

BIBLIOGRAPHY

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ABSTRACT

The study was conducted to determine the growth and yield of potato (cv. Gloria) applied with different rates of Alnus compost enriched with processed chicken manure; determine the best rate of Alnus compost enriched with processed chicken manure on the growth and yield of potato (cv. Gloria); and to determine the profitability of using Alnus compost enriched with processed chicken manure on potato production.

The different rates of Alnus compost enriched with processed chicken manure applied on the potato plants showed no significant effect on plant height, plant vigor, leaf miner infestation and potato late blight infection. Significant effect was shown on the number and weight of marketable tubers. Application of 15kg of Alnus compost plus 5kg of processed chicken manure produced the highest number of marketable tubers and gave the heaviest total yield. Highest ROCE was obtained from potato plants applied with 5kg Alnus compost plus 5kg of processed chicken manure.



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INTRODUCTION

Potatoes have a potential and strong role to play in agriculture, economy and food security, especially in the poorest countries (SONAC News, 2008). In addition, FAO (2008) stated that potato is a staple food of the world's population, affirming the need to focus world attention on the role that it plays in providing food security and eradicating poverty.

In Benguet and Mountain Province it is one of the cash crops grown by the farmers (Simongo, *et al.*, 2009). The production of this crop gives farmers a higher income compare with other crops in the highlands.

Potato farming in Benguet usually involves an intensive use of chicken manure and synthetic fertilizers. Benguet potato farmers tend to use these inorganic fertilizers due to their availability and accessibility. However, the increasing cost of these fertilizers, not to mention their harmful effects to the environment, increases the demand for an alternative low cost fertilizer which is not only safe but also equally or more effective than inorganic fertilizers.

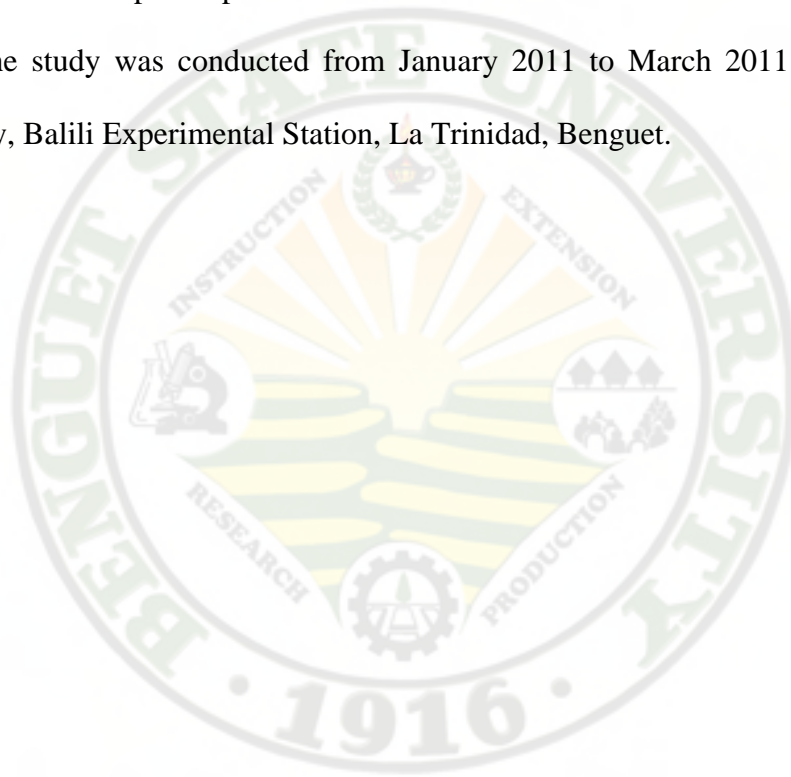
The use of Alnus compost and processed chicken manure (PCM) may serve as an alternative to synthetic fertilizers in potato production. The proper application of these fertilizers may also contribute to lower inputs of production leading to higher profit. Furthermore, Alnus compost and PCM contain quantities of nitrogen, phosphorus, potassium, and organic matter which help improve soil properties making it suitable for potato production.



The objective of the study were to:

1. determine the growth and yield of potato (cv. Gloria) applied with different rates of Alnus compost enriched with Processed Chicken Manure;
2. determine the best rate of Alnus compost enriched with Processed Chicken Manure on the growth and yield of potato (cv. Gloria); and
3. determine the profitability of using Alnus compost enriched with Processed Chicken Manure on potato production.

The study was conducted from January 2011 to March 2011 at Benguet State University, Balili Experimental Station, La Trinidad, Benguet.



REVIEW OF LITERATURE

Importance and Soil Requirement

The potato has a wide range of soil adaptation for optimum yield, deep well drained or a sandy loam soil with ph of 5.5 to 6.0 is required. A fertile soil rich in organic matter is essential for good growth. Average temperature ranges between 15 °C to 18 °C (PCARRD, 1979) but also grows best at temperature of 17 °C to 22 °C with soil of 13 °C to 18 °C (NPRTC, 1998).

In addition HARRDEC (1996) stated that the recommended for potato ranges from 17 °C to 23 °C.

Organic Fertilizer Usage in Potato

According to Ebbes (2000) found that application of 8 to 10 t/ha of alnus compost plus 140-140-140 N –P₂O₅-K₂O/ha had the highest number and weight of mean of super extra –large potato tubers with 98 and 13kg 90 and 13kg respectively . As to the result of soil chemical properties analysis, application of 6 to 8/ha Alnus compost plus 140-140-140 kg N-P₂O₅K₂O/ha promote an increase on the potassium content.

Betayan (2009) reported that increasing the rate of vermi compost to from 5-20 tons/ha had improved the growth of potato and enhanced the initial and final height of the plant.

Use of Organic Matter and Sources



Compost application replenishes soil organic matter and humus being depleted with continuous cropping. Application of compost also activates soil microorganisms consequently increasing the availability of nutrients that plants feed on (Marquez, 1998). In addition, Sangatnan and Sangatnan stated that (2000) application of compost improves the physiological, chemical and biological condition of the soil besides providing plant nutrients. The humus in compost serve as the colloidal material with negative electric charge and coagulated with cation and soil particles to form granules. Soil with more granules is sticky, high buffering capacity, and has better permeability and greater water holding capacity. It is capable of regulating plant growth and preventing disease occurrence.

Manure is another source of organic matter made up of about 75% water and 25% organic matter. In one ton average manure, these are 1500 pounds of organic matter containing about 12 pounds of nitrogen and potash and 5 pounds of phosphoric acid with, sulfur and trace elements (Bear, 1990).

