

Exploring Yield Potential of *Raphanussativus* L. By Various Organic Matter Sources



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<http://abr.damray.com>

OPEN ACCESS

DOI: 10.26855/abr.2020007

Received: September 04, 2020

Accepted: October 01, 2020

Published: November 18, 2020

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Abstract

An experiment was conducted in order evaluate the influence of various organic matter sources on radish crop at Vegetable Research Farm Singri, Bhimber Azad Kashmir, during October, 2018. The experiment was replicated three times with 4 treatments (control, chicken manure, FYM and leaf compost). The lowest non-significant results for days to germination (6.00) were observed in chicken manure and highest (8.33) in control treatment. The maximum significantly high yield was obtained where organic matter sources (chicken manure, FYM and leaf compost) were applied and significantly low yield was observed in control treatment. The non-significantly high yield (4541g, 4665g and 4599g) was obtained in chicken manure, FYM and leaf compost respectively which was significantly low (3953g) in control treatments related with vegetative growth (number of leaves and leaf length) that was more where organic fertilizer was applied. It was proved that chicken manure was best for vegetative growth of radish as well as its root growth development and FYM and leaf compost results for yield was almost same and highest under the agro-climatic conditions of district Bhimber, Azad Kashmir. Pakistan.

Keywords

Radish, Organic Matter, FYM, Chicken Manure, Organic Compost

1. Introduction

Leaves of *Raphanussativus*, radish, have been utilized in different parts of the world to treat various diseases and used by antimicrobial and antiviral specialist. The phytochemistry and pharmacology of this radish is has been studied. The structures of the mixes separated and distinguished are recorded and parts of their science and pharmacology are talked about. The mixes are gathered by basic classes. In summary, radish has been identified as having antidiabetic effects, making it favorable for those with diabetic conditions. This may be due to its ability to enhance the antioxidant defense mechanism and reduce the accumulation of free radicals, affect hormonal-induced glucose hemostasis, promote glucose uptake and energy metabolism, and reduce glucose

absorption in the intestine. However, this summary requires further confirmation in research in vivo studies and clinical trials[1].

Various organic matter sources have been utilized for growing radish. Biochar amendment in nutrition for vegetable production is highly valuable for its quality of produce. Similarly, Vermicomposting is a traditional technology that produces the best quality of compost in this regard [2]. Changes in carbon and nitrogen reserves reflect the impacts of land use and management. To assess the changes in organic matter stocks and quality in an Oxisol under intensive vegetable cultivation in the Brazilian [3]. N compost is frequently seen as a modest protection against yield misfortune in vegetable creation due to the for the most part huge included worth, bringing about utilization of compost N regularly in overabundance of real harvest request. In blend with the low compost N recuperation by numerous vegetable yields and the regularly extreme water system, this may prompt both wellbeing and natural dangers identified with high nitrate fixations in water leaving the root zone [4]. Well matured compost has the ability to supply the three chief elements: N, P, K and the micro elements, which act as slow-acting fertilizer, however the amount depends on the raw materials. Compost application can expect to supply very beneficial microbes in soil, and to improve soil aggregates, thereby improving aeration and water holding capacity of the soil under Mediterranean environments[5].

The goal of one of previous study was to assess changes in phosphorus divisions during vegetable waste and chicken fertilizer treating the soil. High throughput sequencing, quantitative PCR, and various examination techniques were applied to research interconnections among phosphorus divisions, catalyst action, and phoD-holding bacterial network arrangement [6].

On the other hand, chicken manure is available locally easy to get and also it can be obtained at a low cost, it's not only cheap and effective, it is understood also essential for establishing and maintaining the optimum soil physical conditions for plant growth and yield. The amount of nitrogen in chicken manure is approximately N 3.7%, P₂O₅ 4.4% and K₂O₃.1% of its wet basis content. The chicken manure provides quite large amount of nitrogen for plant growth than the other animal manure (FYM). Therefore, it is still not understood by most farmers the potential of chicken manure to maintain the high marketable yield and to improve soil nutrients level. The availability of organic fertilizer in AJK such as chicken manure and compost is much recommended. However, no recommendation for the rate of chicken manure to be used in growing crops in AJK. Otherwise, this experiment is also focus to understand the potential of chicken manure as a source of organic nitrogen fertilizer and its appropriate level to be used for best production of radish. Lavalley *et al.*, (2020) [7] stated that during 21st century organic matter is effective tool for challenging situation of climate change.

To prepare composting for vegetables is highly technical process. It is a biological and chemical interaction between living microbes and nonliving materials; the microbes are involved in the decomposition process. In one of the study, liquid organic fertilizers produced from agricultural residues and industrial wastes are becoming increasingly popular. This study aimed to examine the effect of liquid organic fertilizers produced from waste molasses, distillery slop and sugarcane leaves on the growth of Green Cos Lettuce. This study showed that organic liquid fertilizers formulas 3 and 5 had similar growth promotion properties as chemical fertilizers with Green Cos Lettuce. Moreover, our products are organic and serve as a rich nutrient source for the plant[8].

