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Influence of Constituents of Coconut Water on Fenugreek Plant

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We collected water, soil samples and analyzed for the better planning of cultivation and also analyzed the Tender, Mature coconut water which contains a remarkable quantity of micronutrients as well as vitamins and proteins which is required to the Fenugreek crop. Author sprayed the coconut liquid on the Fenugreek crops at regular interval of 15 days and compared it with the unsprayed Fenugreek crops and studied a number of leaves, pods, branches and shoot height of the plant. The natural micronutrients which are present in the coconut liquid enhance the growth of plant and root. Fenugreek leaves and seeds have been used extensively for medicinal purposes. The fenugreek plant which is under treatment of Mature, Tender coconut liquid having 27, 24 pods & 145, 137 number of leaves and 9, 7 number of branches, 55, 51 centimeter shoot height were as untreated having 12 pods, 78 numbers of leaves, 2 number of branches, 31 centimeter shoot height respectively.

Keyword: Coconut Water, Micronutrients, Growth, Yield, Fenugreek Plant.

1. Introduction

Water is required for domestic, industrial, agricultural and fishery production for each purpose analytical study of water is essential because impure water cannot be used for agricultural purposes ^[1] for the better yield of the crops analytical study suggests the suitable condition for agriculture and other purposes. From the Physico-chemical characteristic of water it is observed that water contains cations-metallic micronutrients such as H^+ , K^+ , NH_4^+ , Na^+ , Ca^{+2} , Mg^{+2} and anions-non metallic micronutrients such as nitrate(NO_3^-), chlorides (Cl^-), carbonates (CO_3^-), sulphate (SO_4^{2-}), phosphate (PO_4^{2-}) which play vital

role in the growth of crops. In the soil different types of micronutrients are existed naturally, it's depending upon the types of soil, structure and the formation of the soil. Soil supplies the micronutrients to the plants; water contains some of the micronutrients as well as macronutrients, plants get some of the micronutrients from the water but both water and soil does not contain essential micronutrients so it is necessary to supply the essential micronutrients to the plants externally. Chemical micronutrients which are supplied to the crops in the excess quantity, it affects the fertility of the soil which does not undergo degradation but the coconut liquid

which contains micronutrients as well as vitamins and protein which does not affect the fertility of the soil. This is the one of novel methods of cultivations of the vegetable crops. By using tender and mature coconut liquid as micronutrient spray we collected the soil, water, coconut liquid samples and analyzed. We used the well water for the cultivation of vegetable crops which contains sufficient quantity of salts. The mature, tender coconut liquid contains essential micronutrients which are required in very small quantity to the fenugreek crop. Fenugreek is one of the oldest known medicinal plants in the recorded history. Fenugreek leaves and seeds have been used extensively to prepare extracts and powders for medicinal uses ^[2]. Fenugreek is reported to have anti-diabetic, anti-fertility, anticancer, anti-microbial, and anti-parasitic and hypocholesterolaemic, effects ^[3]. In India, fenugreek is used as a lactation stimulant ^[4]. Fenugreek seed in powder or germinated form exhibits anti-diabetic properties anti-cancer effect, effect on thyroxin-induced hyperglycemia and protective effect on ethanol toxicity.

2. Materials and methods:

2.1 Major Headings are Physico-chemical Characteristic of Coconut Liquid Sample:

Author extracted tender and mature Coconut liquid sample from Coconut; the pH, conductivity, total dissolved solid (TDS), dissolved oxygen (DO) Hardness of coconut water sample investigated in the laboratories by physical and chemical methods and also investigated the micronutrient- contents of it which is shown in Table 3a, The Physico-chemical characteristics, Amino Acid. Characteristic property of soil Show in Table 3b, Compositions, Vitamins of Coconut liquid sample is determined by different physical and chemical methods.

2.2 Physical Characteristics Of Coconut Liquid

1. Colour: white colour 2.Odour: sweet smelling 3. Test: slightly sweet.

2.3 Characteristic Property of Soil: We collected one kilogram soil sample from four different corners of the field and middle place of the field with the help of wooden stick and mixed the entire soil sample, from these five kilogram soil samples. One kilogram sample was taken and carried out for the analysis of soil. Testing Characteristics of the soil are given in the table 3b.

2.4 Physical Characteristics of Soil: It is thick, black, sand, gravels types of soil. The soil Contains sand and gravels types of soil therefore the moisture holding capacity of the soil is less. Black soil indicates, it is good fertile and we can use such soil for agricultural purposes; cultivate different vegetable crops, which gives a good yield of the crop.