Beneficial Effects of Organic Fertilizer

Soil organic matter has a variable effect on available water in soil. It is generally a positive relationship but soil properties, notably texture. One experiment, for example found organic matter to influence available water only in soils of medium to low clay content (Ohio State University, 2004).

Newsome (2009), reported that organic fertilizers add the nutrients to the soil that plant used to be more productive. These vital nutrients include phosphorus, nitrogen and potassium. These nutrients allow the plant to grow larger, blooming flowers and larger fruits. Not only does the quality increased, but so do the quantity allowing the grower to



harvest more and better fruits and flowers. Plants receiving the proper amounts of nutrients potassium grow tougher cell walls and coarser vegetation. This makes them much more resistant to pest and diseases. Plants receiving enough phosphorus, water more efficiently, allows them to survive cold and dry spells. Organic fertilizers have positive effects on all types of soil. Loosen soils such as sand, are held together better by a strong root system that promotes nitrogen. In this case, the fertilizer helps the plants grow stronger and also helps slow erosion. Soils that is denser and harder to penetrate, such as clay may be loosened up by similar as root structure. In this case, the soil becomes more easily markable for farming and also more oxygenated to promote synthesis. Organic fertilizer releases their nutrients slowly and consistently. Organic fertilizer keeps plant growing healthy and productive longer into the season despite changing weather and soil temperature. Organic fertilizer breakdown slowly, which means they need to be applied much less frequently than other types of fertilizer.

Organic Production practices maximize the use and recycling of a farm nutrients sources, including animal manure and green manures. Techniques such as accurate soil analysis and nutrients crediting help producers. Avoidance of excess fertilizer applications for sustainable farming methods includes building and conserving practices such as adding management (NSAI, 2005).

Benefits of Using Alnus Compost

Alnus compost is abundant in the highland that can be good source of organic nitrogen. Alnus is easy to compost and it hastens decomposition (Marcelino, 1995). At present, alnus compost has been discovered as good source of organic fertilizer, otherwise it is friendly to the environment and also controls some plant diseases. According to the



study conducted by Dida (1998), the population and incidence of black scurf on potato tuber decrease with increasing level of alnus compost applied. Alnus compost has a ph of 4.6, 50% organic matter, 2.5% nitrogen, 7.0 phosphorous and 3.36% potassium as cited by Mercardo (1996).



MATERIALS AND METHODS

Land Preparation

An area of 150m² was thoroughly prepared before planting. The area was divided into three blocks, which corresponds to three replications. Each block consisted of five plots measuring 1m x 10m. The different rates of Alnus compost enriched with Processed Chicken Manure (PCM) was basally applied per plot following the treatment arrangement before planting. The nutrient analysis of Alnus compost and PCM were the following:

NPKpOrganic matter

Alnus compost	2.5%	7.0%	3.36%	4.6	50%
PCM	4.0%	4.0%	4.0%	6.5-7	20%

All other cultural practices such as weeding, irrigation, hilling up, insects and disease control was employed during the conduct of the study.

The potato seed tubers with equal length of sprouts and number were planted at a distance of 30cm x 30cm between hills and rows at the depth of two inches.

Experimental Lay-out

The experiment was laid -out following the Randomized Complete Block Design (RCBD).

The following treatments replicated three times were:

T₁- 5kg of Alnus compost + 5kg of PCM

T₂- 10kg of Alnus compost + 5kg of PCM

T₃- 15kg of Alnus compost + 5kg of PCM



T₄- 20kg of Alnus compost + 5kg of PCM

T₅- 25kg of Alnus compost + 5kg of PCM

Data Gathered

1. Agro- climatic data. Temperature, relative humidity and rainfall were taken from Philippine Atmospheric Geophysical and Astronomical Services Administration (PAG- ASA) at Benguet State University (BSU).

2. Soil chemical properties. Soil samples were taken from the experimental area before and right after harvest. The organic matter, nitrogen, phosphorous and potassium content of the soil and ph was analyzed at the Soils Laboratory, Department of Agriculture, City of San Fernando, La Union.

3. Percent survival. This was taken by counting the number of plants that survived three weeks after planting using the formula:

$$\% \text{ Survival} = \frac{\text{Total number of plants survived}}{\text{Total number of tubers planted per plot}} \times 100$$

4. Initial height (cm). Ten sample plants were measured from base to the tip of the longest shoots at 30 days using meter stick.

5. Final height (cm). Ten sample plants were measured from the base to the tip of the plant one week after harvest using meter stick.

6. Canopy cover (%). This was gathered at 30, 45, 60, 70 days after planting with the use of wooden frame at 120cm x 60 cm with equal- sized grids.

7. Plant vigor. This was recorded at 30, 45, 60, and 75 days after planting using the CIP (2000) rating scale.



ScaleDescriptionRemarks

1	Plants are weak with few stem and leaves; very pale	Poor vigor
2	Plants are weak with few thin stems and leaves pale	Less vigorous
3	Better than less vigorous	Moderate vigorous
4	Plants are moderately strong with robust stems and leaves:	Vigorous
5	Plants are strong with robust stem and leaves; Leaves are light to dark green color.	Highly vigorous

8. Leaf miner Infestation. This was observed and recorded at 30, 45, 60, and 75

DAP using the following scale (CIP, 2000):

ScaleDescriptionRemarks

1	Less infested (1-20%)	Resistant
2	Infested (20-40%)	Moderately resistance
3	Moderately infested (41-60%)	Intermediate
4	Severely infested (61-80%)	Moderate susceptibility
5	Most serious Susceptible	

9. Late Blight Infection. This was observed and recorded at 30, 45, 60 and 75

days after planting using the CIP rating scale (Henfling, 1987):

Late Blight InfectionCIP ScaleDescription corresponding symptoms

0	1	No late blight observed.	
Trace	<5	2	Late blight present. Maximum 10 lesions per Plant.
5-<25	3	Plants look healthy, but lesions are easily seen at a closer distance. Maximum foliage area is affected by lesions or destroyed. It corresponds to no more than 20 leaflets .	
15-35	4	Late blight is easily seen on most plants. About 25% of foliage is covered with lesions.	
35-<65	5	Treatments look green; however all plants are affected leaves are dead. About half the foliage are destroyed.	
65-<85	6	Treatments look green with brown flecks. About 75% of each plant is affected. Leaves of the lower half of the plants are destroyed.	
85-<95	7	treatments are neither predominantly green Nor brown. Only top leaves are green. Many have large lesions.	



95-<100	8	Treatments are look brown-colored. A few top Leaves still have green areas. Most stems have lesions or are dead.
100	9	All leaves and stems are dead.

Descriptions: 1=highly resistant; 2-3= resistant; 4-5= moderately resistant; 6-7= moderately susceptible; 8-9= susceptible

10. Number and weight of marketable tuber per 10m². This was taken by counting and weighing the tubers from extra large to marble- sized, not malformed and free from natural cracks and with no more than 10% greening of the total surface at harvest.

