

A Comparative study on the efficacy of three eco- friendly fertilizers on Bhindi

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SUMMARY

The present report is an attempt to study the comparative effects of Vermicompost (VC), Farm yard manure (FYM), and Seaweed Liquid Fertilizer (SLF) individually and in combination on morphology and yield in *Abelmoschus esculentus* variety Kumuda 501(Bhindi). The SLF was extracted from *Hypnea muciformis* Lamour (Red alga). The germination percentage was higher in all treatments over control. Though, initially the shoot and root growth were almost same in all treatments and control, as the growth advanced, the best results were obtained in VC and VC+SLF combinations. Increased leaf area, better sized flowers and fruits and better fruits weight were obtained in VC and VC+SLF treatments. Though, there were several reports of beneficial effects of SLF in different plants, in the present study SLF individually could not bring much beneficial effects in *Abelmoschus esculentus*. However, it was in combination with VC induced better results.

Key words : Farm yard manure, Vermicompost, Seaweed liquid fertilizer, *Abelmoschus esculentus*, Comparative efficacy

Soil fertility began to decline due to the vast amount of application of chemical fertilizers. In addition a vast amount of pesticides were used to protect crops from pests. Not only this cause harm to the environment but also the pests became tolerant to the most poisonous pesticides. Further, the data reveals that yield rose initially between 1949-1965 but an overall decline can be seen from 1967 onwards in terms of production, area of cultivation and yield as a result of loss of soil fertility (Sharma, 2002). Therefore, the best way to improve the environment, soil fertility and increase of yields of crop is to rely on traditional and eco-friendly method of farming. Though there were reports on the efficacy of farmyard manure (Kancheiah, 1997), Vermicompost (Thangavel *et al.*, 2003; Shweta *et al.*, 2004) and seaweed liquid fertilizer (Jayachandran and Ramassamy, 1999; Kannan and Thamizhselvan, 1990), a comparative account of the three kinds of natural eco-friendly manures is not available. Hence, the present work has been taken up.

MATERIALS AND METHODS

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The present pot study was conducted under shade house condition. Sieved (0.5 mm size) red soil from the college campus, Vermicompost (VC) and certified seeds of *Abelmoschus esculentus* (L.) Moench. from Pondicherry Agro Service Industries Corporation (PASIC) were used for the present study. Seaweed liquid Fertilizer (SLF) was extracted from *Hypnea muciformis* Lamour. (Red alga) collected from Pondicherry coast using the protocol of Rama Rao, (1990). A 10% SLF was prepared from the stock solution and the same was utilized for the present study. The following six combinations including control were employed.

- Soil (S) - control,
- Soil + VC (3:1 ratio),
- Soil + FM (3:1 ratio),
- Soil + SLF (10%),
- Soil + VC+SLF (10%),
- Soil + FM+SLF (10%),

Five sets were maintained in each combination and the plants were grown upto 75 days.

The morphological parameters such as seed germination percentage, shoot length, leaf area, length and number of lateral roots, wet and dry weights of roots, number and size of flowers, number, length and weight of fruits were calculated (Table 1)

RESULTS AND DISCUSSION

Germination of seeds though initiated on 5th day after sowing but completed by 7th day in all treatments and control. Higher percentage of seed germination was recorded in all combinations than control (Table1). Initially

Table 1: Efficacy of three eco – friendly fertilizers on growth and yield of Bhindi

Treatments	Percentage of seed germination	Number of average lateral roots	Average shoots length (cm)	Average root length (cm)	Average leaf area	Total number of flowers	Total number of fruits	Weight of fruits (g)
Soil(control)	75	15.6	26.0	18.0	20.75	12	6	5.50
Soil + VC	83.3	18.0	35.0	21.0	53.75	20	19	16.07
Soil + FM	100	18.0	30.0	21.0	36.15	20	17	5.22
Soil + SLF	100	13.3	25.0	15.0	32.10	18	7	2.62
Soil + VC +SLF	83.3	23.3	33.0	18.0	28.85	26	20	11.06
Soil + FM +SLF	83.3	9.6	24.0	11.0	23.20	13	11	9.24

