

Short Communication

Natural Growth of Plant by Bio-Organic Input

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Abstract: Fertilisers are usually added on plants to improve the plants growth and production. Oriental Herbal Nutrients (OHN) is a fluid form of fertilisers which consists of the leftover agricultural and wet market wastes and also microbes. OHN was fermented and added to the plants when it was ready to use after one week. The experiment was done to produce organic fertiliser from wet market waste for better soil fertility and also to increase the growth of spinach plants by using different concentrations of OHN. In this experiment, two different concentrations of OHN were made which were 10%, 20% and control. The efficiency of the experiment was determined by the measurement of the plants' height, the number of leaves and the spinach length. At the end of the experiment, OHN with a concentration of 20% had shown excellent results of 21.7 cm plants' height, 23 leaves, and 7.3 cm length of spinach. The study had shown that the OHN with the concentration of 20% was able to enhance the growth of the spinach. In conclusion, the implementation of OHN in plants had been proven to enhance the plants' growth while being able to reduce the amount of market wastes and also sustain the fertility of the soil which is also known as organic fertiliser.

Keywords: Oriental Herbal Nutrients; wet market waste

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1. Introduction

Oriental Herbal Nutrient (OHN) can be used by applying directly to soil and plants. OHN is produced by the fermentation of herbs such as herbals leaves, flowers and plant stems or other types of herbs that contain NPK. It contains micronutrients and plant growth hormones that encourage the growth of beneficial microorganisms. The common materials that are used are fresh ginger root (*Zingiber officinale*), turmeric root (*Curcuma longa*), garlic cloves (*Allium sativum*), the bark of *Angelica acutiloba*, licorice root (*Glycyrrhiza uralensis*) and cinnamon bark (*Cinnamomum sp.*) (Chang *et al.* 2014). OHN is a fermented extract of herbs that uses natural farming to provide plants and soil microorganisms with the use of micro-nutrients (Chang *et al.* 2014). OHN is made of herbs that function to increase plant robustness, to sterile

and keep plants warm. OHN heals crops and increases growth production. It is made from oriental herbs such as mint leaf, parsley and turmeric that are fermented to maintain the rapid growth of crops. This has a lot of potential towards self-sustainable agriculture. Molasses plays the main role in making OHN. Meanwhile, the use of refined white sugar should be avoided because refined white sugar will lower the quality of OHN. Crude sugar is best for OHN fermentation or other types of sugar also can be used such as molasses, or other types of sugar are also used depending on price and availability. The best time for fermentation is in between four to seven days. This study is important to promote plant growth and plant production by improving the plant efficiencies to capture nutrients, water and improve the plant systemic endurance against abiotic, biotic pressure and pathogen.

2. Materials and Methods

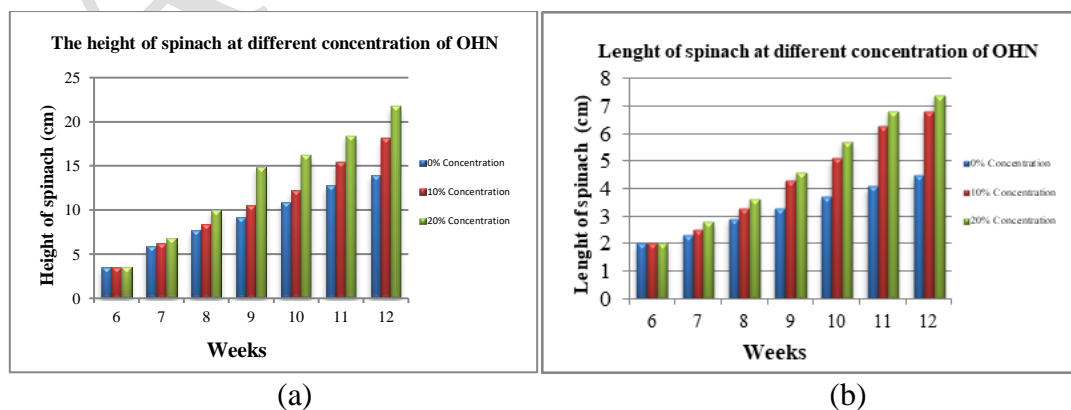
The polybags were arranged in three rows representing three different concentrations. There are 10 polybags in each row. The first row of spinach was for control. Moreover, the second row of spinach was sprayed with a concentration of 10% OHN. Then, the third row of spinach was sprayed with a concentration of 20% OHN. The spinach (*Spinacia oleracea*) was sprayed with OHN two weeks after spinach cultivation.