11. Number and weight of non- marketable tubers per 10m². This was obtained by counting and weighing all tubers that has natural cracks, malformed and damaged by pest and disease.

12. Total yield per 10m² (kg.). This was recorded by getting the weight of marketable and non- marketable tubers.

13. Computed yield (10 / ha). This was obtained by using the following formula:

$$\text{Yield (t/ha)} = \frac{\text{Total yield}}{10\text{m}^2} \times \frac{10,000}{1,000}$$

14. Return on cash expenses. This was obtained through the following formula:

$$\text{ROCE} = \frac{\text{Gross sales} - \text{Total expenses}}{\text{Total expenses}} \times 100$$



Data Analysis

All quantitative data were analyzed using the Analysis of Variance for the Randomized Complete Block Design (RCBD) with three replications. The significance of differences among treatment means was tested using the Duncan's Multiple Range Test (DMRT) at 5% level of significance.



RESULTS AND DISCUSSION

Meteorological Data

Table 1 shows the temperature, relatively humidity and rainfall at Balili, La Trinidad, Benguet during the conduct of the study from January 2011 to March 2011. Minimum temperature ranges from 13°C to 15°C while the maximum temperature ranges from 17.7°C to 25.7°C. The average temperature ranges from 13.30°C to 22.0°C. The lowest relative humidity was noted in January at 80% while the highest relative humidity was in February at 87%. The longest sunshine duration was noted in the month of January at 368.3 minutes while the shortest sunshine duration was noted in the month of February with a 214.2 minutes. Potatogrow best in areas with temperature ranging from 17°C to 22°C and average relative humidity of 86%. The temperature, relative humidity, rainfall and sunshine duration during the conduct of the study favors the production requirements of the potato especially the temperature. Hence, the favorable environmental conditionenhanced better accumulation of carbohydrates and dry matter of the tubers (HARRDEC, 1996).

Table 1. Meteorological data during the conduct of the study from January to March 2011

MONTH	TEMP.			RELATIVE HUMIDITY (%)	RAINFALL AMOUNT (mm)	DAILY SUNSHINE DURATION (min)
	MIN. °C	MAX. °C	AVE. °C			
January	15.5	25.7	20.60	80	0.1	368.3
February	8.9	17.7	13.30	87	Trace	214.2
March	13.3	23.0	22.0	82	0.1	253.0

Source:Philippine Atmospheric Geophysical and Astronomical ServicesAdministration (PAG-ASA) BSU, La Trinidad, Benguet.



Soil Analysis

Table 2 shows the of soil chemical properties before and after the application of Alnus compost enriched with processed chicken manure (PCM). The soil texture is medium, pH is 6.0, electrical current is 30 ms/ cm, % organic matter is 2.0, phosphorous is 290 parts per million and potassium is 148 ppm before the application of processed chicken manure (PCM). The result of soil analysis after harvest show that the soil texture is medium wherein the soil has a mixture of clay, silt, sand and humus referred to as loam and contain the nutrients necessary for plant roots with air pockets between the particles that allows good drainage, and holds together well. The soil has a pH of 6.0. The electrical conductivity was increased to 0.51ms/cm. The percent organic matter was maintained at 2.0% which may be due to the influence of Alnus compost and PCM. Phosphorous content is 170 ppm and potassium is 484 ppm. There was a decrease in phosphorous content which might have been used by the potato plants.

Table 2. Analysis of the soil before and after the application of Alnus compost and PCM

SAMPLE	TEXTURE	PH	ELECTRICAL CONDUCTIVITY (ms/cm)	ORGANIC MATTER (%)	PHOSPHOROUS (ppm)	POTASSIUM (ppm)
Before	Medium	6.0	0.30	2.0	290	148
After	Medium	6.0	0.51	2.0	170	484

Analyzed by: Department of Agriculture, City of San Fernando, La Union



Percent Survival

All the potato plants (cv. Gloria) applied with different rates of Alnus compost enriched with processed chicken manure has survived at 30 DAP.

Plant Height

No significant differences were observed on the height of potato plants at 30 and 75 DAP applied with different rates of Alnus compost (Table 3). Numerically, at 30 DAP, the tallest plants were observed on those applied with 25kg of Alnus compost plus 5kg of PCM (53.70 cm) while the shortest plants were those applied with 15kg of Alnus compost plus 5kg of PCM (50.3 cm). However at 75 DAP, the tallest plants were observed were those applied with 15kg of Alnus compost plus 5kg of PCM (73.67 cm)while the shortest plants were those applied with 5kg of Alnus compost plus 5kg of PCM (68.80 cm).

Table 3. Plant height of potato (cv. Gloria) at 30DAP and 75DAP applied with different rates of Alnus compost and PCM

TREATMENT	HEIGHT (cm)	
	30 DAP	75 DAP
5kg of Alnus compost	51.00	68.80
10kg of Alnus compost	52.00	70.70
15kg of Alnus compost	50.3	73.67
20kg of Alnus compost	50.03	70.00
25kg of Alnus compost	53.70	72.13
CV (%)	11.41	4.96



Canopy Cover

Statistically, no significant differences were observed on the canopy cover of potato at 30 DAP, 45 DAP, 60 DAP, 75 DAP applied with different rates of Alnus compost (Table 5). Numerically, at 30 DAP the widest canopy cover was observed on the potato plants applied with 5kg of Alnus compost plus 5kg of PCM (53.33) while the narrowest canopy cover was observed on the plants applied with 10kg of Alnus compost plus 5kg of PCM (48.33). At 45 DAP, the highest canopy cover was obtained from the plants applied with 15kg of Alnus compost plus 5kg of PCM (63.00) followed by the application of 25kg of Alnus compost plus 5kg of PCM (60.00) while the narrowest was obtained from the plants applied with 20kg of Alnus compost plus 5kg of PCM (59.00). Relatively, at 60 DAP the widest canopy reduction was the application of 10kg of Alnus compost plus 5kg of PCM at 23.00.

Table 4. Canopy cover of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	CANOPY COVER		CANOPY REDUCTION	
	30 DAP	45DAP	60 DAP	75DAP
5kg of Alnus compost	53.00	59.00	19.00	17.00
10kg of Alnus compost	48.00	60.00	21.00	18.00
15kg of Alnus compost	49.00	63.00	23.00	13.00
20kg of Alnus compost	51.00	59.00	22.00	16.00
25kg of Alnus compost	52.00	60.00	15.00	17.00
CV (%)	3.71	8.93	27.39	20.53



Plant Vigor

Table 5 shows the plant vigor of the potato plants at 30, 45, 60 and 75 DAP applied with different rates of Alnus compost. At 30 DAP and 45 DAP, the plants were all vigorous. At 75 DAP the vigor was from less to poor vigorous due to senescence.

