

**PROJECT TITLE** : **GROWTH AND YIELD OF PECHAY AS INFLUENCED BY FULL ON LIQUID FERTILIZER (FOLF)**

**FUNDING AGENCY** : **JJAA AGRICULTURAL PRODUCTS TRADING**

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**PROPOSED LOCATION** : **APOKON, TAGUM CITY, DAVAO DEL NORTE**

**DURATION** : **2 MONTHS**

### **ABSTRACT**

This study aimed to verify the use of this FULL ON LIQUID FERTILIZER (FOLF) for vegetable crops such as pechay. This was conducted for two months duration from January to February 2021 at Apokon, Tagum, Davao del Norte. The experiment was carried out in Randomized Complete Block Design (RCBD) composed of six treatments replicated three times. The treatments were:  $T_1$  = control;  $T_2$  = RR of inorganic NPK fertilizer based on soil analysis;  $T_3$  = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF);  $T_4$  = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF);  $T_5$  = rr of FULL ON LIQUID FERTILIZER (FOLF); and  $T_6$  = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF). Data on growth and yield components were gathered and analyzed using Analysis of Variance (ANOVA) and differences between treatments were compared using Honest Significant Difference (HSD) Test.

Results showed that the growth and yield of pechay were significantly affected by Full On Liquid Fertilizer (FOLF) in terms of plant height, fresh weight, dry weight and yields of pechay but not leaf length and width, number of leaves and root length. This study indicated that  $T_6$  = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) and  $T_4$  = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) increased the plant height of pechay up to 29% compared to control at 30DAT. It was further confirmed that  $T_4$  = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) had the highest pechay fresh weight up to 13% higher, dry weight up to 3 times higher and yields up to 4 times higher than the control at 30DAT. It was comparable to the rest of the treatments except for the control. This implies that application of FOLF can reduce the recommended NPK fertilizer application into half to achieve higher weight and yields of pechay.

## INTRODUCTION

FULL ON™ is a new Proprietary Nano Ionic Biostimulant that sets new levels of nutrient uptake and conversion to new cell divisions and overall plant growth. There were consistent reports from commercial customers around the country about reducing cycle times by 7 to 10 days or more, regardless of plant genetics, nutrients or growing methods/environments, while helping plants to achieve their full genetic expression. It can reduce some synthetic NPK Requirements by up to ~50%, lowering growing costs and reducing the environmental impact of fertilizer. With increased yields, flush cycles reduced from weeks to days. Full On uses nanoscale technology (particles less than 50 nanometers in size) which fills in the missing links and provides all necessary building blocks of plant life, and the energy for the necessary conversions and exchanges to occur. It is like a super effective transporter moving nutrients into the plant, very efficiently because of the minuscule nano, size (quantum angstrom) allows it to enter into plant cells with ease. As a result, increased photosynthesis occurs that improves cellulose, sugars/brix, starches, waxes, carbohydrates, oils and proteins; the building blocks of plant growth and health, and increases the plant's natural ability to complete growth cycles sooner (<https://growswitch.com/organic-plant-nutrients/>). It is formulated with 0.4-0.1-0.7 containing 20% humic acid derived from Leonardite. Previous study reported increased yield in pechay using FOLF (Eroy 2019). The yield was significantly improved by the mere application of Full On Liquid Fertilizer at its recommended dose (T5) resulting to 86.11% additional yield. However, this yield level was further increased when 50% (T4) or full dose of the reference fertilizer (T6) was added.

Various fertilization techniques and foliar supplements have been done to maximize the growth and establishment of various crops (Bilog 2006; Eroy 2019; Andigan and Fernandez 2017; Fernandez and Sabay 2016; Fernandez and Caballes 2016; Fernandez and Matuguinas 2016, Fernandez and Quilab-Tud 2016; Fernandez and Miñoza 2015; Fernandez and Lumbo 2015; Magbalot-Fernandez and Montifalcon 2019; Montifalcon and Fernandez 2017; Rayon 2003).

This study was therefore conducted to verify the use of this FULL ON LIQUID FERTILIZER (FOLF) for vegetable crops such as pechay.

