

BIBLIOGRAPHY

BAUTISTA, FERNANDO B. MAY 2013. Yield of Broccoli Variety ‘Lucky Miracle’ Applied with Different Concentrations of Vermicompost Tea. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

This study was conducted under greenhouse condition of Balili, La Trinidad, Benguet from November 2012 to April 2013 to evaluate the yield of broccoli as affected by different concentrations of vermicompost tea and identify the best concentrations of vermicompost tea in broccoli production.

Results revealed that broccoli applied with 2.0 liters of vermicompost tea was the earliest to produce curd, had the highest curd diameter, produced the heaviest marketable yield and average curd weight, had the highest percentage of harvested plants and highest net income that resulted in the highest return on cash expenses. It was also recorded that in organic production of broccoli, Php 59.00 was spent to produce one kilogram of curd.



RESULTS AND DISCUSSION

Initial Curd Appearance

Initial curd appearance was first observed on Broccoli applied with 2.0 liters of vermicompost tea followed by Broccoli with no vermicompost tea application, 0.5 and 1.0 liters have identical days to initial curd appearance while the plants applied with 1.5 liters had the longest duration, but the 54 to 59 days did not differ significantly (Table 1).

First and Last Curd Harvest

Table 1 shows no significant differences observed on broccoli applied with the different concentrations of vermicompost tea. However, broccoli applied with 2.0 and 1.5 liters of vermicompost tea was the first to be harvested.

Table 1. Number of days from transplanting to initial curd appearance, first curd harvest, last curd harvest of broccoli applied with different concentrations of vermicompost tea

TREATMENT	DAYS FROM TRANSPLANTING		
	INITIAL CURD APPEARANCE	FIRST CURD HARVEST	LAST CURD HARVEST
2.0 liters vermicompost tea	54 ^a	67 ^a	88 ^a
1.5 liters vermicompost tea	59 ^a	67 ^a	89 ^a
1.0 liters vermicompost tea	56 ^a	68 ^a	86 ^a
0.5 liters vermicompost tea	56 ^a	69 ^a	88 ^a
No vermicompost tea (Control)	55 ^a	69 ^a	87 ^a

Means in a column with the same letter are not significantly different at 5% by DMRT.



Final Height at Harvest

The final height of broccoli was measured from the base of the main stem to the top of the curd before harvest as shown in Figure 4. Table 2 shows the height of the broccoli applied with different concentrations of vermicompost tea at maturity. Statistically, there were no significant differences in height among the broccoli studied. The similar height among the plants may be due to the high nutrient contents in the soil as shown by the soil analysis before land preparation and after harvesting in Table 3. The area converted to organic in 2007 had been continuously applied with organic matter which cannot already show differences in growth and yield.

Table 2. Final height at harvest of broccoli applied with different concentrations of vermicompost tea

TREATMENT	FINAL HEIGHT AT HARVEST
2.0 liters vermicompost tea	34.47 ^a
1.5 liters vermicompost tea	34.03 ^a
1.0 liters vermicompost tea	33.50 ^a
0.5 liters vermicompost tea	33.30 ^a
No vermicompost tea (Control)	33.17 ^a

Means in a column with the same letter are not significantly different at 5% by DMRT.





Figure 4. Final height of broccoli measured before harvest

Soil Analysis

The slight differences in the final height of the broccoli applied with different vermicompost tea may be due to the presence of nutrient elements in the soils enough to support the plants as shown in the soil samples analysis (Table 3). The area utilized in the study had been continuously applied with compost since 2003 and then converted to organic farming practices in 2008 which might explain the slight differences in final height among the broccoli applied with different vermicompost tea. Fig. 3 shows the crop stand from the different vermicompost tea applied with similar final height.

Table 3. Soil analysis results from the Department of Agriculture Soil Laboratory in Baguio City

SOILS ANALYSIS	PH	OM %	P (ppm)	K (ppm)
Before Planting	6.03	6	172	1180
After Planting	6.43	2.5	185	928
2.0 liters vermicompost tea	7.28	3.75	180	836
1.5 liters vermicompost tea	6.44	5	181	1100
1.0 liters vermicompost tea	4.99	5	177	950
0.5 liters vermicompost tea	6.08	3.75	175	836



Curd Diameter and Average Weight of Curd

As presented in Table 4, there was a corresponding increase in curd diameter as the concentration of vermicompost was increased. However, the differences observed were not significant. Similarly, the average weight of curd increased as the vermicompost tea was increased but the differences among the treatments were not significant.

Table 4. Curd diameter (cm) and average weight (g) of curd of broccoli applied with different concentrations of vermicompost tea

TREATMENT	CURD DIAMETER	AVERAGE WEIGHT OF CURD
2.0 liters vermicompost tea	17.70 ^a	228.38 ^a
1.5 liters vermicompost tea	17.44 ^a	226.99 ^a
1.0 liters vermicompost tea	17.13 ^a	225.26 ^a
0.5 liters vermicompost tea	16.70 ^a	200.61 ^a
No vermicompost tea (Control)	16.36 ^a	182.52 ^a

Means in a column with the same letter are not significantly different at 5% by DMRT.





Figure 5. Curd diameter measured after harvested



Figure 6. Mushroom cut type of harvesting broccoli

Percentage of Harvested Plants

There were no significant differences on the percentage of plants that produce curds which were harvested as presented in Table 5. The percentages of plants with harvested curds did not attain 100%. Some of the transplanted seedlings did not survive up to curd formation. There was club root infestation and the shoots of the transplanted seedlings were eaten by larvae of diamond back moth.