Reaction to Leaf Miner

Visual rating for leaf miner incidence was done at the vegetative stage of the potato plants (cv. Gloria) as shown in Table 6. No significant differences were observed on the response of plants to leaf miner occurrence. All the plants were highly resistant. At 60 DAP, plants were highly resistant to moderately resistant and at 75 DAP all were moderately resistant.

Reaction to Late Blight

Table 7 shows the reaction to late blight of the potato plants at 30 DAP, 45 DAP, 60 DAP, and 75 DAP applied with different rates of Alnus compost. At 30 DAP, to 45 DAP, plants were highly resistant. At 75 DAP, all plants were moderately susceptible with blight. The weak resistance of the potato plants despite the favorable weather condition during the conduct the plant stage could attributed to the varietal characteristics.



Table 5. Plant vigor of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	PLANT VIGOR			
	30 DAP	45DAP	60 DAP	75DAP
5kg of Alnus compost	Highly	Highly	Moderately	Moderately
	Vigorously	vigorously	vigorously	vigorously
10kg of Alnus compost	Highly	Highly	Moderately	Poorly
	Vigorously	vigorously	vigorously	vigorously
15kg of Alnus compost	Highly	Highly	Moderately	Less
	Vigorously	vigorously	vigorously	vigorously
20kg of Alnus compost	Highly	Highly	Moderately	Less
	Vigorously	vigorously	vigorously	vigorously
25kg of Alnus compost	Highly	Highly	Moderately	Less
	Vigorously	vigorously	vigorously	vigorously

Table 6. Leaf miner reaction of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	REACTION TO LEAF MINER			
	30 DAP	45DAP	60 DAP	75DAP
5kg of Alnus compost	Highly	Highly	Moderately	Intermediately
	resistant	resistant	resistant	resistant
10kg of Alnus compost	Highly	Highly	Highly	Moderately
	resistant	resistant	resistant	resistant
15kg of Alnus compost	Highly	Highly	Highly	Moderately
	resistant	resistant	resistant	resistant
20kg of Alnus compost	Highly	Highly	Highly	Moderately
	Resistant	resistant	resistant	resistant
25kg of Alnus compost	Highly	Highly	Moderately	Moderately
	resistant	resistant	resistant	resistant



Table 7. Late blight reaction of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	REACTION TO LATE BLIGHT INFECTION			
	30 DAP	45DAP	60 DAP	75DAP
5kg of Alnus compost	Highly resistant	Highly resistant	Moderately resistant	Moderately susceptible
10kg of Alnus compost	Highly resistant	Highly resistant	Moderately resistant	Moderately susceptible
15kg of Alnus compost	Highly resistant	Highly resistant	Moderately resistant	Moderately susceptible
20kg of Alnus compost	Highly Resistant	Highly resistant	Moderately resistant	Moderately susceptible
25kg of Alnus compost	Highly resistant	Highly resistant	Moderately resistant	Moderately susceptible

Number of Marketable Tubers of Potato (cv. Gloria)

Potato plants applied with 20kg of Alnus compost plus 5kg PCM significantly had the most number of super extra-large potato tubers (73) which was comparable with those plants applied with 25kg of Alnus compost plus 5kg PCM (69). The least tubers were obtained from plants applied with 5kg of Alnus compost plus 5kg of PCM with (52). For extra large sized tubers, plants applied with 15kg of Alnus compost plus 5kg of PCM (59) had the most tubers which was comparable with those plants applied with 10kg of Alnus compost plus 5kg of PCM (146). The least tubers were obtained from those plants applied with 20kg of Alnus compost plus 5kg of PCM with 119.

On the big- sized tubers, potato plants applied with 10kg and 15kg of Alnus compost plus 5kg of PCM were the most numerous but comparable with those plants applied with 20kg of Alnus compost plus 5kg of PCM. The least tubers were obtained from the plants applied with 25kg of Alnus compost plus 5kg of PCM with 124.



For the medium tubers most plants applied with 5kg, 20kg and 25kg of Alnus compost plus 5kg of PCM were the most, followed by the plants applied with 10kg and 15kg of Alnus compost plus 5kg of PCM. As to the small tubers, the most were obtained from plants applied with 5kg of Alnus compost plus 5kg of PCM (Table 8).

Number Non-marketable Tubers of Potato
(cv. Gloria)

Table 9 shows the number of non-marketable tubers. Statistically, no significant differences were obtained on the number of non-marketable tubers except for the big-sized tubers. Plants applied with 5kg of Alnus compost plus 5kg of PCM with 14.00 had the most non-marketable tubers but was comparable with those plants applied with 10kg of Alnus compost plus 5kg of PCM (13.00).

Table 8. Number of marketable tubers of potato (cv. Gloria) per 10m² applied with different rates of Alnus compost

TREATMENT	NUMBER OF MARKETABLE TUBERS				
	SXL	XL	B	MD	S
5kg of Alnus compost	52 ^c	143 ^b	133 ^{bc}	133 ^a	87 ^a
10kg of Alnus compost	62 ^{bc}	146 ^{ab}	161 ^a	89 ^b	53 ^c
15kg of Alnus compost	58 ^c	159 ^a	158 ^a	77 ^b	90 ^a
20kg of Alnus compost	73 ^a	119 ^c	145 ^{ab}	125 ^a	66 ^b
25kg of Alnus compost	69 ^{ab}	145 ^b	124 ^c	122 ^a	58 ^{bc}
CV (%)	9.33	5.29	6.09	9.13	9.3

Legend: SXL= super-extra large, XL= extra large, B= big, MD= medium, S= small



Table 9. Number of non-marketable tubers of potato (cv. Gloria) per 10m² applied with different rates of Alnus compost and PCM

TREATMENT	NUMBER OF NON- MARKETABLE TUBERS				
	SXL	XL	B	MD	S
5kg of Alnus compost	7.00	12.00	14.00 ^a	12.00	30.00
10kg of Alnus compost	11.00	10.00	13.00 ^{ab}	18.00	33.00
15kg of Alnus compost	10.00	11.00	11.00 ^{bc}	18.00	32.00
20kg of Alnus compost	9.00	9.00	10.00 ^c	19.00	32.00
25kg of Alnus compost	9.00	9.00	10.00 ^c	18.00	29.00
CV (%)	29.15	14.72	13.25	28.23	7.13

Legend: SXL= super-extra large, XL= extra large, B= big, MD= medium, S= small

Weight of Marketable and Non-marketable Tubers of Potato (cv. Gloria)

No significant differences were observed on the weight of marketable tubers of potato (cv. Gloria) on the weight of super extra large, extra large, medium to small size as shown in Table 10. However, plants applied with 10kg of Alnus compost plus 5kg of PCM with 7.33kg significantly had the heaviest weight of big-sized tubers but was comparable with plants applied with 25kg of Alnus compost plus 5kg of PCM (6.75kg).