2.5 Analysis of Water: The pH, conductivity, TDS, Hardness and DO are investigated by physical and chemical methods which is shown in the Table 1a.

2.6 For Growth Promoting Effects: The beds of black cotton soil, 30 x 30 centimetre size were prepared in the pots for small plants of Fenugreek of this specie. The plants of this species Fenugreek under examination were planted in these beds separately by conventional method. The plant beds were irrigated as and when required with tap water. The spraying solutions of newly naturally collected liquid compound separately and sprayed once at forting intervals (15, 30, 45 days).The plants from each bed were divided into two groups (A) and (B). The groups (A) plants were kept unsprayed and termed as a control group. Whereas the plants from group (B)

designated as treated group plants were sprayed with the compounds being tested. All the field experiments were conducted to compare the treated plant and control plant. The sample was taken at 15, 30, 45, 60, 75, 90 and 105 days after planting stage. The plants were carefully examined and the number of leaves, number of pods, number of branches, number seeds and its shoot height were recorded (Table-2a-2b). The data obtained was subjected to analysis of growth parameters.

The efforts have been made to investigate and analyze the convergence and divergence of the effects of Tender, Mature coconut liquid sample on the morphology of treated plants^[5,6]. When the first comparison of morphological characters was made between those of treated and control group plants, it was interesting to note that, all the treated plants exhibited remarkable shoot growth, and considerable increase in the number of leaves, number of branches and number of pods, number of seeds as compared to those untreated ones. When all the treated plants were compared among themselves, it was distinctly observed that, the Treated Fenugreek showed the pronounced vegetative growth than untreated Fenugreek. There has been a fair amount of satisfaction in carrying out the present study.

3. Results & Discussion

The coconut liquid is eco-friendly it is one of the effective complete micronutrients and it does not affect on the fertility of soil, by using in excess quantity^[7,8,9]. It shows the positive vegetative growth of the fenugreek plant as compared to control plant. After 105 days the treated Fenugreek plant by mature coconut liquid having number of leaves-145, 55 cm shoot height, number of branches-9, number of pods-27, number of seeds-284 and the Fenugreek plant treated by tender coconut liquid having number of leaves-137,

51 cm shoot height, number of branches-7, number of pods-24, number of seeds-217 whereas the control Fenugreek plant having number of leaves-78, 31 cm shoot height, number of branches-2, number of pods 12, number of seeds-129 respectively.

3.1 Plant Height

Table 2a indicates that the effects of tender coconut liquid, mature coconut liquid on the plant height were found to be significant. There were statistical differences for plant height between the two (Table 2a). Average plant heights were found as 55 and 51 cm, respectively (Table 2b). The highest plant height 55 cm was obtained by treatment of mature coconut liquid. The lowest values were obtained by treatment of tender coconut liquid, respectively (Table 2a). Plant height of fenugreek was not affected by increase in concentration of coconut liquid. There were significant differences among the plant heights of fenugreek in terms of mature coconut liquid tender coconut liquid. While the highest plant height was obtained from 30 kg P ha⁻¹ application as the lowest plant heights (37.5 and 38.3 cm) were obtained from the control plots and 90 kg ha⁻¹ phosphorus doses, respectively. These values were in the same Duncan groups. Halesh et al. (2000) and Mavai et al. (2000) reported that the higher plant heights in fenugreek were obtained from the higher P doses (75 and 90 kg P ha⁻¹, respectively)^[10,11].

3.2 Number of Branches

Differences among the plant branches of fenugreek by the treatment of mature coconut liquid and tender coconut liquid has a number of branches 9, 7 respectively whereas the effects of different phosphorus levels on the number of branches of fenugreek were found significant in 2006 and in average of the years, in 2007. As the highest numbers of branches (2.8-2.9) was

obtained from 60 and 90 kg P ha⁻¹ applications in the first and second experimental years which were in the same. Reported that the numbers of branches are more than that of by phosphorus application

3.3 Number of Pods

There were statistically significant differences between the numbers of pods by the treatment of tender coconut liquid. As the lower number of pod 24 pods plant⁻¹ was obtained, while by the treatment of mature coconut liquid gave a higher number of pod 27 pods plant⁻¹. The effect of increasing phosphorus doses on the number of pods of

fenugreek was statistically significant the highest number of pod 8.4-8.5 pods plant⁻¹ was obtained from 60 kg ha⁻¹ phosphorus application. previously reported that the number of pods was not affected by phosphorus applications. Our findings were compatible with the previous studies' results.

