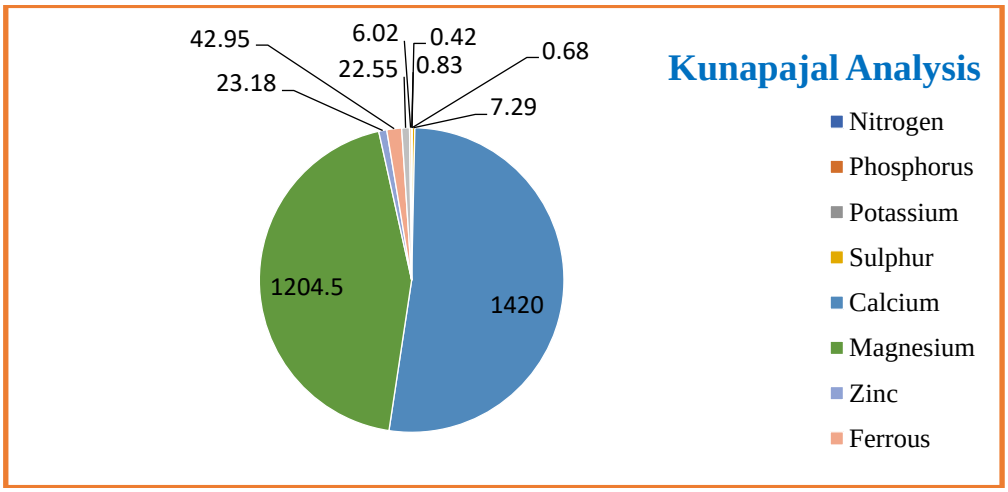
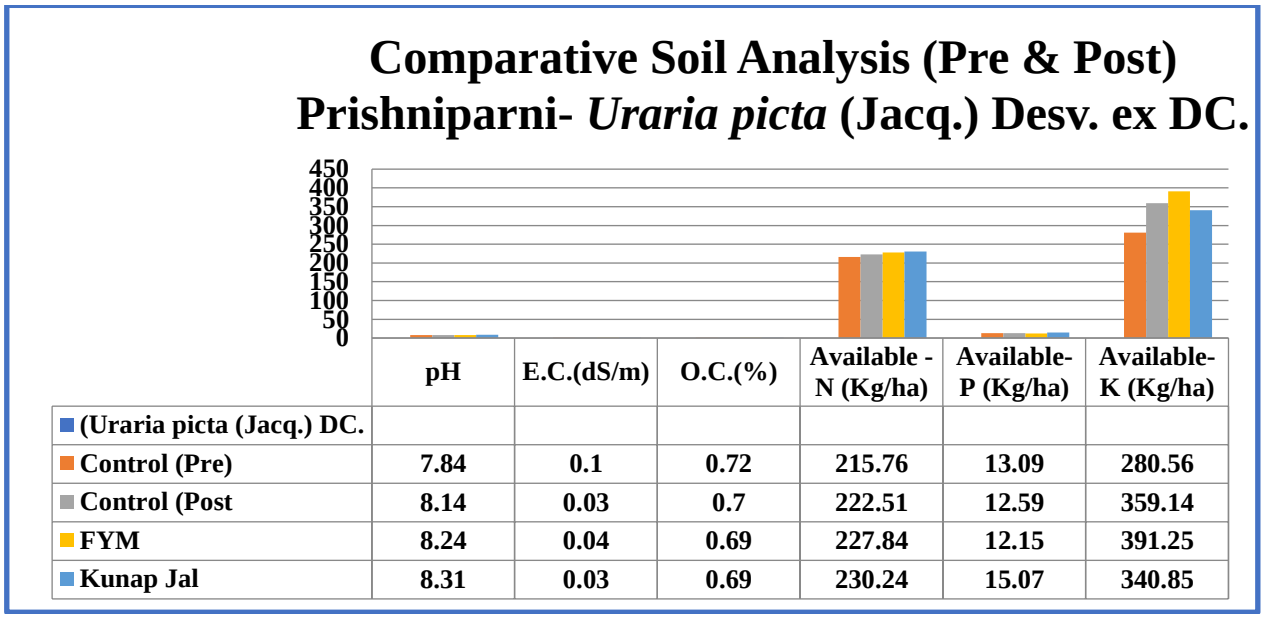


Figure 3: Composition of *Kunapajal*

The *Kunapajal* analysis findings revealed a high concentration of macronutrients (NPK) and micronutrients (Mg, Zn, etc.), as well as a higher content of calcium.



	pH	E.C.(dS/m)	O.C.(%)	Available - N (Kg/ha)	Available- P (Kg/ha)	Available- K (Kg/ha)
(Uraria picta (Jacq.) DC.						
Control (Pre)	7.84	0.1	0.72	215.76	13.09	280.56
Control (Post	8.14	0.03	0.7	222.51	12.59	359.14
FYM	8.24	0.04	0.69	227.84	12.15	391.25
Kunap Jal	8.31	0.03	0.69	230.24	15.07	340.85

Figure 4: Diagramatic representation of comparative soil analysis in experimental groups.

