

**COST COMPARISON OF SELECTED PESTICIDES ON CHILLY
CULTIVATION**

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**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Plantation Technology and Management
in the Faculty of Plantation and Agrotechnology
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DECLARATION

This Final Year Project is a partial fulfillment of the requirements for a degree of Bachelor of Science (Hons.) Plantation Technology and Management, Faculty of Plantation and Agrotechnology, Universiti Teknologi MARA.

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LIST OF ABBREVIATIONS

Kg	: kilogram
g	: gram
No	: Number
Ft	: feet
Ha	: hectare
a.i	:Active Ingredient
RM	: Ringgit Malaysia
UiTM	: Universiti Teknologi MARA
BCR	: Benefit-cost ration
N.P.K	: Nitrogen. Phosphorus. Potassium

ABSTRACT

This research study is conducted to find the comparison of cost by using selected chemical application on chilly cultivation. This is because the pesticides were different cost of using, dos been applied, time action to been applied that affect to the yield collection. The different yield may influenced the sales and income to the farmers. Pesticides was important to the farmers to increase the yield and profit. The better selected chemical to the pest attack gave advantage to them to reduced the cost and got higher profit. The purpose of this research also was to identify the most economically feasible according to the yield, payback period and benefit-cost ratio. This was important step to the farmers to select pesticides should farmers take to increase their yield and profit while cost may been recovered by the sales of yield production.

ABSTRAK

Kajian ini dijalankan untuk mencari perbandingan kos dengan menggunakan aplikasi kimia dipilih pada penanaman cili. Ini kerana racun perosak adalah kos yang berbeza menggunakan , dos diguna pakai , tindakan masa untuk diguna pakai yang memberikan impak yang baik berbeza dengan koleksi hasil dikutip. Hasil yang berlainan boleh mempengaruhi jualan dan pendapatan kepada petani-petani. Racun perosak adalah penting kepada petani untuk meningkatkan hasil dan keuntungan. Kimia yang lebih baik dipilih untuk serangan dari perosak-perosak yang memberi kelebihan kepada mereka untuk mengurangkan kos dan mendapat keuntungan yang lebih tinggi. Tujuan kajian ini juga adalah untuk mengenal pasti yang manakah paling ekonomi yang boleh dilaksanakan mengikut hasil dikutip, tempoh bayaran balik dan faedah - kos nisbah . Ini adalah penting untuk menunjukkan yang seseorang petani itu perlu mengambil inisiatif untuk meningkatkan hasil dan keuntungan mereka manakala kos boleh didapatkan kembali oleh jualan pengeluaran hasil.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Chilly (*Capsicum spp.*) was belonged to the family of Solanaceae that planted as annual crop which are the most widely grown vegetables in the world (Khan et al., 2012). Chilly was originated from Central America and Mexico that are importance and popular vegetables (Mishra et al., 2009). The most important spice crop grown was chilly because of widely commercial in food flavoring (Shil et al., 2013); (Harindh et al., 2009).

In Malaysia, Chilly was cultivated in lowland or highland by vegetable farmers which might enhance economy production. It is an important commodity used as a vegetable, spice, medicinal, herb by plant on billion of people every day and it is ingredient in industrial products on various cooking (Khayadagi et al., 2012). However, the growth of chilly and it yield was disturbed especially by insect and pest.

In serious situation, the developments of pest population on crop led to the dangerous chilly yield damaged (Sarkar, et al., 2013). They also stated where the pest caused havoc on economic loss every year. According to Khalid et al., (2013) whitefly was the major insect pest that caused serious damage on chilly cultivation. It was the one of the one that gave biggest impact on economic with chilly growth and yield production. Thus, most of farmers used chemical to control the spoilage agent that destroyed and damaged their yield production.

Today the chemicals pesticides are the effective ways to control pest population and the preferred especially in the periods that are closed to the harvesting seasons were chemical pesticides (Dura et al., 2011). Chemical control was often used to protect the chilly from pest infestation on chilly cultivation. Thus, they also mentioned that chemicals pesticides were continue to play a role to control pest especially periods that are close to the harvest which must good in pest management for the future and also are effective to control pest.

1.2 Problem statements

Chemical pesticides was most importance for economic agricultural industries especially on chilly cultivation that one of most popular vegetable in Malaysia. In recent years, chemical pesticides were extensively applied to gain the higher crop of yield (Sarwa et al., 2014). They also stated when overusing agrochemicals led to several agricultural problems such as poor system. The cost of pesticides usage was the important element before applying to the field that influenced the production of yield. The excessive usages of chemical pesticides were led to higher in cost through the crop.

