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EFFECT OF BIO-STIMULANTS ON GROWTH AND YIELD OF COW PEA (*VIGNA UNGUICULATA* (L.) WALP)

G. Ramesh[1*], Kusuru Meghana[2], A. Srinivasa Rao[3] and N. Vijaya Sree[4]

[1&2]Department of Botany, Hindu College, Guntur, A.P., India Pin - 522003

[3]Department of Botany, Government Degree College, Naidupet, A.P., India, Pin - 523126

[4]Department of Biotechnology, Acharya Nagarjuna University, A.P., India, Pin - 522510

*Corresponding Author

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ABSTRACT

A field experiment is carried out at agriculture field of Agriculture Research Station, Amaravathi to study the influence of different levels of Jeevamrutha, sea weed and KNF (Korean Natural Farming). The main concept of this research work is to apply a mineral source in the form of Korean Natural forming, involving the culturing of Indigenous Micro Organisms (IMO) . KNF emphasizes self sufficiency by limiting externals inputs and relying on recycled farm waste to produce biologically active inputs. The application of this method has given more yield in cow pea. The results reveals that application of jeevamrutha at 1000 lha-1 3% of sea weed *Sargassum swartzii* (SSE) and KNF at 5-3-2 nutra rich pellets, significantly influenced growth parameters like plant height, number of branches, number of leaves, number of pods per plant, length of pods, number of seeds per pod, seeds weight per plant and 100 seed weight. Application of KNF is more affective in producing higher grain yield in cow pea.

Keywords: Jeevamrutha, sea weed, KNF, cow pea, height, grain yield.

INTRODUCTION

Soil plays a vital role in our ecosystem; without it, life for many multicellular organisms would cease to exit. In addition, for shortages are driven by soil degradation as poor farming practices lead to loss of nutrients through erosion and leaching to maximize crop yield, it is imperative that farmers maintain a healthy environment for plants to grow, as the quality of the soil can change

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outcome of the harvest. KNF is a sustainable farming system. It has been practiced for over 40 year s throughout Asia. It is gaining popularity among farmers in Hawai. KNF is a self sufficient system that involves culturing indigenous micro organisms (IMO) fungi, bacteria and protozoa.

Cow pea (*Vigna unguiculata* L. Walp), is an important vegetative legume crop, belongs to family Fabaceae, consumed by people all around the world. Especially in the developing nations, is rich in proteins, vitamins and essential minerals. Cow pea seeds have been reported to contain about 0.18-0.59% tannins (Reddy *et al.* 1985). The crop utilized either for dry seeds (or) green pods (Abbas and Akladious, 2013). It is considered as rich source of carbohydrates and dietary fibers (Goncalves *et al*. 2016). It is popularly called as vegetable meat as it plays an important role in Indian diet on account of high per cent of proteins (23.14%), which is double than that of cereals. The many benefits associated with organic farming practices have renewed interest in adoption of the same among farming community and this has started gaining momentum in all crops.

The aim of this study was to compare Jeevamrutha, seed weed and KNF on growth and yield capacity of *Vigna unguiculata* L. Walp for the development and use of environmental friendly bio fertilizer in sustainable organic farming.

MATERIALS AND METHODS

A field experiment was conducted during Kharif April, 2023. The experiment was laid out in factorial randomized complete block design (FRCBD) with jeevamrutha, sea weed and KNF (Korean Natural Farming) as 3 factors and is tried at three and four levels respectively. Thus, the 3 treatment combinations were replicated thrice and tried in FRCBD. Jeevamrutha was applied to soil, sea weed extract applied as manure to the soil and KNF is applied to soil for the development of IMO (indigenous microorganisms).