### **Objectives:**

1. To generate bioefficacy data of the FULL ON LIQUID FERTILIZER (FOLF) for FPA registration;
2. To test the efficacy of the FULL ON LIQUID FERTILIZER (FOLF) in increasing the yield of pechay; and
3. To determine the best treatment combination that will increase the yield of pechay.

## METHODOLOGY

### Site and Duration

To evaluate the efficacy of the FULL ON LIQUID FERTILIZER (FOLF) application on the yield of pechay, field experiment was conducted for two months duration from January to February 2021 at Apokon, Tagum, Davao del Norte. The area was situated in a flat topography with nutrient-deficient soil.

### Climatic Condition

Meteorological data of the area was taken from the nearest Agromet station within the duration of the study. Weather condition was rainy most of the days and were favourable for the growth of plants.

### Experimental Design and Layout

The experiment was carried out in Randomized Complete Block Design (RCBD). Field experiment was composed of six treatments replicated three times. There were 32 more pechay plants in a 30 x 30 cm planting distance with a plot size of 10m<sup>2</sup> per replication for a total area of 180 m<sup>2</sup> with a total of 576 more pechay plants. Each plot was provided with 0.5m alleyway.

### Soil Analysis

Soil analysis was done to determine the nutrient requirement of the area for pechay. before the conduct of the experiment, soil samples were collected at random in the area following the standard procedure of the DA Regional Soil Laboratory, Davao City and analyzed for nutrient requirement. The result of Soil analysis is shown in Appendix A.

### Treatments

The recommended rate of fertilizer was applied based on the recommendation of soil analysis. Inorganic fertilizers such as urea, MOP, ammonium sulfate and ammonium phosphate were purchased based on the recommendation and the FULL ON LIQUID FERTILIZER (FOLF) were applied based on the following treatments:

T<sub>1</sub> = control

T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis

T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)

T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)

T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)

T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)

The recommended rate of full on liquid fertilizer will be applied every week (7-10 days) as foliar one week after transplanting up to one week before harvest at 4ml per gallon water

### Cultural Management

**Sowing.** Seeds were sown in a prepared seed box with ordinary garden soil.

**Land preparation.** The field was cultivated manually using hoes and implements.

**Transplanting and Thinning.** Two to three seedlings were transplanted per hill, one-two weeks after planting from the seed box. One seedling per hill was maintained one week after transplanting.

**Weeding.** Manual weeding was done weekly whenever necessary.

**Watering.** The plants were watered daily whenever necessary using sprinkler.

**Pesticide application.** Insecticide and fungicide were applied whenever necessary at recommended dosage and interval. Rotation use of pesticides were done to avoid the development of resistance to pest and diseases.

**Fertilizer Application.** The different fertilizer treatments were applied based on soil analysis and manufacturer's recommendation.

**Harvesting.** Pechay was harvested at maturity, 30 days from transplanting.

## DATA GATHERED

### Growth Parameters

The pechay plant height, number of leaves, leaf length & width at 15 and 30 days after transplanting were taken. Also fresh weight, dry weight and root length of pechay were taken at harvest to support the yield data.

### Marketable Yield (tons/ha)

All marketable plant parts per plot were weighed and converted to tons/ha using the formula:

$$\text{Yield (tons/ha)} = \frac{\text{plot yield (kg)}}{\text{area (sq.m.)}} \times \frac{10,000}{1,000}$$

### Statistical Analysis

Data were analyzed using Analysis of Variance (ANOVA) and differences between treatments were compared using Honest Significant Difference (HSD) Test.

## RESULTS AND DISCUSSION

### Plant Height (cm)

As shown in Table 1 and Figure 1, the plant height was significantly affected by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT). Results showed that  $T_6 = \text{RR of inorganic NPK} + \text{rr of FULL ON LIQUID FERTILIZER (FOLF)}$  and  $T_4 = 0.5 \text{ RR of inorganic NPK} + \text{rr of FULL ON LIQUID FERTILIZER (FOLF)}$  increased the plant height of pechay up to 29% compared to control at 30DAT. It is comparable to  $T_2 = \text{RR of inorganic NPK fertilizer based on soil analysis}$ ,  $T_3 = 0.5 \text{ rr of FULL ON LIQUID FERTILIZER (FOLF)}$  and  $T_5 = \text{rr of FULL ON LIQUID FERTILIZER (FOLF)}$ . This indicates that application of both or each recommended NPK fertilizer and FOLF increased the plant height of pechay.