Pakistan produced about 157 thousand tons annually of radish from the area of 9600 hectares [9]. Radish grown in southern districts of AJK as autumn (winter), is extremely popular in Japan. Usually it has a white outer color, although pink cultivars also exist. It can be eaten raw, in salads, or pickled. It reaches full maturity after 50-90 days after planting, depending on the variety.

Keeping in view the importance of organic matter residues this experiment was carried out at vegetable research farm Singri Bhimber during the autumn 2018-19 to now that how to use organic fertilizer for radish cultivation as an alternative of inorganic fertilizer. To observe the effect of organic matter application on growth and yield of radish. To study reduction of chemical fertilizer application depending on the organic matter application on radish production.

2. Materials and methods

This study was conducted at vegetable research farm Singri, under the agro-climatic conditions of district Bhimber, Azad Kashmir in October 2018. Radish seeds of variety mino-early Chemical fertilizer (DAP and Urea 1 bag/acre). Pesticide/insecticide as necessary. Description of the treatment, control, chicken manure, FYM, leaf compost

2.1 Field preparation and sowing

The land was ploughed 3-4 times than sowing was done 15 October 2018 by maintaining row to row distance 60cm and plant to plant distance 10cm. Two seeds were sown on each spot to acquire adequate germination. The net plot size was kept 3 x 2 m². All the cultural practices were remained uniform for all the experimental plots. Various parameters were recorded during the course of study. Days to germination, number of leaves, leaf length(cm), root length(cm), root weight(g), yield(kg/kanal).

2.2 Experimental design

Experiment design was Randomized Complete Block Design (RCBD) with three replications, while data was analyzed by STATISTIX 8.1 Software package.

3. Results and Discussions

3.1 Days to germination

The non-significant variations were observed amongst the different organic matters for days to germination. As there were no significant variations among the treatment means, but minimum (6.00) days to germination was taken by chicken manure and maximum days (8.33) was taken by treatment where organic matter sources were not applied. This might be due to the proper utilization and use of nutrient and the heat of organic matter which increase the soil temperature, which boosted up the performance of radish seeds for early germination (Table 1).

Table 1. Influence of various organic matter sources on different parameters of radish crop

Treatments	Days to germination ^s	Number of leaves ^{NS}	Leaf length (cm) ^{NS}	Root length (cm) ^{**}	Root weight (g) ^{**}
Control (NPK)	8.33a ± 0.97	16.67a ± 1.9	13.00b ± 1.2	15c ± 1.4	159b ± 4.2
Chicken manure (1 ton/kanal)	6.00a ± 0.44	18.00a ± 1.2	16.00ab ± 1.4	25a ± 2.3	183a ± 3.2
FYM (1 ton/kanal)	7.33a ± 0.89	17.33a ± 1.4	16.67a ± 1.2	22b ± 1.4	188a ± 4.4
Leaf Compost (1 ton/kanal)	7.33a ± 0.76	17.33a ± 1.7	17.67a ± 1.6	25a ± 1.9	185a ± 5.2
LSD@ 0.05%	3.632	3.632	3.524	2.330	9.861

Where ns, Non-significant; *significant and **highly significant ($P > 0.05$)

3.2 Number of leaves

The results show the non-significant differences in the number of leaves per plant for various fertilizers (Table 1). However, the maximum number of leaves per plant (18.00) was recorded in the plots where chicken manure was applied followed by FYM and leaf compost which takes 17.33 numbers of leaves. The minimum (16.67) leaves per plant were noted in control treatment. This may be due to easily availability of nitrogen found in chicken manure followed by FYM and leaf compost (Table 1).

3.3 Leaf length(cm)

Radish leaves can be used as cooking vegetable in our daily diet. The results for leaf length remained significant. Maximum leaf length (17.67 cm) was achieved by FYM that was significantly different from the FYM and control (22.00 cm and 13.00cm). These variations of data for leaf length may be also due to availability of nitrogen for vegetative growth which increases the leaf length where organic matter sources were applied (Table 1).

3.4 Root length(cm)

Radish roots are used as cooking vegetable and salad in our daily diet. The results for root length remained significant. Maximum root length (25 cm) was achieved by chicken manure and leaf compost that was significantly different from control (15.00cm). These variations of data for root length may be relate with vegetative growth (number of leaves and leaf length) that was more where organic fertilizer was applied also due to change in the physical properties of soil and make soil soft which increase root length (Table 1).

3.5 Root weight(g)

The results for root weight where organic matter was applied were remained significantly high (183g, 188g & 185g) with control treatment(159g). Maximum root weight (188g) was achieved by FYM that was no significant with chicken manure and leaf compost. These variations of data for root length may be relate with vegetative growth (number of leaves and leaf length) that was more where organic fertilizer was applied also due to change in the physical properties of soil and make soil soft which increase root length (Table 1).