As to the weight of non-marketable tubers, no significant differences were observed on the potato plants applied with the different rates of Alnus compost.



Table 10. Weight of marketable and non-marketable tubers of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	MARKETABLE (kg/10m ²)					NON MARKE-TABLE TUBERS
	SXL	XL	B	MD	S	
5kg of Alnus compost	6.83	8.83	4.16 ^b	1.33	1.33	1.67
10kg of Alnus compost	6.33	8.25	7.33 ^a	0.67	0.67	1.08
15kg of Alnus compost	6.58	7.83	6.41 ^a	1.33	1.33	1.41
20kg of Alnus compost	7.08	7.25	6.08 ^a	1.41	1.41	0.91
25kg of Alnus compost	6.67	7.91	6.75 ^a	0.83	1.16	0.91
CV (%)	8.72	8.09	11.34	34.68	26.72	22.35

Legend: SXL= super-extra large, XL= extra large, B= big, MD= medium, S= small

Total Yield and Computed Yield

Table 11 shows that the total and computed yield of potato (cv. Gloria) applied with Alnus compost and PCM had no significant differences. Numerically, 15kg of Alnus compost plus 5kg of PCM with 23.50kg gave the highest total and computed yield.

Return on Cash Expense

Potato plants applied with 5kg of Alnus compost plus 5kg of PCM gave the highest ROCE. Plants applied with 15kg and 25kg of Alnus compost plus 5kg of Alnus compost plus 5kg of PCM produced the highest tuber yield, however, the cost of amendment was high resulting to lower ROCE (Table 12).



Table 11. Total yield and computed yield of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	TOTAL YIELD (Kg/10m ²)	COMPUTED YIELD (tons/ha)
5kg of Alnus compost	23.837	23.837
10kg of Alnus compost	24.33	24.33
15kg of Alnus compost	24.91	24.91
20kg of Alnus compost	24.24	24.41
25kg of Alnus compost	24.41	24.41
CV (%)	6.67	6.67

Table 12. Return on Cash Expense of potato (cv. Gloria) applied with different rates of Alnus compost and PCM

TREATMENT	MARKETABLE YIELD (kg/10m ²)	COST OF PRODUCTION (PhP)	GROSS SALE (PhP)	NET INCOME (PhP)	ROCE (%)
5kg of Alnus compost	22.41	684.00	4035.00	3351.00	489.9
10kg of Alnus compost	23.25	732.00	4185.00	3453.00	471.72
15kg of Alnus compost	23.50	780.00	4230.00	3450.00	442.31
20kg of Alnus compost	23.33	828.00	4200.00	3372.00	407.25
25kg of Alnus compost	23.50	876.00	4230.00	3354.00	382.88

*Total cost of production includes cost of planting materials, tractor hire and fertilizers and yellow plastics.

* Selling price of potato tubers was based on the 60.00 per kilogram.



SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted from January 2011 to March 2011 at Benguet State University, La Trinidad, Benguet to: determine the growth and yield of potato (cv. Gloria) applied with different rates Alnus compost enriched with processed chicken manure; determine the best rate of Alnus compost enriched with processed chicken manure on the growth and yield of potato (cv. Gloria); and determine the profitability of using Alnus compost enriched with processed chicken manure on potato production.

Different rates of Alnus no significant effect on plant height, plant vigor, leaf miner infestation and potato late blight infection. Significant effects were obtained for number of marketable tubers and weight of marketable tubers. The best rate was the application of 15kg of Alnus compost and 5kg of PCM. Highest ROCE was obtained from plants applied with 5kg Alnus compost plus 5kg of PCM.

Conclusions

The potato plants (cv. Gloria) were resistant to leaf miner and late blight infection. The best rate of the application is 15kg of Alnus compost and 5kg of processed chicken manure. The highest ROCE was obtained from plants applied with 5kg Alnus compost plus 5kg of PCM.

Recommendation

Application of 15kg of Alnus compost plus 5kg of PCM is recommended under organic production at Balili, La Trinidad Benguet.



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APPENDICES

Appendix Table 1. Percent survival (%) of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	100	100	100	300	100
10kg of Alnus compost	100	100	100	300	100
15kg of Alnus compost	100	100	100	300	100
20kg of Alnus compost	100	100	100	300	100
25kg of Alnus compost	100	100	100	300	100
TOTAL	500	500	500	500	



Appendix Table 2. Initial plant height at 30 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	52.5	50.9	49.2	152.6	50.87
10kg of Alnus compost	50.4	53.8	52.9	157.1	52.37
15kg of Alnus compost	51.3	48.6	51	150.9	50.3
20kg of Alnus compost	50.4	52.4	47.3	150.1	50.03
25kg of Alnus compost	52.7	52.9	51.5	158.1	52.7
TOTAL	257.3	258.6	251.9	768.8	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	37.049	18.525			
Treatment	4	134.477	33.619	1.04 ^{ns}	3.84	7.01
Error	8	258.671	32.334			
TOTAL	14	430.19				

ns= not significant

Coefficient of Variation: 11.41 %



Appendix Table 3. Final height 75 at DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	67.8	69.7	68.9	206.4	68.8
10kg of Alnus compost	76.2	68.8	73.1	212.1	70.7
15kg of Alnus compost	70.4	77.5	73.1	221	73.67
20kg of Alnus compost	72.4	70.5	67.6	210	70.00
5kg of Alnus compost	70.6	68.9	76.9	216.4	72.13
TOTAL	357.3	355.4	359.6	1072.3	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	1.765	0.833			
Treatment	4	46.809	11.702	0.93 ^{ns}	3.84	7.01
Error	8	100.575	12.572			
TOTAL	14	149.149				

ns= Not significant

Coefficient of Variation: 4.96 %



Appendix Table 4. Canopy cover at 30 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	50	50	51	151	53.33
5kg of Alnus compost	50	45	50	145	48.33
5kg of Alnus compost	47	49	50	146	48.67
5kg of Alnus compost	51	49	52	152	50.67
5kg of Alnus compost	51	54	51	156	52
TOTAL	249	247	254	750	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	5.200	2.600			
Treatment	4	27.333	6.833	1.99 ^{ns}	3.84	7.01
Error	8	27.467	3.433			
TOTAL	14	60.000				