Preparation and application

Natural faming is a way to keep the native organic life alive and maintain the health of the soil by the use of natural manures and other cow based liquid organic bio fertilizers, which increase the microbial count that are beneficial in releasing the nutrients to the crops. There are many indigenous techniques followed by the farmers. The natural formations prepared by Jeevamruth. This enriches the soil with nutrients and increase the soil fertility. Soil application of Jeevamrutha create favorable conditions for the availabilities nutrients by increasing the PH in acidic soils and decrease the PH in alkaline soils and maximizing nutrient availability at PH 6.5 to 7.8. it contains the micro organisms as bacteria – 20.4 X 105, fungi – 13.8 X 103, Actinomycetes 3.6 x 103 of colony count.

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Jeevamrutha: Jeevamrutha was prepared by mixing 10 kg of cow dung, 10 liter of cow urine, 2 kg of local Jiggery, 2 kg of pigeon pea flour and handful of soil collected from farm. All these were put in 200 liter capacity plastic drum and mixed thoroughly and volume was made up to 200 liter. The solution was regularly stirred clockwise in morning, afternoon and in evening continuously for 10 days and it was used for soil application, it increases the nitrogen percentage in organic fertilizer (Herran, J., Toress, RRS, Rojo, G.E. 2008).

Sea weed: *Sargassum swatzii* extract (SSE) was prepared using *Sargassum swartzii* collected from Tamil Nadu, India. The sea weeds were washed, dried and pulverized into fine powder, with continuous stirring for 15 min, filtered and stored at 4oC. the filtrate was assumed as 100% SSE extract and different concentration of SSE (3%, 4% and 5% v/v) were prepared by diluting with distilled water. The total organic composition of SSE were analyzed according to the procedure described in (Mondal *et al*. 2015).

KNF (Korean Natural Farming); Involves the collecting and culturing indigenous microorganisms (IMO). This farming approach has been extensively promoted by Han-Kyucho and his followers (Cho and Cho, 2010; Drake, 2012).

RESULTS AND DISCUSSION

The experiment is proved that the natural inputs are important, as they enhance plant growth and IMO proliferation (Table 3) and also the experimental results are showing approximate analysis as (Maghirang, 2011). Enhanced growth parameters due to interaction of sea weed, Jeevamrutha and IMO are due to significant effect of rhizobia bacteria with soil application of IMO has helped translocation of carbohydrates to developing rootnodules as reported by (Sait and Kibritci, 2016). In the present study, all the yield attributing parameters were significantly higher with IMO, which might be due to favourable effects of IAA, GA3, which mean the microbial population (Cho, 2010) (Table 4). The Korean Natural Farming is a great alternative for the farms looking to become self-sufficient. The comparable, height, leaf area, pod size, number of seeds per pod are comparatively greater with the application of IMO (table 4). The application of sea weed, jeevamrutha and KNF has given increased rate to IMO (Fig. $1F^4$).

Our findings coincide with those of earlier studies carried out on *Vigna unguiculata* L. (Sivasankari *et al*., 2006), where there there was an increase in vegetative growth by the application of IMO (Fig. 1.D). The length of the pod size is comparatively larger (Fig. $1F^4$) 5

when treated with KNF as shown in figure. And also the height of the plant is approximately larger when treated with KNF (Fig. 1.D).