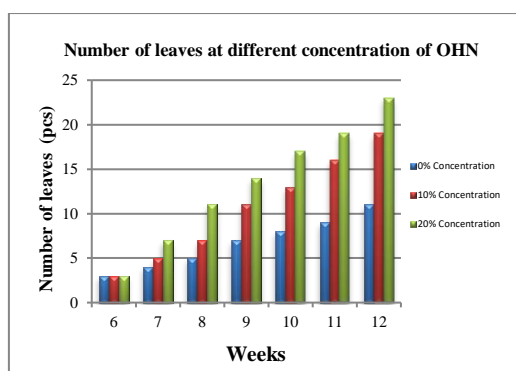
Method of Making OHN

- i. The materials and equipment needed to make OHN were prepared.
- ii. Crush or chop the peppermint, parsley and turmeric.
- iii. Weight one kg peppermint, one kg parsley and one kg turmeric.
- iv. Mix the peppermint, parsley and turmeric, and then put them in a plastic container. Next, add one kg molasses and one liter of coconut wine.
- v. After that keep the plastic container closed. After a week, the OHN is ready to use.

3. Results

The growth data of the spinach plants sprayed using different concentrations of OHN were collected in terms of the height of plant, the length of leaf size and the number of leaves to optimise the growth of spinach (*Spinacia oleracea*) plant. .





(c)

Figure 1. (a) The height of spinach at different concentrations of OHN for seven weeks. (b) The number of spinach leaves by using different concentrations of OHN for seven weeks. (c) The length of spinach using different concentrations of OHN for seven weeks.

Table 1. Data on the growth of spinach

Weeks	The height of the plant. (cm)	The length of the leaf size. (cm)	The number of the leaves. (pcs)	Controlled
Week 6	4	3	2	-
Week 7	6	5	3	-
Week 8	10	9	4	-
Week 9	15	13	5	-
Week 10	17	14	6	-
Week 11	19	16	7	-
Week 12	22	19	7	-

4. Discussion

Height of Spinach Plants. Based on this graph, the result showed the height of spinach plants after seven weeks after the initial spraying with different concentrations of OHN. The green colour bar chart represents 20% of OHN, red represents 10% of OHN and blue represents 0% concentration of OHN. The height of the spinach plants of those without OHN or 0% concentration of OHN was the lowest, indicating slower growth rate. At the same time, the height of spinach sprayed using 10% of OHN was seen to have increased significantly. Meanwhile, the height of the spinach plants that were sprayed with 20% of OHN increased exponentially as compared to the others. Hence, the use of 20% of OHN for spraying was seen to be the most effective in increasing, the height of spinach plants.

Number of Spinach Leaves. Based on this graph, the result showed the number of spinach leaves grown in the plants seven weeks after the initial spraying using different concentrations of OHN. The number of spinach leaves counted from the plants that were sprayed using 0% of OHN was lower than 10% and 20% of OHN. At the same time, the number of spinach leaves counted on plants using 10% of OHN showed better result than 0% of OHN while, the number of spinach leaves for 20% of OHN were shown to have increased exponentially. Based on the results, 20% of OHN was demonstrated to be the most effective in increasing the number of spinach leaves on the spinach plants.

Length of Spinach Leaves. Based on this graph, the result showed the length of spinach leaves seven weeks after the initial spraying of OHN in different concentrations. . The length of the spinach leaves were seen to have increased slowly for plants that were sprayed with 0% of OHN. Next, the length of spinach leaves on plants sprayed with 10% of OHN increased significantly while the length of spinach leaves of the plants that were sprayed using 20% of OHN increased exponentially when compared to the other two categories. Thus, it was seen that the spraying of the spinach plants with 20% of OHN was the most effective on increasing the length of spinach leaves.

5. Conclusions

In conclusion, the results proved that organic fertiliser in combination with market waste were able to complement each other for spinach growth. Survey results also found that number of leaves, length of spinach leaves and height of spinach plant showed positive changes after being fertilised with OHN.. This study has achieved the objective to generate organic fertiliser from market waste for better soil fertility and increase the growth of spinach plants by using different concentrations of OHN.

Conflicts of Interest: The authors declare no conflict of interest.

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