Also in previous studies, various foliar supplements have been studied to maximize the growth and establishment of various crops (Bilog 2006; Eroy 2019; Andigan and Fernandez 2017; Fernandez and Sabay 2016; Fernandez and Caballes 2016; Fernandez and Matuguinas 2016, Fernandez and Quilab-Tud 2016; Fernandez and Miñoza 2015; Fernandez and Lumbo 2015; Fernandez and Tipay 2013; Magbalot-Fernandez and Montifalcon 2019; Montifalcon and Fernandez 2017; Rayon 2003).

Table 1. Plant height (cm) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT).

Treatments	15 DAT *	30 DAT**
$T_1 = \text{control}$	5.3 ab	14.7 b
$T_2 = \text{RR of inorganic NPK fertilizer based on soil analysis}$	4.3 b	18.3 a
$T_3 = 0.5 \text{ rr of FULL ON LIQUID FERTILIZER (FOLF)}$	5.3 ab	16.7 ab
$T_4 = 0.5 \text{ RR of inorganic NPK} + \text{rr of FULL ON LIQUID FERTILIZER (FOLF)}$	6 a	18.7 a
$T_5 = \text{rr of FULL ON LIQUID FERTILIZER (FOLF)}$	5.6 ab	16.3 ab
$T_6 = \text{RR of inorganic NPK} + \text{rr of FULL ON LIQUID FERTILIZER (FOLF)}$	5.3 ab	19.0 a
CV (%)	10.27	6.40

\* - significant

\*\* - highly significant

Means with the same letter are not significantly different at 5% and 1% level of probability using HSD.



Figure 1. Growth of Pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting.  $T_1$  = control;  $T_2$  = RR of inorganic NPK fertilizer based on soil analysis;  $T_3$  = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF);  $T_4$  = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF);  $T_5$  = rr of FULL ON LIQUID FERTILIZER (FOLF); and  $T_6$  = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF).

#### Number of leaves

The number of pechay leaves was not significantly affected by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT) as shown in Table 2. The effect of various fertilizers on the number of pechay leaves were the same which ranged from 3.3-4.0 at 15DAT and 5.6-7.7 at 30 DAT.

Table 2. Number of pechay leaves as influenced by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT).

Treatments	15 DAT <sup>ns</sup>	30 DAT <sup>ns</sup>
T <sub>1</sub> = control	3.3	5.6
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	3.3	7
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	3.6	6.7
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	4.0	7.3
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	4.0	6.7
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	3.7	7.7
CV (%)	16.51	16.69

ns - not significant

#### Leaf length (cm)

As indicated in Table 4, the pechay leaf length was not significantly affected by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT). This shows that all fertilizer treatments have the same pechay leaf length which ranged from 5.0-6.3cm at 15DAT and 9.6-12.0cm at 30 DAT.

Table 3. Leaf Length (cm) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT).

Treatments	15 DAT <sup>ns</sup>	30 DAT <sup>ns</sup>
T <sub>1</sub> = control	5.0	9.6
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	5.3	10.6
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	5.3	10.3
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	6.3	12.0
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	5.6	9.6
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	5.3	11.6
CV (%)	14.47	11.98

ns - not significant

### Leaf width (cm)

The pechay leaf width was also not significantly affected by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT). Table 4 shows that regardless of fertilizer treatments, the pechay leaf width did not change which ranged from 3.0-3.7cm at 15DAT and 6.0-8.0cm at 30 DAT.

Table 4. Leaf width (cm) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 15 and 30 days after transplanting (DAT).