3.4 Number of Seeds in Pod

There were statistical differences by the treatment of mature coconut liquid and tender coconuts liquid are a number of 10.5 seeds pod⁻¹, 9.04 seeds pod⁻¹ was obtained.

Table 1a: Shown Analytical result of water

| Sr. No | pH | Conductivity | TDS ppm | DO ppm | Hardness ppm |
|--------|------|--------------|---------|--------|--------------|
| 1 | 7.49 | 1.2 ms/cm | 158 | 14 | 450 |

Table 2a: Effect of tender coconut liquid on the growth of Fenugreek crop.

| Periodicity of the observation (in day) | No. of pods | | Shoot height in cm | | No. of Branches | | No. of Seeds | |
|---|-------------|----|--------------------|----|-----------------|----|--------------|-----|
| | C | T | C | T | C | T | C | T |
| 15 | 00 | 00 | 5 | 6 | 00 | 00 | 129 | 284 |
| 30 | 02 | 04 | 11 | 22 | 01 | 02 | | |
| 45 | 05 | 09 | 14 | 29 | 01 | 04 | | |
| 60 | 10 | 12 | 18 | 37 | 02 | 05 | | |
| 75 | 10 | 17 | 23 | 42 | 02 | 07 | | |
| 90 | 12 | 27 | 31 | 55 | 02 | 09 | | |
| 105 | 12 | 27 | 33 | 61 | 02 | 09 | | |

Table 2b: Effect of mature coconut liquid on the growth of Fenugreek crop.

| Periodicity of the observation (in days) | Fenugreek plant | | | | | | | | | |
|--|-----------------|----|---------------|-----|-----------------|----|-----------------|----|--------------|-----|
| | No. of pods | | No. of Leaves | | Shoot height cm | | No. of Branches | | No. of Seeds | |
| | C | T | C | T | C | T | C | T | C | T |
| 15 | 00 | 00 | 15 | 22 | 5 | 6 | 00 | 00 | 129 | 217 |
| 30 | 02 | 03 | 25 | 29 | 11 | 19 | 01 | 02 | | |
| 45 | 05 | 07 | 38 | 58 | 14 | 27 | 01 | 03 | | |
| 60 | 10 | 10 | 52 | 69 | 18 | 34 | 02 | 04 | | |
| 75 | 10 | 14 | 63 | 99 | 23 | 39 | 02 | 05 | | |
| 90 | 12 | 24 | 78 | 137 | 31 | 51 | 02 | 07 | | |
| 105 | 12 | 24 | 90 | 151 | 33 | 57 | 02 | 07 | | |

Table 3a: Show a micronutrient contents of mature and tender coconut liquid

| Contents | Mature Coconut liquid | Tender Coconut liquid |
|-------------------|-----------------------|-----------------------|
| Total solids% | 5.4 | 6.5 |
| Reducing sugars % | 0.2 | 4.4 |
| Minerals % | 0.5 | 0.6 |
| Protein % | 0.1 | 0.001 |
| Fat % | 0.1 | 0.01 |
| pH | 5.2 | 4.5 |
| Potassium mg% | 247 | 290 |
| Sodium mg% | 48 | 42 |
| Calcium mg% | 40 | 44 |
| Magnesium mg % | 15 | 10 |
| Phosphorous mg% | 6.3 | 9.2 |
| Iron mg% | 79 | 106 |
| Copper mg% | 26 | 26 |
| TDS | 2000 ppm | 2100 ppm |
| Conductivity | 8 Ms/Cm | 8.5 Ms/Cm |
| Total Hardness | 850 ppm | 670 ppm |
| DO | 70 ppm | 28 ppm |
| pH | 5.70 | 5.32 |