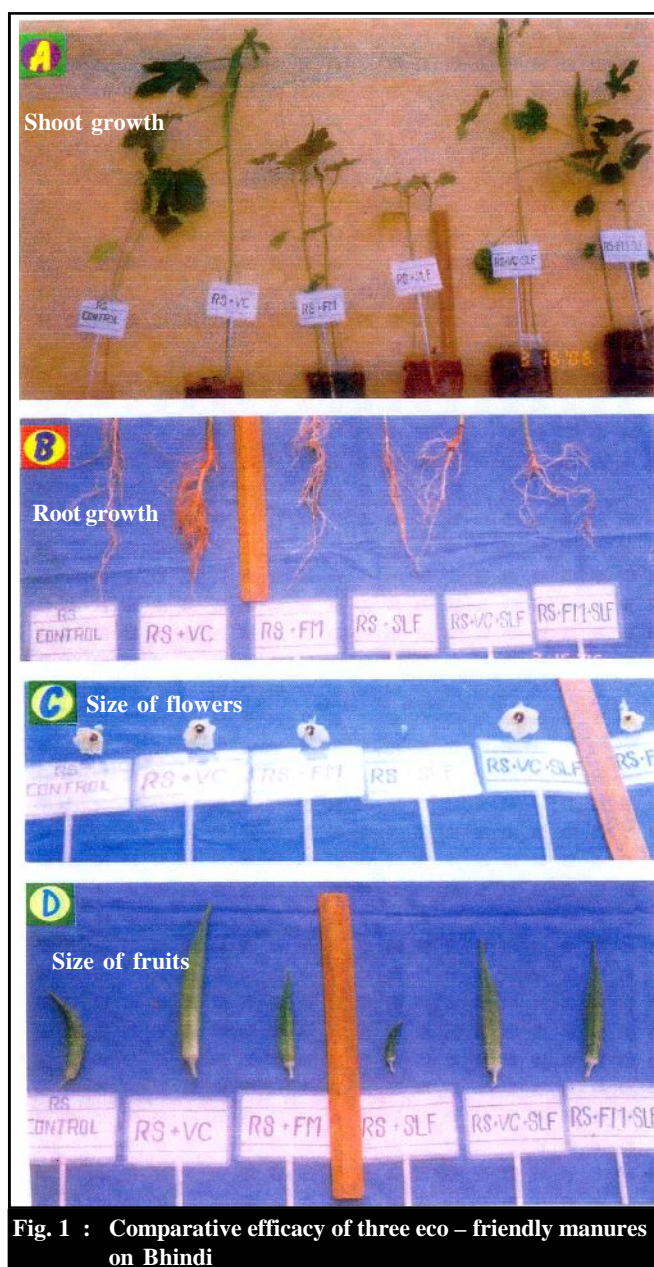
shoot growth was similar in all five combinations and control but over a period of time greater shoot length was obtained in all treatments over control except S+FM+SLF and the highest values were recorded for S+VC (Table 1). The leaf area was also comparatively higher in all combinations than control (Table 1 and Fig. 1A). Root growth was initially poorer in all treatments than control, but steadily increased over a period of growth over control except S+SLF and S+FM+SLF (Table 1 and Fig. 1B). Similarly, the wet and dry weights were greater in all combinations except S+FM+SLF over control with the highest values were obtained for S+VC, (Table 1)

Plants started producing flower buds when they were 30 days old. The total number of flowers was higher in all treatments as compared to the control and the highest and lowest values were obtained in S+VC+SLF and S+FM+SLF, respectively (Table 1 and Fig. 1C). Hence, similar results were also recorded in respect of total number of fruits. Best results were recorded with reference to length and weight of fruits in S+VC (Table 1 and Fig. 1D).

In general the reported beneficial effects of SLF are overall increase in plant vigour and yield qualities. Though better vegetative growth (Jayachandran and Ramassamy, 1999) and yield (Manimagalai, 2006) were recorded in *Arachis hypogaea* grown in soil fertilized with SLF of *Hypnea muciformis*, its effects on *Abelmoschus esculentus* was contrary to the above.

The positive role of FM on plant development, yield and dry matter production have been well brought out in Rice (Kancheiah, 1997; Udayasoorian, 1998) and Potato (Warman and Howard, 1998). Though, similar situation was observed in Bhindi grown in soil fertilized with FM and SLF, their responses are not comparable to S+VC+SLF. The individual effects of FM was, however, not commendable in the present study. Contradictory reports are available for plants grown in VC as better grain and straw yield for rice (Thangavel *et al.*, 2003) and poor performance for *Premna serratifolia* and

Caralluma attenuata (Devi, 2005). In the present study in Bhindi the best results were obtained for all parameters

**Fig. 1 : Comparative efficacy of three eco – friendly manures on Bhindi**

in plants grown in combination of S+VC.

Therefore, it is evident from the present study that SLF and FM individually did not yield the desired effects

in Bhindi. The S+VC and S+VC+SLF gave the best results. It is further confirmed that efficacy of these eco-friendly fertilizers varied with crop to crop.

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