Treatments	15 DAT <sup>ns</sup>	30 DAT <sup>ns</sup>
T <sub>1</sub> = control	3.0	6.0
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	3.3	7.7
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	3.3	7.0
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	3.6	8.0
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	3.0	6.0
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	3.7	8.0
CV (%)	18.17	15.76

ns - not significant

### Root Length (cm)

The root length of pechay as shown in Table 5 was not significantly affected by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting (DAT). This implies that the root length of pechay in all treatments were the same which ranged from 9.0-11.7cm at 30 DAT.

Table 5. Root length (cm) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting (DAT).

Treatments	Root length (cm) <sup>ns</sup>
T <sub>1</sub> = control	9.0
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	11.7
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	9.0



Treatments	Root length (cm) <sup>ns</sup>
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	10.3
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	9.3
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	10.0
CV (%)	25.58

ns - not significant

#### Fresh Weight (g)

There was a significant difference among treatments in terms of fresh weight (g) as shown in Table 6 and Figure 2. Results showed that T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) had the highest the pechay fresh weight up to 13% higher compared to control at 30DAT. The same result was also observed to T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis, T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF). This implies that application of FOLF can reduce the recommended NPK fertilizer application into half to achieve higher weight of pechay.

Table 6. Fresh weight (g) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting (DAT).

Treatments	Fresh Weight (g) *
T <sub>1</sub> = control	25.3 b
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	55.7 ab
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	38.0 ab
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	63.0 a
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	47.3 ab
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	55.0 ab
CV (%)	35.01

\* - significant

Means with the same letter are not significantly different at 5% level of probability using HSD.

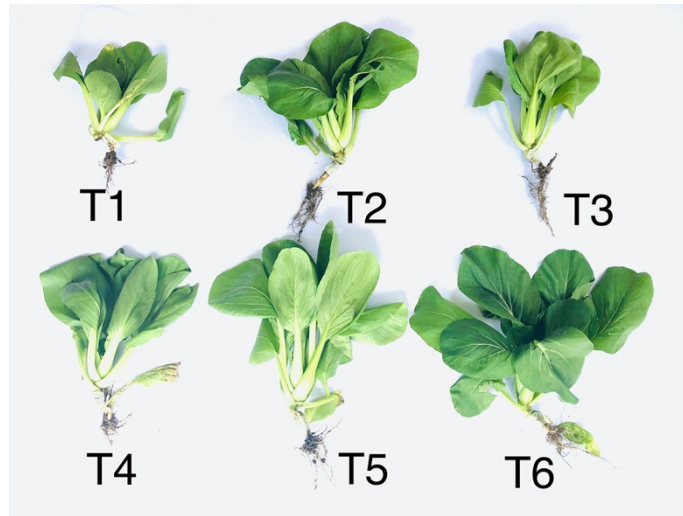


Figure 2. Fresh harvested Pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting. T<sub>1</sub> = control; T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis; T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF); T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF); T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF); and T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF).

#### Dry Weight (g)

Table 7 and Figure 3 indicate a significant difference among treatments in the dry weight (g) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting. Results verified that T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) had the highest the pechay dry weight up to 3 times higher than the control at 30DAT. It was statistically the same to T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis, T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF). This further verify that application of FOLF and half of the recommended NPK fertilizer application obtained higher weight of pechay.

Table 7. Dry weight (g) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting (DAT).

Treatments	Dry Weight (g) *
T <sub>1</sub> = control	3.3 b
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	7.0 ab
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	6.0ab
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	9.0 a
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	8.0 ab

Treatments	Dry Weight (g) *
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	8.3 ab
CV (%)	26.77

\* - significant

Means with the same letter are not significantly different at 5% level of probability using HSD.