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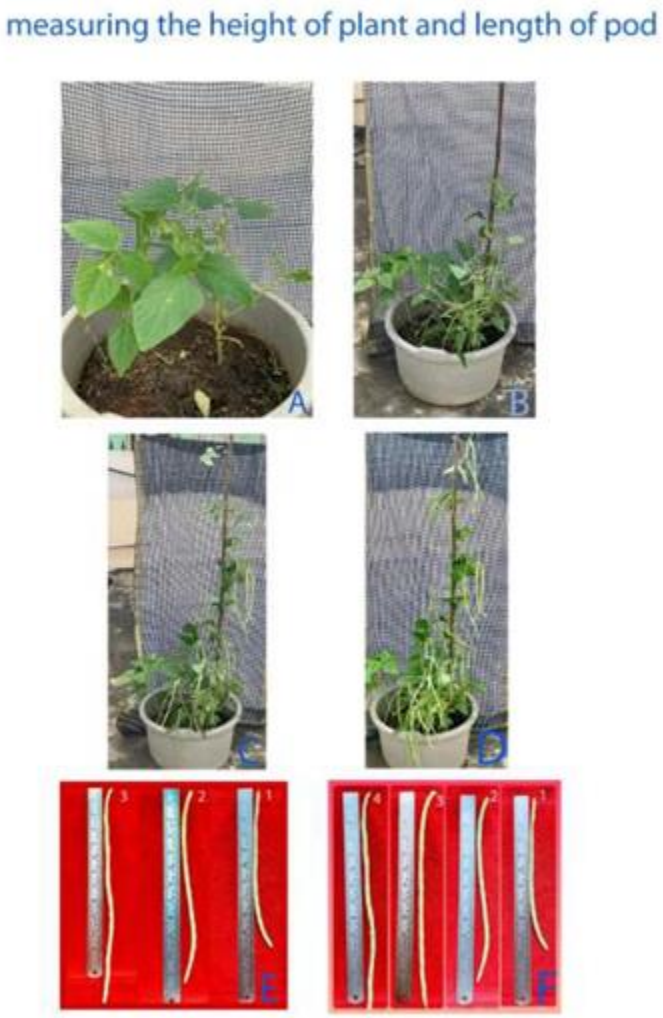

Figure 1

Statistical analysis: the observing finding of the shot, root, leaf date are calculated by ANOVA to determine the influence of the independent variables by Z – test method. F = MST/MES F= A NOVA coefficient, MST = mean sum of readings due to treatment, and MSE = Mean sum of readings due to error.

Data were analyzed using analysis of variance (ANOVA) following randomized block design (Gomez and Gomez, 1989). Differences were considered significant at 5% level of probability. From the experimental on serrations reveal the implications of high yield, and positive growth in shoot size, root length, leaf area size, number of pods per plant, number of seeds in pod and seed weight. From the readings given below in the table indicating the early and positive response with the KNF method.

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Morphological characters of cow pea (*Vigna unguiculata* (L.) Walp)

Table 1

15 days						
Parameters	**Shoot length (cm)**	**Root length (cm)**	**Leaf area (cm^2)**	**No of pods per plant**	**No of seeds per pod**	**Seed weight of 100**
Un-treated	10	7	12	0	0	0
Seaweed	12	9	8	0	0	0
Jeevamrutham	14	10	20	0	0	0
KNF	*17*	*12*	*24*	*0*	*0*	0

Table 2

30 days						
Parameters	**Shoot length (cm)**	**Root length (cm)**	**Leaf area (cm^2)**	**No of pods per plant**	**No of seeds per pod**	**Seed weight of 100**
Un-treated	12	10	15	0	0	0
Seaweed	15	12	21	3	2	8
Jeevamrutham	16	13	22	4	3	10
KNF	21	15	28	6	3	13

Table 3

45 days						
Parameters	**Shoot length (cm)**	**Root length (cm)**	**Leaf area (cm^2)**	**No of pods per plant**	**No of seeds per pod**	**Seed weight of 100**
Un-treated	14	11	17	1	0	1
Seaweed	16	13	23	5	3	10
Jeevamrutham	19	15	26	6	5	13
KNF	27	17	31	8	8	17