ns= Not significant

Coefficient of Variation: 3.71 %



Appendix Table 5. Canopy cover 45 DAP potato (cv. Gloria) applied with different rates Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	64	58	56	178	59.33
10kg of Alnus compost	63	63	55	181	60.33
15kg of Alnus compost	57	63	69	189	63.00
20kg of Alnus compost	65	56	56	177	59.00
25kg of Alnus compost	57	59	65	181	60.33
TOTAL	306	299	301	906	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	5.200	2.600			
Treatment	4	29.600	7.400	0.25 ^{ns}	3.84	7.01
Error	8	232.800	29.100			
TOTAL	14	267.600				

ns= Not significant

Coefficient of Variation: 8.93%



Appendix Table 6. Canopy reduction at 60 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	18	19	20	57	19.00
10kg of Alnus compost	25	23	14	62	21.00
15kg of Alnus compost	17	22	30	69	23.00
20kg of Alnus compost	29	16	21	66	22.00
25kg of Alnus compost	17	12	18	47	16.00
TOTAL	106	92	103	301	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	21.733	10.867			
Treatment	4	99.600	24.900	0.82 ^{ns}	3.84	7.01
Error	8	241.600	30.200			
TOTAL	14	362.933				

ns= Not significant

Coefficient of Variance: 13.81 %



Appendix Table 7. Canopy reduction at 75 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	21	15	15	51	17.00
10kg of Alnus compost	18	21	15	54	18.00
15kg of Alnus compost	19	5	15	39	13.00
20kg of Alnus compost	17	18	11	46	15.00
25kg of Alnus compost	7	21	23	51	17.00
TOTAL	82	80	79	211	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.933	0.467			
Treatment	4	46.267	11.567	0.28 ^{ns}	3.84	7.01
Error	8	325.733	40.717			
TOTAL	14	32.933				

Coefficient of Variance: 9.67 % ns = not significant



Appendix Table 8. Plant vigor at 30 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	4	5	4	13	4.33
10kg of Alnus compost	5	4	4	13	4.33
15kg of Alnus compost	4	4	4	12	4.00
20kg of Alnus compost	4	5	4	13	4.33
25kg of Alnus compost	4	4	5	13	4.33
TOTAL	21	22	21	64	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.133	0.067			
Treatment	4	0.267	0.067	0.21 ^{ns}	3.84	7.01
Error	8	2.533	0.317			
TOTAL	14	2.933				

ns= not significant

Coefficient of Variance:13.19%



Appendix Table 9. Plant vigor at 45 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	4	5	5	14	4.67
10kg of Alnus compost	4	4	5	13	4.33
15kg of Alnus compost	5	4	4	13	4.33
20kg of Alnus compost	4	5	5	14	4.67
25kg of Alnus compost	5	5	4	14	4.67
TOTAL	22	23	23	68	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.133	0.067			
Treatment	4	0.400	0.100	0.25 ^{ns}	3.84	7.01
Error	8	3.200	0.400			
TOTAL	14	3.733				

ns= Not significant

Coefficient of Variance: 13.95%



Appendix Table 10. Plant vigor at 60 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	3	3	4	10	3.33
10kg of Alnus compost	3	4	3	10	3.33
15kg of Alnus compost	4	3	3	10	3.33
20kg of Alnus compost	3	4	3	10	3.33
25kg of Alnus compost	3	4	3	10	33.33
TOTAL	16	18	16	50	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.133	0.067			
Treatment	4	0.400	0.100	0.25 ^{ns}	3.84	7.01
Error	8	3.200	0.400			
TOTAL	14	3.733				

ns= Not significant

Coefficient of Variance: 13.95%



Appendix Table 11. Plant vigor at 75 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	2	2	2	6	3
10kg of Alnus compost	1	2	2	5	1.67
15kg of Alnus compost	2	2	2	6	2
20kg of Alnus compost	2	3	2	7	2.33
25kg of Alnus compost	3	2	2	7	2.33
TOTAL	10	11	10	31	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.533	0.067			
Treatment	4	0.000	0.000	0.00 ^{ns}	3.84	7.01
Error	8	2.800	0.350			
TOTAL	14	3.333				

ns= Not significant

Coefficient of Variance:17.75 %



Appendix Table 12. Leaf miner infestation at 30 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	1	2	2	5	1.67
10kg of Alnus compost	2	1	2	5	1.67
15kg of Alnus compost	2	2	1	5	1.67
20kg of Alnus compost	1	2	2	5	1.67
25kg of Alnus compost	2	1	2	5	1.67
TOTAL	8	8	9	25	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.133	0.067			
Treatment	4	0.933	0.233	1.00 ^{ns.}	3.84	7.01
Error	8	1.867	0.233			
TOTAL	14	2.933				

ns= Not significant

Coefficient of Variance:23.37 %



Appendix Table 13. Leaf miner infestation at 45 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	1	2	1	4	1.33
10kg of Alnus compost	2	1	1	4	1.33
15kg of Alnus compost	1	1	2	4	1.33
20kg of Alnus compost	1	1	2	4	1.33
25kg of Alnus compost	1	2	1	4	1.33
TOTAL	6	7	7	20	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.133	0.067			
Treatment	4	0.000	0.000	0.00 ^{ns}	3.84	7.01
Error	8	3.200	0.400			
TOTAL	14	3.333				

ns = Not significant

Coefficient of Variance: 3.333%



Appendix Table 14. Leaf miner infestation at 60 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	1	2	2	5	1.67
10kg of Alnus compost	2	1	1	4	1.33
15kg of Alnus compost	1	2	1	4	1.33
20kg of Alnus compost	2	1	1	4	1.33
25kg of Alnus compost	1	1	2	4	1.33
TOTAL	7	7	7	21	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.000	0.000			
Treatment	4	0.267	0.067	0.16 ^{ns}	3.84	7.01
Error	8	3.333	0.417			
TOTAL	14	3.600				

ns= Not significant

Coefficient of Variance: 46.11%



Appendix Table 15. Leaf miner infestation at 75 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	3	2	3	7	2.33
10kg of Alnus compost	3	2	3	8	2.67
15kg of Alnus compost	3	2	3	8	2.67
20kg of Alnus compost	3	2	3	8	2.67
25kg of Alnus compost	3	3	2	8	2.67
TOTAL	15	11	14	39	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	1.733	0.867			
Treatment	4	0.000	0.000	0.00 ^{ns}	3.84	7.01
Error	8	1.600	0.200			
TOTAL	14	3.333				