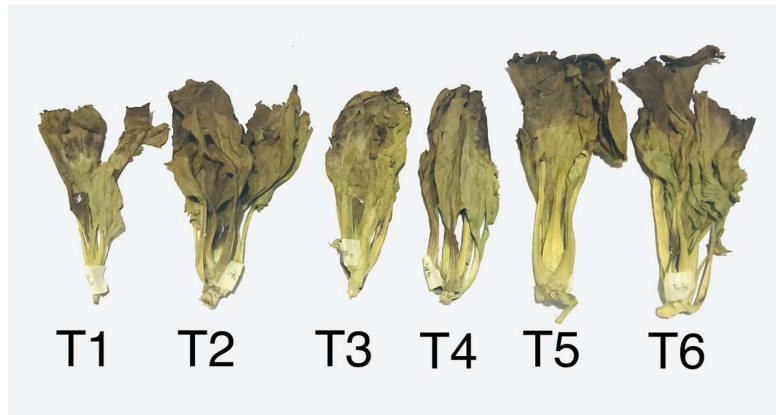


Figure 3. Dried Pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting. T<sub>1</sub> = control; T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis; T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF); T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF); T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF); and T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF).

#### Yield (tons/ha)

As shown in Table 8, there were significant differences in the yield (tons/ha) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting. Results confirmed that T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) increased the pechay yields up to 4 times higher than the control at 30DAT. It was statistically comparable to T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis, T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF). This further confirmed that application of FOLF will reduce the recommended NPK fertilizer application by half to obtain greater yields of pechay.

This study verified that the yield of pechay increased using FOLF (Eroy 2019). The yield was significantly improved by the mere application of Full On Liquid Fertilizer at its recommended dose (T<sub>5</sub>) resulting to 86.11% additional yield. However, this yield level was further increased when 50% (T<sub>4</sub>) or full dose of the reference fertilizer (T<sub>6</sub>) was added.

Table 8. Yield (tons/ha) of pechay as influenced by Full On Liquid Fertilizer (FOLF) at 30 days after transplanting (DAT).

Treatments	Yield (tons/ha) *
T <sub>1</sub> = control	17.3 b
T <sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis	61.7 ab
T <sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF)	42.3 ab
T <sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	70 a
T <sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF)	52.7 ab
T <sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF)	61.0 ab
CV (%)	34.72

\* - significant

Means with the same letter are not significantly different at 5% level of probability using HSD.

### CONCLUSION

Based on the result of the study, the growth and yield of pechay were significantly affected by Full On Liquid Fertilizer (FOLF) in terms of plant height, fresh weight, dry weight and yields of pechay. However, the leaf length and width, number of leaves and root length did not have significant differences among treatments.

Results showed that T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) increased the plant height of pechay up to 29% compared to control at 30DAT. While T<sub>4</sub> = 0.5 RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF) had the highest the pechay fresh weight up to 13% higher, dry weight up to 3 times higher and yields up to 4 times higher than the control at 30DAT. The same result was also observed to T<sub>2</sub> = RR of inorganic NPK fertilizer based on soil analysis, T<sub>3</sub> = 0.5 rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>5</sub> = rr of FULL ON LIQUID FERTILIZER (FOLF) and T<sub>6</sub> = RR of inorganic NPK + rr of FULL ON LIQUID FERTILIZER (FOLF). This implies that application of FOLF can reduce the recommended NPK fertilizer application into half to achieve higher weight and yields of pechay.

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## REFERENCES

BILOG, G.N. (2006). Growth Performance of Tissue Cultured (Lakatan Banana) as affected by Different Levels of Fermented Plant Juice (FPJ) using Banana Buds. Unpublished Undergraduate Thesis. University of Southeastern Philippines, Mabini Campus.

Eroy, M.N. (2019). EFFICACY OF FULL ON LIQUID FERTILIZER (FOLF) ON THE YIELD OF PECHAY (*Brassica napus* L. var. Black Behi). FPA EUP trial.