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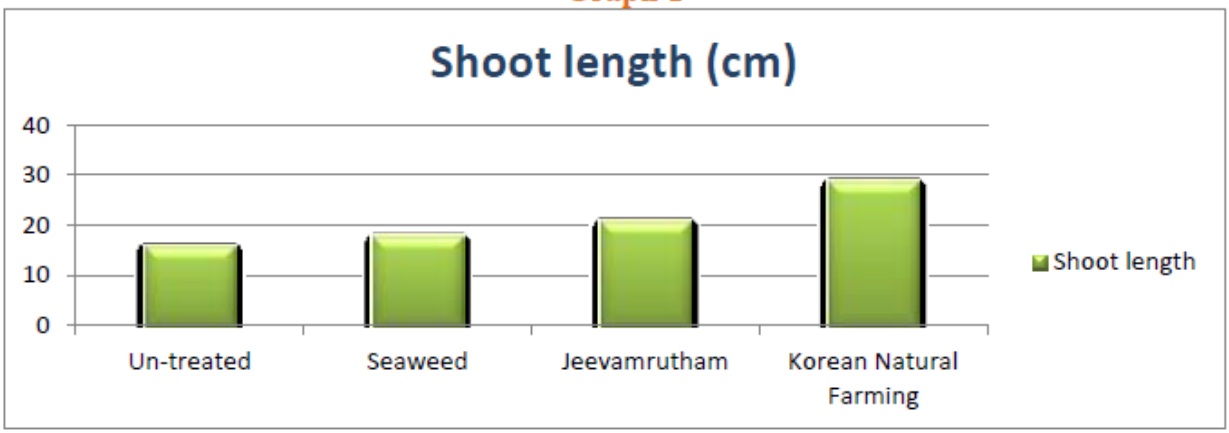
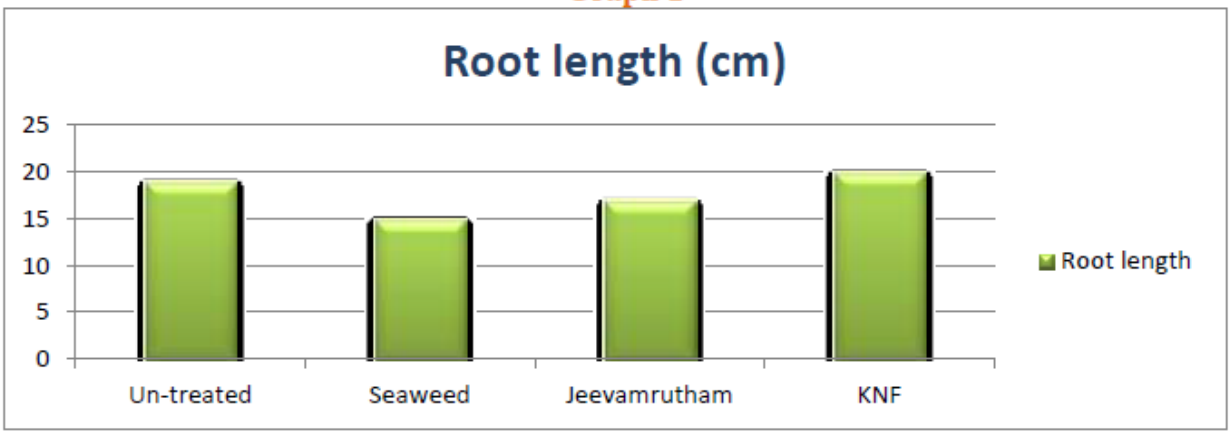
Table 4

60 days						
Parameters	**Shoot length (cm)**	**Root length (cm)**	**Leaf area (cm^2)**	**No of pods per plant**	**No of seeds per pod**	**Seed weight of 100**
Un-treated	16	19	3	3	2	10
Seaweed	18	15	2	70	7	15
Jeevamrutham	21	17	27	10	8	16
KNF	29	20	40	12	10	23