3.6 Yield/kanal(kg)

The maximum significantly high yield (4541g, 4665g and 4599g) was obtained where organic matter sources were applied and significantly low(3953g) yield was observed in control treatment. These variations of data for yield is related with vegetative growth (number of leaves and leaf length) that was more where organic fertilizer was applied also due to change in the physical properties of soil and make soil soft which increase root length(Fig 1).

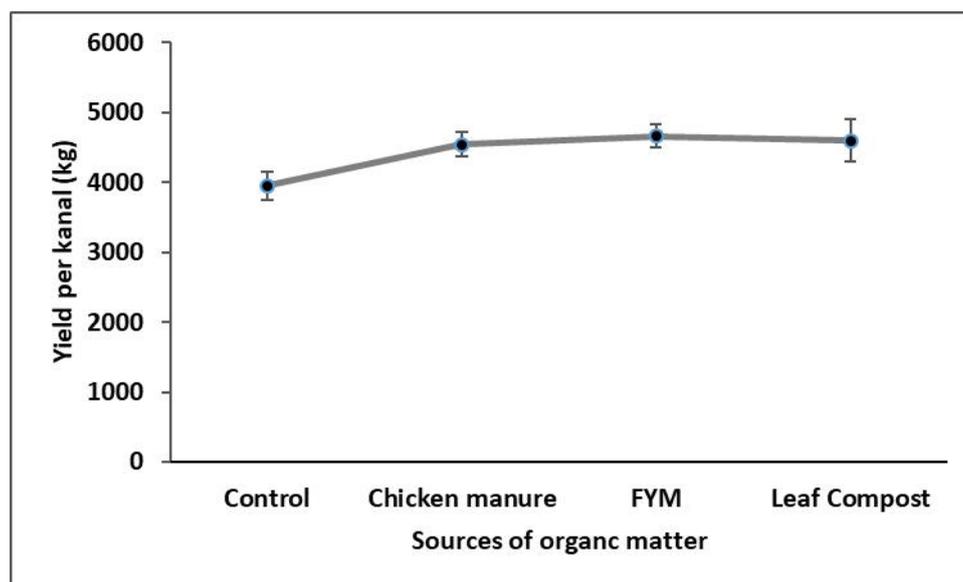


Figure 1. Impact of various organic matter sources on yield of radish

4. Discussion

Organic matter is indispensable for the world of chemicals where food safety is concerning issue. In light of the current examination, the lingering impact of natural compost is affirmed, improving the synthetic properties of soil and creation of radish in the "high" soil fruitfulness territory. During present research it was observed that chicken manure conferred high yield potential in radish these results are in line with the findings of Maneerung *et al.* (2016) [10]. In any case, during this time, some portion of the supplements was utilized by endive furthermore, weeds and some may have been drained, particularly potassium, being the snappiest supplement delivered during the natural issue mineralization (Kumar *et al.*, 2014) and the rainfall were high during the endive cycle. Another study proved the current findings by Basha and El-Aila (2015) [11] when response of foliar spraying with amino acids and integrated use of nitrogen fertilizer on radish (*Raphanussativus*) plant was highly effective in yield and quality. Previous findings of Kiran *et al.* (2016) [12] proved that impact of organic manures and inorganic fertilizers on growth and yield of radish was parallel to the present outcomes. Lanna *et al.* (2018)[13] described that when radish seeds were sowing and various organic compost doses (0, 35, 70, 105, 140 and 175 t ha⁻¹) were given. There was no significant difference was observed for all doses of organic compost in the "low" soil fertility area, obtaining only non-commercial roots (average fresh weight of 5.01 g per root). in the "high" soil fertility area, the higher the organic compost doses, the higher the values of most vegetative characteristics of radish plants and the chemical properties of the soil in both dates. for root fresh weight, the values ranged from 4.63 to 9.15 g in the control without organic compost and in the highest dose, respectively. in "high" soil fertility area, only k content in soil has not remained high for all organic compost doses, and the values ranged from 2.8 and 4.5 mmolc dm⁻³, in control without organic compost and in the highest dose, respectively. the residual effect of organic compost was confirmed by the increasing on the radish production in initial "high" soil fertility area.

It improves the structure of soils that are high in mud or sand so roots can all the more likely develop and exploit accessible water, air, and supplements [14] Animal waste treatment is a customary agrarian practice, which may have antagonistic impacts to soil biological system. Nonetheless, the reactions of Animal wastetreatment on vegetables are less considered. Here we chose a pig cultivating town for examination with a close by town without pig cultivating as correlation. In the pig cultivating town, the ranchers utilize untreated pig excrement and wastewater as composts for vegetable development. In the reference town, the ranchers fundamentally utilize business natural manures. The target of this investigation is to evaluate the effects of untreated pig squander preparation on the two soils and vegetables regarding anti-infection agents, anti-infection opposition qualities (ARGs) and bacterial microbial networks [15].

5. Conclusion

From this research it was concluded that the chicken manure was best for vegetative growth of radish as well as root growth and FYM and leaf compost results for yield was almost same and highest under the agro-climatic conditions of district Bhimber, Azad Kashmir. Pakistan.

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