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RESPONSE OF RADISH TO LHA AND ORGANICS IN PADUGAI SERIES SOIL (Typic Ustifluvents)

R. Bhuvanewari*

Department of Soil Science and Agricultural Chemistry, Faculty of Agriculture,
Annamalai University, Annamalai Nagar - 608 002, Tamil Nadu, India

Abstract

The field experiment was conducted to study the performance of LHA in the presence of both organic manures and inorganic fertilizers. The results of the field experiment established that application of LHA along with organic manure and inorganic fertilizers favourably improved the yield of tuber and leaves, as well as the quality characters like total carbohydrate, crude fiber content, crude protein, ascorbic acid, P, K, Ca and Fe content. Combined application of LHA either with organic manure or inorganic fertilizers did not affect the influence of LHA, instead, it had a synergetic effect and improved the yield and quality of radish besides sustaining soil health. From the results of the field experiment, it was concluded that soil application of LHA @ 60 kg ha⁻¹ along with 12.5 t ha⁻¹ of FYM + Recommended dose of NPK + *Azospirillum* and foliar application of micronutrients enriched LHA (0.2%) on 15 and 30 DAS maximized the yield of radish to a tune of 103.5 per cent in Typic ustifluvents soil.

Key words: Radish, Organic manures, LHA, Soil and *Azospirillum*.

1. Introduction

Radish belongs to the mustard family (Cruciferae) which explains thick sharp taste and it is related to broccoli and water cress. Humic substances are very important component of soil that affect physical and chemical properties and improve soil fertility. They are complex and heterogenous mixture of poly dispersed materials formed by biochemical and chemical reactions during the decay and transformation of plant and microbial remains. An attention was focused mainly on major vegetables like onion, potato,

tomato and chillies etc., neglecting other minor vegetables which are traditionally grown in India. Radish is one among the vegetables which are commonly grown in both plains and hilly regions of India which has wider adaptability. In view of above facts, the present experiment was contemplated to the study the response of radish to LHA and organics in Padugai (Pd) series soil (Typic Ustifluvents).

2. Materials and Methods

Field experiments was conducted in Padugai (Pd) series soil (Typic Ustifluvents) to study the performance of LHA in the presence of both organic manures and inorganic fertilizers. The experimental padugai soil was sandy loam in texture with a pH 7.2. The treatment consisted of T₁- Control; T₂ – 100 % NPK (100:60:100 kg of N, P₂O₅ and K₂O ha⁻¹); T₃– 100 % NPK + LHA@ 60 kg⁻¹; T₄- 75 % NPK + LHA@60 kg⁻¹; T₅- 12.5

*Corresponding author: R. Bhuvanewari

E.mail: bhuvanavasusoil@gmail.com

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t FYM + *Azospirillum*; T₆ - 25 t FYM + *Azospirillum*; T₇ - 12.5 t FYM + *Azospirillum* + LHA@60 kg⁻¹; T₈ - 25 t FYM + *Azospirillum* + LHA @60 kg⁻¹; T₉- 100 % NPK + 12.5 t FYM + *Azospirillum*; T₁₀ - 75 % NPK + 12.5 t FYM + *Azospirillum*; T₁₁ - 100 % NPK + 12.5 t FYM + *Azospirillum* + LHA @ 60 kg⁻¹; T₁₂ - 75 % NPK + 12.5 t FYM + *Azospirillum* + LHA @ 60 kg⁻¹. The experiment was carried out in Randomized block design with three replications. The variety used for the experiment was Pusa Chekti. A common dose of 100:60:100 kg of N, P₂O₅ and K₂O ha⁻¹ was supplied through urea, SSP and MOP, respectively. Representative plants in each plot were labeled and the observations on the growth characters and yield components were recorded at appropriate stages.

3. Results and Discussion

Radish responded well for the addition of nutrients either through organic manures or inorganic fertilizers. The tuber length, single tuber weight and tuber yield of radish was significantly increased with addition of both organic manures and inorganic fertilizers. Integration of inorganic fertilizers with organic manures showed a synergistic influence on tuber length, tuber weight and tuber yield as compared to sole application of either organic manures or inorganic fertilizers. Soil application of LHA @ 60 kg along with 12.5 t ha⁻¹ of FYM + NPK + *Azospirillum* and micronutrients enriched LHA (0.2 %) foliar spray on 15 and 30 DAS maximized the yield and improved the quality of radish.

The highest tuber length, tuber weight and tuber yield of 24.3 cm, 215.3 g and 33.1 t ha⁻¹ was noticed in T₁₁ which was found to be on par with T₁₂ (75 % NPK + 12.5 t FYM + *Azospirillum* + LHA) which recorded the tuber length, tuber weight and tuber yield of 23.8 cm, 214.0 g and 32.4 t ha⁻¹ respectively, which was followed by T₉. Based on the tuber length, tuber weight and tuber yield the treatments are arranged in descending order as T₉ > T₁₀ > T₃ > T₆ > T₇ > T₅ > T₄ > T₂ > T₁. The shortest tuber, lowest tuber weight and tuber yield was registered under control. Humic

substances are known to improve the root growth development especially the root initiation (Dhanasekaran and Govindasamy, 1995). The improved root growth might be responsible for better absorption of macro and micronutrients and improved growth and yield of radish. Integrated addition of NPK, FYM and *Azospirillum* was tested both in presence and absence of humic acid. The results revealed that application of FYM @ 25 t ha⁻¹ along with *Azospirillum* significantly increased the yield and quality of radish. This shows the necessity of increased application of FYM in the absence of inorganic fertilizers. *Azospirillum* being an efficient fixer of atmospheric N, it could have improved the supply of N to the crop during the different phases of crop growth. Further, the *Azospirillum* secretes some of the growth promoting substances like auxin in rhizosphere which are absorbed by the plants (Sundaravelu and Muthukrishnan, 1993), thereby improves the growth, yield as well as quality of radish. Similar observations in vegetable crops are made by Boopathi *et al.* (2002), Nirmala and Vadivel (1999) and Nanthakumar and Veera ragavathatham (2000).



Table – 1: Effect of LHA, NPK and organics on yield characters of radish in padugai series soil (Typic Ustifluvents)

Treatments	Tuber length (cm)	Single tuber weight (g)	Tuber yield (t ha ⁻¹)	Shoot yield (t ha ⁻¹)
T ₁ - Control	13.0	185.3	15.2	18.3
T ₂ - 100% NPK	20.2	200.2	23.9	28.7
T ₃ - T ₂ + LHA	21.0	204.2	26.8	32.22
T ₄ - 75% NPK + LHA	14.5	188.0	17.3	20.8
T ₅ - 12.5 t FYM + <i>Azospirillum</i>	15.9	190.1	18.2	21.8
T ₆ - 25 t FYM + <i>Azospirillum</i>	18.3	195.2	21.6	25.9
T ₇ - T ₅ + LHA	17.1	192.3	19.6	23.5
T ₈ - T ₆ + LHA	18.9	198.7	22.6	27.1
T ₉ - T ₂ + T ₅	22.0	210.2	30.6	36.7
T ₁₀ - T ₄ + T ₅	21.4	208.3	28.2	33.8
T ₁₁ - T ₉ + LHA	24.3	215.3	33.1	39.7
T ₁₂ - T ₁₀ + LHA	23.8	214.0	32.4	38.9
Mean	19.2	200.1	24.1	28.9
SEd	0.635	5.28	0.72	0.86
CD (p=0.05)	1.312	12.0	1.63	1.96

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