Fernandez, A.M. and Andigan, A.M. (2017). Stimulate Hormones for Higher Yield of Pechay (*Brassica pekinensis*). Lambert Academic Publishing. Saarbrucken, Germany. ISBN 978-3-330-05054-9. <https://www.lap-publishing.com/catalog/details//store/gb/book/978-3-330-05054-9/stimulate-hormones-for-higher-yield-of-pechay-brassica-pekinensis>

Fernandez, A.M. and Sabay, J.L. (2016). Growth of tissue-cultured abaca hybrid (*Musa textiles* var. 'seven') plantlets using bioforge supplement. Imperial Journal of Interdisciplinary Research. Vol. 2, Issue 8. ISSN 2454-1362, <http://www.onlinejournal.in/IJIRV218/040.pdf>

Fernandez, A.M. and Caballes, J. (2016). Stimulants for tissue-cultured 'Lakatan' banana (*M. paradisiaca*) plantlets. Fastpencil publication, USA. <http://fp.fastpencil.com> ISBN 978-1-49-990174-0. <https://www.amazon.com/STIMULANTS-TISSUE-CULTURED-LAKATAN-paradisiaca-PLANTLET/dp/1976243882>

Fernandez, A.M. and Matuguinas, J.P. (2016). Enhanced growth in 'Lakatan' Banana plantlet with bioforge stimulant. Lambert Academic Publishing. Saarbrucken, Germany. ISBN 978-3-659-82627-6. <https://www.lap-publishing.com/catalog/details//store/tr/book/978-3-659-82627-6/enhanced-growth-in-lakatan-banana-plantlet-with-bioforge-stimulant>

Fernandez, A.M. and Quilab-Tud, A.F. (2016). Optimum Growth In Tissue-Cultured 'Cardava' (*Musa balbisiana*) Banana Plantlets Using Stimulate. CreateSpace Independent Publishing Platform. ISBN-10: 1549738518, ISBN-13: 978-1549738517. <https://www.amazon.com/OPTIMUM-TISSUE-CULTURED-balbisiana-PLANTLETS-STIMULATE/dp/1549738518>

Fernandez, A.M. and Miñoza, E. (2015). Growth and Yield of Pechay (*Brassica pekinensis*) as affected by Green Herds Organic Based Foliar Fertilizer. Special Issue: First International Conference on Quality Management of Organic Horticultural Produce 2015. Book of Proceedings, Horticulturae. Basel, Switzerland. ISSN 2311-7524. p. 346. <https://www.researchgate.net/publication/337549018> Growth and Yield of Pechay *Brassica pekinensis* as affected by Green Herds Organic Based Foliar Fertilizer

Fernandez, A.M. and Lumbo, K.C. (2015). Enhanced Growth Of Tissue-Cultured Abaca Hybrid (*Musa textilis* Var. 'Seven') Using Stimulate Hormones. CreateSpace Independent Publishing Platform. ISBN-10: 1976304520, ISBN-13: 978-1976304521. <https://www.amazon.com/ENHANCED-TISSUE-CULTURED-textilis-STIMULATE-HORMONES/dp/1976304520>

Fernandez, A.M. and Tipay, W.C. (2013). Potassium Foliar Fertilizers For The Flowering, Yield And Quality Of Pummelo. CreateSpace Independent Publishing Platform. ISBN-10: 1976351030, ISBN-13: 978-1976351037. <https://www.amazon.com/Potassium-Fertilizers-Flowering-Quality-Pummelo/dp/1976351030>

Fernandez, A.M. and Tipay, W.C. (2013). Fermented Banana Peel as Potassium Foliar Fertilizer in Pummelo. Southeastern Philippines Journal of Research and Development, Vol. 22, No. 2, p. 27-39, ISSN 0117-6293, Research Division, University of Southeastern Philippines, Obrero, Davao City. <https://www.researchgate.net/publication/337548703> Fermented Banana Peel as Potassium Foliar Fertilizer in Pummelo

Magbalot-Fernandez, A., & Montifalcon, L. (2019). Effects of Organic-based Fortified Foliar Fertilizer on the Growth and Yield of 'Lakatan' Banana (*Musa acuminata*). Asian Journal of Research in Crop Science,

3(4), 1-9. ISSN: 2581-7167. <https://doi.org/10.9734/ajrcs/2019/v3i430053>

Montifalcon, J.R. and Fernandez A.M. (2017). Enhanced Growth and Yield of Lowland Rice (*Oryza sativa* L.) with Greenshield Organic-based Fortified Foliar Fertilizer. Asian Journal of Soil Science and Plant Nutrition 1(1): 1-10, 2017; Article no. AJSSPN.33267. <http://www.journalajsspn.com/index.php/AJSSPN/article/view/97>

RAYON, R.E. (2003). The Growth Performance of Tissue-cultured Lakatan Plantlets as Influenced by Foliar Fertilizer. Unpublished Undergraduate Thesis. University of Southeastern Philippines, Mabini Campus.