ns= Not significant

Coefficient of Variance:37.85 %



Appendix Table 16. Late blight infection at 30, 45, 60 DAP of potato (cv. Gloria) applied different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	2	1	2	5	1.67
10kg of Anus compost	1	2	2	5	1.67
15kg of Alnus compost	2	2	1	5	1.67
20kg of Alnus compost	2	1	1	4	1.33
25kg of Alnus compost	2	1	2	5	1.67
TOTAL	9	7	8	24	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.400	0.200			
Treatment	4	0.267	0.067	0.18 ^{ns}	3.84	7.01
Error	8	2.933	0.367			
TOTAL	14	3.600				

ns = Not significant

Coefficient of Variance: 37.85%



Appendix Table 17. Late blight infection at 75 DAP of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	7		7	22	7.33
10kg of Alnus compost	6	7	7	20	6.67
15kg of Alnus compost	7	6	6	20	6.67
20kg of Alnus compost	6	6	7	19	6.33
25kg of Alnus compost	6	6	7	19	6.33
TOTAL	32	25	34	91	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.400	0.200			
Treatment	4	2.267	0.567	1.54 ^{ns}	3.84	7.01
Error	8	2.933	0.367			
TOTAL	14	5.600				

ns= Not significant

Coefficient of Variance:9.17 %



Appendix Table 18. Number of marketable tuber SXLof potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	54	44	58	156	52 ^c
10kg of Alnus compost	63	58	65	186	62 ^{bc}
15kg of Alnus compost	59	65	50	174	58 ^c
20kg of Alnus compost	75	75	69	218	73 ^a
25kg of Alnus compost	70	65	72	207	69 ^{ab}
TOTAL	321	307	314	941	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	19.600	9.800			
Treatment	4	848.400	212.100	6.18*	3.84	7.01
Error	8	274.400	34.300			
TOTAL	14	1142.400				

*= significant

Coefficient of Variance: 9.33 %



Appendix Table 19. Number of marketable tuber extra- largeof potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	144	134	150	399.00	133 ^{bc}
10kg of Alnus compost	159	135	145	482.00	482 ^a
15kg of Alnus compost	160	161	155	473.00	158 ^a
20kg of Alnus compost	126	121	110	434.00	145 ^{ab}
25kg of Alnus compost	145	139	151	373	124 ^a
TOTAL	734	720	711	2165	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	193.733	96.867			
Treatment	4	2503.333	625.833	11.02**	3.84	7.01
Error	8	454.267	56.783			
TOTAL	14	3151.333				

**= highly significant

Coefficient of Variance: 6.09 %



Appendix Table 20. Number of marketable tuber bigof potato (cv. Gloria) applied with different rates of Alnus compost PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	134		140	399	133 ^{bc}
10kg of Alnus compost	158	164	160	482	161 ^a
15kg of Alnus compost	160	161	152	473	158 ^a
20kg of Alnus compost	160	130	145	317	145 ^{ab}
5kg of Alnus compost	131	127	115	373	124 ^c
TOTAL	903	707	684	2294	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	155.733	77.867			
Treatment	4	2918.267	729.567	9.49 ^{**}	3.84	7.01
Error	8	614.933	76.867			
Total	14	3688.933				

**= highly significant

Coefficient of Variance: 6.09 %



Appendix Table 21. Number of marketable tuber medium of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	134.00	125.00	140.00	399.00	133 ^a
10kg of Alnus compost	98.00	84.00	90.00	266.00	89 ^b
15g of Alnus compost	63.00	88.00	79.00	230.00	76.67 ^b
20kg of Alnus compost	126.00	130.00	119.00	375.00	125 ^a
25kg of Alnus compost	127.00	127.00	112.00	366.00	122 ^a
TOTAL	548.00	554.00	540.00	1642.0	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	16.533	8.267			
Treatment	4	7379.600	1844.900	18.62**	3.84	7.01
Error	8	792.800	99.100			
TOTAL	14	8188.933				

**= highly significant

Coefficient of Variance:9.13 %



Appendix Table 22. Number of marketable tuber of potato small (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	92	81	88	261	87 ^a
10kg of Alnus compost	49	60	57	158	53 ^c
15kg of Alnus compost	90	88	91	269	89 ^a
20kg of Alnus compost	70	64	64	198	66 ^b
25kg of Alnus compost	53	60	60	173	58 ^{bc}
TOTAL	354	353	360	1067	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	11.200	5.600			
Treatment	4	3427.600	856.900	19.54**	3.84	7.01
Error	8	350.800	43.850			
TOTAL	14	3789.800				

**=highly significant

Coefficient of Variance: 9.38 %



Appendix Table 23. Weight of potato super extra- large (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	7.00	6.00	7.50	20.5.0	6.833
10kg of Alnus compost	5.50	6.5	6.00	19.00	6.333
15kg of Alnus compost	6.75	6.00	7.00	19.750	6.583
20kg of Alnus compost	7.00	6.75	7.50	21.250	7.083
25kg of Alnus compost	6.75	7.00	6.25	20.000	6.667
TOTAL	33.00	32.25	34.25	99.50	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.225	0.113			
Treatment	4	0.942	0.235	0.68 ^{ns}	3.84	7.01
Error	8	2.733	0.342			
Total	14	3.900				

ns= Not significant

Coefficient of Variance: 8.72 %



Appendix Table 24. Weight of potato extra- large (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	8.25	9.00	9.25	26.5	8.83
10kg of Alnus compost	9.00	8.25	7.50	26.5	8.83
15kg of Alnus compost	8.00	6.75	8.75	23.5	7.83
20kg of Alnus compost	7.25	7.00	7.50	21.75	7.25
25kg of Alnus compost	8.25	7.5.0	8.00	23.75	7.92
TOTAL	40.75	38.5	41.00	120.25	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.225	0.113			
Treatment	4	0.942	0.235	0.68 ^{ns}	3.84	7.01
Error	8	2.733	0.342			
Total	14	3.900				

ns= Not significant

Coefficient of Variance: 8.09 %



Appendix Table 25. Weight of potato big tubers (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	4.25	3.50	4.73	12.50	4.167 ^b
10kg of Alnus compost	6.75	7.75	7.5	22.00	7.333 ^a
15kg of Alnus compost	6.25	6.25	6.75	19.25	6.417 ^a
20kg of Alnus compost	6.25	7.00	5.00	18.25	6.083 ^a
25kg of Alnus compost	6.00	7.25	7.00	20.25	6.750 ^a
TOTAL	29.5	31.75	30.98	92.23	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.525	0.262			
Treatment	4	17.308	4.327	8.89**	3.84	7.01
Error	8	3.892	0.486			
TOTAL	14	21.725				