Table 3b: Show characteristic property of soil

| Characteristics of soil | Normal Quantity | Observations | Justification | Information |
|--|-----------------|--------------|---------------|-------------------------|
| PH of soil | 7.1 to 7.5 | 7.66 | Medium alkali | Nature: alkaline nature |
| Nitrogen kg/hectare | 281 to 420 | 286.72 | medium | It required nitrogen |
| Single super phosphate kg/hectare | 15 to 21 | 43.07 | More | Does not required |
| K _m n _o 4 kg/hectare | 181 to 240 | 1130.4 4 | more | Does not required |
| Free Caco ₃ % | 1 to 5 | 8.12 | more | Does not required |
| Zinc ppm | 0.5 to 0.75 | 0.85 | more | Does not required |
| Copper ppm | 1 to 1.5 | 2.5 | more | Does not required |
| Iron (Fe) ppm | 5 to 7.5 | 24.96 | more | Does not required |
| Boron ppm | 0.03 to 0.06 | 0.9 | more | Does not required |
| Calcium (mg/100 gm. soil %) | 65 to 80 | 63.6 | medium | It required Calcium |
| Magnesium (mg/100 gm. soil %) | 10 to 15 | 10.88 | Very less | It required Magnesium |

Fig 1a: Show comparisons between shoot heights of control plant Vs treated plant by mature coconut liquid

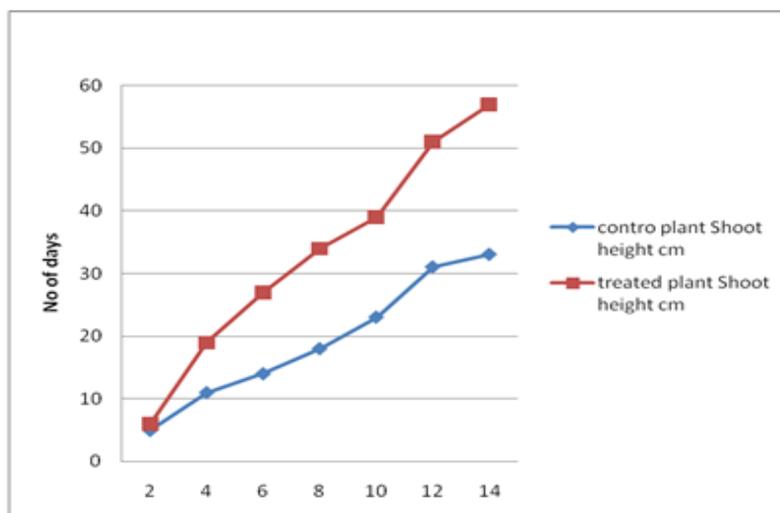
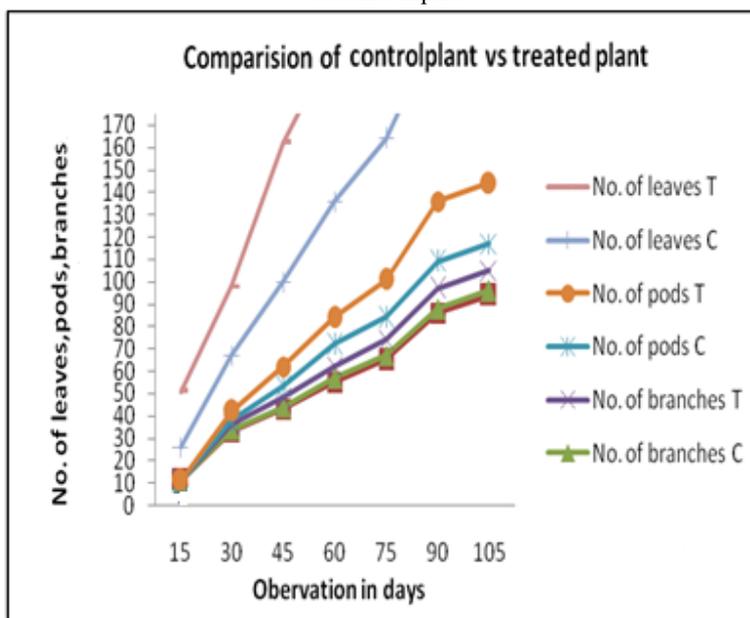


Fig 2b: Show comparisons between no. of pods, leaves; branches of control plant Vs treated plant with mature coconut liquid



4. Conclusions

The matured and tender coconut liquid is used as herbal micronutrients for the fenugreek crop for the better yield of crop. The amino acid composition of coconut liquid, Vitamins of coconut liquid and essential micronutrients of it play a significant role in the vegetative growth [13,14], root growth of the plant initially and it also enhances the quality of the seeds as

compared to the central plant; so it is one of the Novel micronutrients which is eco-friendly liquid micronutrient spray for multipurpose medicinal fenugreek plant [15].

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