## APPENDIX A. Soil Analysis



Republic of the Philippines  
DEPARTMENT OF AGRICULTURE  
**REGIONAL SOILS LABORATORY**  
F. Bangoy St., Agdao, Davao City  
Tel. No. 227-2925  
DA TIN No. 840-000-845-895

### SOIL TEST REPORT

Name : **ALMINDA M. FERNANDEZ** Submitted by: **A. FERNANDEZ** Ref. No. : **20-12-0833**  
 Site of Farm (Sitio/Brgy/Municipality/Province) : **APOKON, TAGUM CITY, DAVAO DEL NORTE**  
 Area Represented (has.) : **180 SQ. M.** Topography (plain/sloping/hilly) \_\_\_\_\_  
 Water Supply (Irrigated/Rainfed) : **RAINFED** Past Fertilizer Applied : \_\_\_\_\_  
 Previous Crops : \_\_\_\_\_ Date Collected: **DEC. 27, 2020**  
 Previous Yield (Cavans/ha.) : \_\_\_\_\_ Date Submitted: **DEC. 29, 2020**  
 Soil Type : **SANDY CLAY LOAM** Date Finished : **JAN. 15, 2021**  
 Crops to be fertilized : **PECHAY** Contact No. **0926 - 873 0753**

Lab. No.	Field Name	Texture	RESULT OF ANALYSIS				CROP VARIETY/ AGE	NUTRIENT REQUIREMENT			LIME REQ'T T/ha.	pH preference
			Soil Reaction	Wilde's	Olsen	H2SO4 Ext's		N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O		
			pH 1:1	OM %	P ppm	K ppm		(kgs./tree/yr.)				
20-2005		MEDIUM	7.2	1.0	25	465	Pechay	150	20	15	-	6.0 - 6.5
			<i>NW</i>	<i>L</i>	<i>M</i>	<i>A</i>						

**Fertilizer Recommendation :**

Options	Compost/ Organic Fert.	Ammophos (16-20-0)	Ammosul (21-0-0-24)	Mu. Of Potash (0-0-60)	Urea (46-0-0)	Solophos (0-18-0)
(bags per hectare per season; kilograms per hectare per season)						
Option 1 - 1st app.	20 bags	1 - 2 bags	1.75 - 3.25 bags	13 - 25 kgs	-	-
2nd application	-	-	-	-	2.25 - 4.25 bags	-
Option 2 - 1st app.	20 bags	-	2.5 - 4.75 bags	13 - 25 kgs	-	1.25 - 2.25 bags
2nd application	-	-	-	-	2.25 - 4.25 bags	-

**Legend:**

NN- near neutral      L - low      M - medium      A - adequate

**Note:** If Compost/Organic Fertilizer is available, apply the minimum amount of the recommended inorganic fertilizer.

Measurement of uncertainty is available upon request of customer.

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Result of analysis as per sample submitted by the customer. Samples will be kept only for a month from the date received.

Samples from the same lot, may produce different result.

**Placement of Fertilizer:**

PECHAY Sensitive to heavy applications of nitrogen. Apply 1/3 of the recommended nitrogen fertilizer with the potash and phosphate dressing 8-14 days before planting.  
 Topdress with the remaining fertilizer 2-5 weeks after planting.

Analyzed & Certified by:

  
**ADRIENNE MAE B. ZABATE**  
Registered Chemist  
PRC Registration No. 13241

Approved by:

  
**ENGR. ROSALINA B. SALVE**  
OIC, Regional Soils Laboratory  
PRC Registration No. 17642

**APPENDIX B. Experimental area of pechay as influenced by Full On Liquid Fertilize (FOLF) at 30 days after transplanting (DAT).**