Weight of Marketable and Non-Marketable Curds

Table 6 shows the weight of marketable curds which did not differ significantly. However, similar to the curd diameter and average weight of curds, the trend was increasing as the concentration of vermicompost tea applied was increased.

On the other hand, the weight of non-marketable curds were slightly different among the treatments as shown in Table 6. Lagman (2003) reported that organic matter content of vermicompost supplies the nitrogen required for plant growth. It serves as an energy source for microfloral and microfaunal organisms. The worm produces pounds of nitrogen during the growing period. Likewise, De La Cruz (2009), mentioned that slow release of nutrients from organic fertilizers minimize nutrient losses resulting to efficient uptake by the crops that leads to higher yield. Aside from its nutrient supplying capacity, vermicompost has excellent structure, aeration, and high water holding capacity. These conditions of the soil are favourable for crop growth and development.



Table 5. Percentage of broccoli head harvested

TREATMENT	HARVESTED PLANTS
2.0 liters vermicompost tea	71.44 ^a
1.5 liters vermicompost tea	64.31 ^a
1.0 liters vermicompost tea	64.29 ^a
0.5 liters vermicompost tea	63.12 ^a
No vermicompost tea (Control)	62.95 ^a

Means in a column with the same letter are not significantly different at 5% by DMRT.

Table 6. Weight of marketable and non-marketable broccoli head

TREATMENT	MARKETABLE (kg)	NON- MARKETABLE (g)
2.0 liters vermicompost tea	4536.67 ^a	450.00 ^a
1.5 liters vermicompost tea	4370.00 ^a	566.67 ^a
1.0 liters vermicompost tea	4463.33 ^a	333.33 ^a
0.5 liters vermicompost tea	4045.00 ^a	566.67 ^a
No vermicompost tea (Control)	3625.00 ^a	683.00 ^a

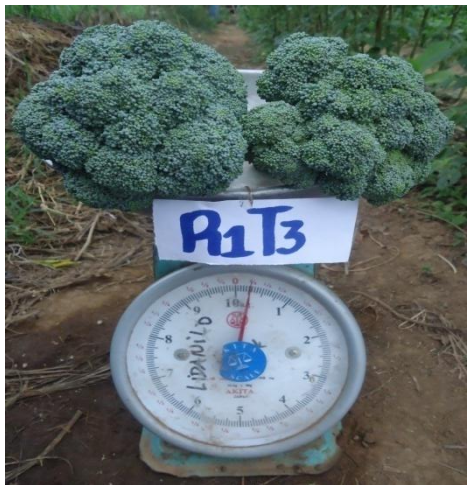
Means in a column with the same letter are not significantly different at 5% by DMRT.





Treatment 1

Treatment 2



Treatment 3

Treatment 4



Figure 7. Curd samples harvested from the different treatments of vermicompost tea concentrations

Cost and Return Analysis

Table 7 shows that the application of 2.0 liters of vermicompost tea + 14 liters of water followed by 1.0 liter vermicompost tea + 14.5 liters water, plants with no vermicompost tea application and the 0.5 liter vermicompost tea + 15.5 liters water. This result did not established a trend which is expected where in the net income decreases as the concentration decreased.

Based on the weight of curd harvested and the total expenses, the production cost was Php 59.63. This means that Php 59.63 was spent to produce 1.0 kilogram of broccoli.

Table 7. Cost and return analysis of broccoli applied with different concentrations of vermicompost tea

ITEMS	VERMICOMPOST TEA CONCENTRATION (LITER)				
	2.0	1.5	1.0	0.5	0
A.MARKETABLE YIELD (kg)	13.610	13.110	13.390	12.135	10.875
B. SALES	1361.00	1311.00	1339.00	1213.50	1087.50
C. EXPENSES(Php)					
1. Seeds	27.50	27.50	27.50	27.50	27.50
2. Muscovado	83.75	83.75	83.75	83.75	-
3. Vermicompost	12.25	12.25	12.25	12.25	-
4. Labor	270.00	270.00	270.00	270.00	270.00
5. Irrigation	220.32	220.32	220.32	220.32	220.32
6. Depreciation cost	153.06	153.06	153.06	153.06	153.06
7. Packaging materials	5.44	5.24	5.35	4.85	4.35
TOTAL EXPENSES	772.32	772.12	772.23	771.73	675.23
NET INCOME	588.68	538.88	566.77	441.77	412.27
ROCE(%)	76.20	69.79	73.39	57.24	61.05
Rank	1	3	2	5	4

Note: The selling price of broccoli during harvest was Php 100.00 per kilo.

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at Benguet State University, La Trinidad, Benguet from November 2012 to May 2013 to evaluate the growth and yield of broccoli ‘Lucky Miracle’ applied with different concentrations of vermicompost tea, identify the best concentration of vermicompost tea that will produce the highest yield and to determine the profitability of using vermicompost tea in broccoli production.

Results of the study showed that broccoli applied with 2.0 liters of vermicompost



Tea + 14 liters water produced the heavier yield, taller plants, and application of bigger curds compared to plants that were not applied with vermicompost tea. In profitability, higher concentrations from 1.0 to 2.0 liters of vermicompost tea obtained the higher net incomes than application of 0.5 liter vermicompost tea and the plants without vermicompost tea application.

Results shown, that to produce 1.0 kg of broccoli curd, Php 59.63 was spent.

Conclusion

Based from the results presented and discussed, application of 2.0 liters vermicompost tea + 14 liters water enhanced better yield and higher net income in broccoli production.

Recommendation

It is therefore recommended that 2.0 liters of vermicompost tea diluted in 14 liters of water should be used in organic production of broccoli to obtain higher yield and income. It is also recommended that these findings should be verified because of missing hills from the third replication.



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