Graph 1



Graph 2



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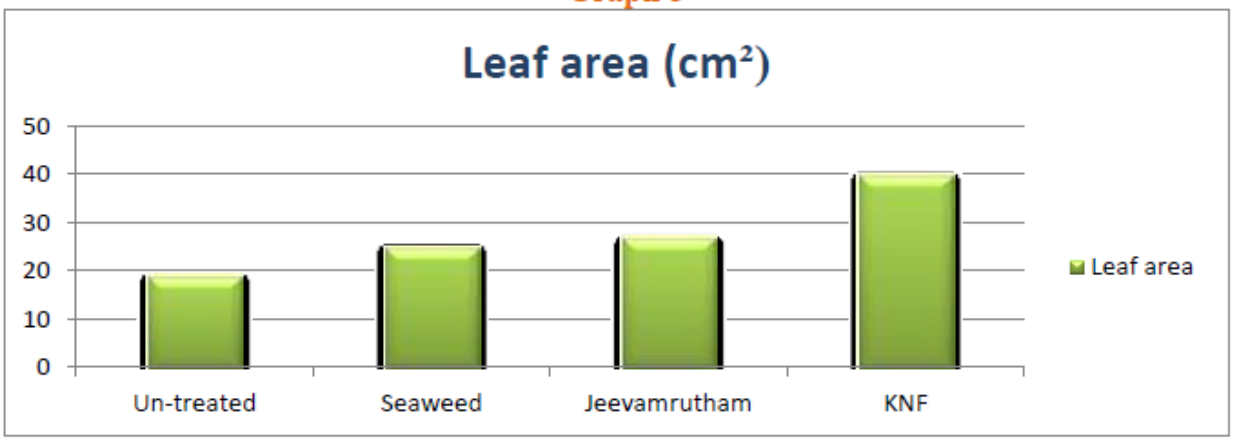
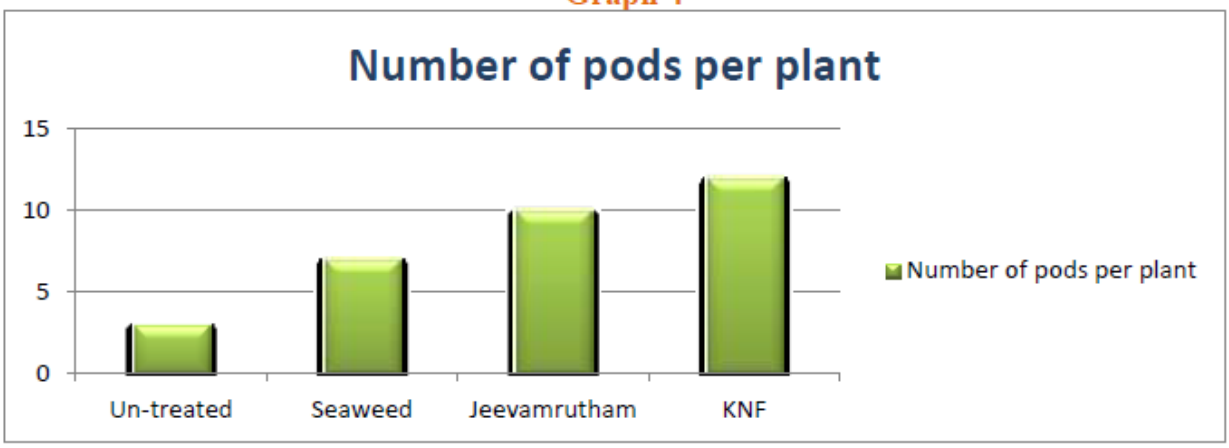
Graph 3



Graph 4



CONCLUSION

With the experimental evidences it shows the cultivation and propagation by KNF is showing environmentally friendly. Farmers are able to obtain all the minerals and equipment needed to cultivate. IMO directly from the ARS, research station. The application method of KNF is giving good growth and high yield when compared to Jeevamrutha and sea weed as per my research findings as given in the tables.

KNF is the rich source of the beneficial microorganisms such as nitrogen fixing and phosphate solubilizing bacteria, from this study, it is found that KNF is effectively used and it helps to improve efficient microbial consortia thereby increasing NPK content and plant growth promoting factors. KNF is the best alternative to chemical fertilizer to improve soil fertility, crop productivity and quality.

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