Physico-chemical analysis in post-harvest soil in *Prishniparni* was done at IGFRI, Jhansi and the observations reported as follows:

pH: It is non-significantly higher with the *Kunapjal* treated soil. Higher K, Ca in the *Kunapjal* might have increased the alkalinity of the soil.

O.C.(%): Lower Organic Carbon in the post-harvest soil of *Kunapjal* treated plant could have due to its mineralization in to various minerals like NPK and micro-nutrients which results higher uptake of the available nutrients by the plant, these all leads better plant growth.

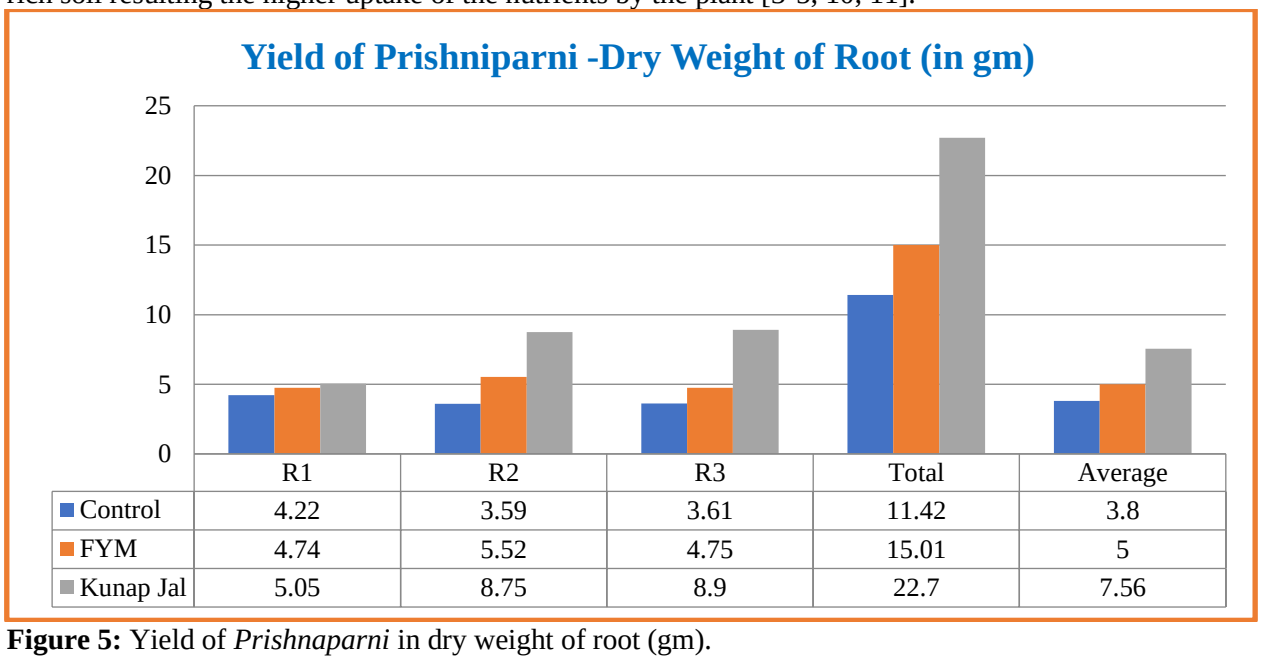
Available-N: It was non-significantly higher in the *Kunapjal* and FYM treated soil, which could have due to mineralization of organic substances in to various micro and macro nutrients.

Available –P: It is also non-significantly higher in case of *Kunapjal* treated soil, resulting in better plant growth.

Available-K: It is lower in case of *Kunapjal* treated soil, which could have due to higher uptake of Potassium by the plants resulting in better plant growth.

Yield of *Prishniparni* (Dry Weight of Root):

The *Prishnaparni* dry weight of root was 49.73 % non-significantly higher than the Control in the *Kunapajal* treated plant; however, it was 33.86 % higher than the FYM (**Figure:5**). Higher % of yield in case of Kunapajal could have due to rich organic matter content which could have converted in the better nutrient rich soil resulting the higher uptake of the nutrients by the plant [3-5, 10, 11].



	R1	R2	R3	Total	Average
Control	4.22	3.59	3.61	11.42	3.8
FYM	4.74	5.52	4.75	15.01	5
Kunap Jal	5.05	8.75	8.9	22.7	7.56

Figure 5: Yield of *Prishnaparni* in dry weight of root (gm).

Conclusion

The *Kunapajal* treatment responded the best out of the three in terms of root yield, post-harvest physico-chemical characteristics of the soil, and the presence of active ingredients. So, it can be concluded from the study that *Kunapajal* can be used in place of FYM during the seed germination, and cultivation processes of *Prishnaparni* in order to increase the plant's output, both quantitatively and qualitatively. The current study also recommends a field test to validate the method.

Conflict of interest

None

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