** =highly significant

Coefficient of Variance: 11.34 %



Appendix Table 26. Weight of medium of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	.75	1.75	1.5	4	1.333
10kg of Alnus compost	.25	1	0.75	2	0.667
15kg of Alnus compost	1.25	1	1.75	4	1.333
20kg of Alnus compost	.75	1.75	1.75	4.25	1.417
25kg of Alnus compost	1.5	1.5	.5	3.50	1.167
TOTAL	4.5	7	6.25	17.75	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	0.758	0.379			
Treatment	4	1.400	0.350	2.33 ^{ns}	3.84	7.01
Error	8	1.200	0.150			
TOTAL	14	3.358				

ns =Not significant

Coefficient of Variance: 34.68 %



Appendix Table 27. Weight of small of potato (cv. Gloria) applied with different rates rates of compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	.75	1.75	1.5	4	1.333
10kg of Alnus compost	.25	1	0.75	2	0.667
15kg of Alnus compost	1.25	1	1.75	4	1.333
20kg of Alnus compost	.75	1.75	1.75	4.25	1.417
25kg of Alnus compost	1	1	.50	2.50	0.833
TOTAL	4	7	7.25	18.25	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	1.158	0.379			
Treatment	4	1.100	0.350	2.275 ^{ns}	3.84	7.01
Error	8	0.800	0.150			
TOTAL	14	3.058				

ns =Not significant

Coefficient of Variance: 26.72 %



Appendix Table 28. Number of non- marketable tuber SXLo of potato (cv. Gloria) applied with different rates of Alnus compost with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	10	11	0	21	7.000
10kg of Alnus compost	11	10	13	34	11.333
15kg of Alnus compost	12	9	10	31	10.333
20kg of Alnus compost	9	8	10	27	9.000
25kg of Alnus compost	9	10	8	27	9.000
TOTAL	51	48	41	140	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	28.133	14.067			
Treatment	4	32.000	8.000	1.08 ^{ns}	3.84	7.01
Error	8	59.200	7.400			
Total	14	119.333				

ns= not significant

Coefficient of Variance:29.15 %



Appendix Table 29. Number of non- marketable tuber extra- large of potato(cv. Gloria) applied with different rates of Alnus compost with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	12	11	13	36	12
10kg of Alnus compost	10	11	9	30	10
15kg of Alnus compost	9	13	12	34	11.83
20kg of Alnus compost	10	7	9	26	8.67
25kg of Alnus compost	8	10	10	28	9.33
TOTAL	49	52	53	153	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	1.733	0.867			
Treatment	4	22.933	5.733	2.51 ^{ns}	3.84	7.01
Error	8	18.267	2.283			
Total	14	42.933				

ns= Not significant

Coefficient of Variance: 14.72%



Appendix Table 30. Number of non-marketable tuber big of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	16	12	15	43	14 ^a
10kg of Alnus compost	12	14	12	38	13 ^{ab}
15kg of Alnus compost	13	10	11	34	11 ^{bc}
20kg of Alnus compost	10	12	9	31	10 ^c
25kg of Alnus compost	11	9	10	30	10 ^c
TOTAL	57	57	57	171	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	3.333	1.667			
Treatment	4	38.267	9.567	3.96*	3.84	7.01
Error	8	19.333	2.417			
Total	14	60.933				

*= significant

Coefficient of Variance: 13.25%



Appendix Table 31. Number of non- marketable tuber mediumof potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	18	19	17	54	11.667
10kg of Alnus compost	17	18	20	55	18.333
15kg of Alnus compost	18	16	19	53	17.667
20kg of Alnus compost	19	20	18	57	19.000
25klg of Alnus compost	18	20	17	55	18.333
TOTAL	90	93	91	274	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	36.400	18.200			
Treatment	4	109.333	27.333	1.18 ^{ns}	3.84	7.01
Error	8	184.267	23.033			
Total	14	330.000				

ns= Not significant

Coefficient of Variance: 28.33%



Appendix Table 32. Number of non- marketable tuber small of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	32	30	29	91	30.33
10kg of Alnus compost	29	33	36	98	32.67
15kg of Alnus compost	30	35	31	96	32
20kg of Alnus compost	31	34	30	95	31.67
25kg of Alnus compost	28	30	29	87	29
TOTAL	150	162	155	467	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	14.533	0.867			
Treatment	4	25.733	5.733	1.30 ^{ns}	3.84	7.01
Error	8	39.467	2.283			
Total	14	79.733				

ns= Not significant

Coefficient of Variance: 7.13%



Appendix Table 33. Total weight of non- marketable tuber of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	1.25	1	1.25	3.5	1.16
10kg of Alnus compost	1.5	1	.75	3.25	1.08
15kg of Alnus compost	1.25	1.75	1.25	4.25	1.41
20kg of Alnus compost	1	1	.75	2.75	0.91
25kg of Alnus compost	1	.75	1	2.75	0.91
TOTAL	6	5.5	5	16.5	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	6.025	3.012			
Treatment	4	2.442	0.610	0.25 ^{ns}	3.84	7.01
Error	8	19.183	2.398			
Total	14	27.650				

ns= Not significant

Coefficient of Variance: 7.13%



Appendix Table 34. Total yield per 10m² of potato (cv. Gloria) applied with different of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	22.25	23.00	24.50	70.75	23.58
10kg of Alnus compost	23.75	26.00	23.00	72.75	24.25
15kg of Alnus compost	24.75	22.75	27.25	70.50	24.92
20kg of Alnus compost	23.25	25.25	24.00	72.50	24.16
25kg of Alnus compost	24.00	24.75	24.5	73.25	24.41
TOTAL	95.59	121.75	123.00	359.5	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	6.025	3.012			
Treatment	4	2.442	0.610	0.25 ^{ns}	3.84	7.01
Error	8	19.183	2.398			
Total	14	27.650				

ns= Not significant

Coefficient of Variance: 6.67%



Appendix Table 35. Computed yield (tons/ha) of potato (cv. Gloria) applied with different rates of Alnus compost enriched with PCM

TREATMENT	REPLICATION			TOTAL	MEAN
	I	II	III		
5kg of Alnus compost	22.25	23.00	24.50	70.75	23.58
10kg of Alnus compost	23.75	26.00	23.00	72.75	24.25
15kg of Alnus compost	24.75	22.75	27.25	70.50	24.92
20kg of Alnus compost	23.25	25.25	24.00	72.50	24.16
25kg of Alnus compost	24.00	24.75	24.5	73.25	24.41
TOTAL	95.59	121.75	123.00	359.5	

ANALYSIS OF VARIANCE

SOURCE OF VARIANCE	DEGREE OF FREEDOM	SUM OF SQUARES	MEAN SQUARE	COMPUTED F	TABULATED F	
					0.05%	0.01%
Replication	2	6.025	3.012			
Treatment	4	2.442	0.610	0.25 ^{ns}	3.84	7.01
Error	8	19.183	2.398			
Total	14	27.650				

ns= Not significant

Coefficient of Variance: 6.67%