As long as insect of chilly remains a regulated pest, chemical control was the only option for controlling pest population. The low coverage of high yielding which are heavy incident from pest attacked and lack of adaptation of scientific practices package was the reason for low yield in chilly (Hiremath and Hilly, 2012). Pesticides problem occur due to chemical pest management are made by the development of resisted pesticides (Sarkar et al., 2013). Seriously economic damaged decline in production caused by insect pest attacked. The increases in growth of crop and yield ware reduced improper chemical pest control usage on the crops were ensured. The high income or profits for growers was caused by used of better pesticides usage on chilly cultivation and to increases of yield production.

The pesticides application identified was important to ensure the proper usage of insecticides and gave advantage through lower in cost and higher production yield and income. These affected to economic on production of chilly.

1.3 Objectives of study

The objectives of this study:

- To find the cost comparative of selected chemical application on chilly.
- To identify the most economically feasible according to the yield, payback period and benefit-cost ratio with selected pesticides.

1.4 Significant of study

The farmers was improved to better chemical pest usage in their field was helped by these study as the most the farmer practices chemical application for controlled the insect pest. The different yield production on chilly with different application of chemical was the result of the researched. The cost comparative was influencing to the consumption of farmers for protecting their yield on field. The result of the cost of cultivation, net present value , payback period and benefit cost ratio were determined. Thus, this information was shared to the farmers and given advantages to them to improvise on their management of their planting crops especially in chilies cultivation that were reduced the cost and increased the profit.

1.5 Limitation of study

In this final year project, I was chose selected pesticides application and were to show to the farmers about the yield production. The farmers got the advantage to reduce the higher of cost and increase higher of the profit by better selected of chemicals application after compares the cost of applying into the field . The different of yield was the limitation of my study on my research. Pest attack are registered that gave different yield of production. The different yield of data and growth of plant are also caused by different soil content. Other than that, the problem chilly to produce higher of yield compared to the normal open system cultivation gave some problem to data collected was expected caused by environment because my project study was on open system that exposed to such factor such as the infection pest and disease, heavy of rain, wind and others to reduced on yield.

CHAPTER 2

LITERATURE REVIEW

2.1 Analysis of cost

The important commercial crops which play a major role in supplementing in the income to small and marginal farmers were chilly (Hiremath and Hilly, 2012). They also mentioned that the chilly production can treat to economic in the world trade. According to Pawar et al. (2014) increases the implication of economic of farmers to influence the income were caused by used of lower of cost production. Vegetable production will provides with high return of profit per unit area was chilly (Gaganjot and Chahal, 2009). They stated the chilly cultivation was important to agricultural diversification system.

The market demand for local chilly was expended by helped of economic development of chilly to ensure a steady supply from the local growers to the large processor (Monowar, 2014). Therefore, it was utmost important to evaluate the relative profitability of chilly (Gaganjot and Chahal, 2009). In development countries, food grain productions and consumptions were often fell below demand as a result of post harvesting loses caused by pests and other spoilage agents (Patil et al., 2014). Thus, studies have included the economic analysis of pesticides application for fruit growing (Engindeniz and Cosar, 2013).

2.1.1 Payback Period - PP

Payback period referred to the period of time required to recoup the funds expended in an investment, or reach the break-even point in capital budgeted (Gajanan, 2013). To recover the cost of an investment, the length of time was required. The payback period of a gave investment or project was the important determinant of whether to undertake the position or project, as longer payback periods was typically not desirable for investment positions (Branka and Bojan, 2005).

Calculated as:

Payback period = cost of project/annual cash inflows

All the things being equal, the one with the shorter payback period was the better investment. The time value of money was ignored because of these reason other methods of capital budgeting, like net present value, internal rate of return of discounted flow were generally preferred.

The widely term used in other types of investment areas, often with respected to energy efficiency technologies, maintenance, upgrades or other changes. The easier to applied and understood for most individuals, regardless of academic training or field of endeavor, the payback period as a tool of analysis is often used. It can be quite useful when used carefully or to compare similar investments. Payback period has no explicit criteria for decision-making (except, perhaps, that the payback period should be less than infinity) as it was a stand-alone tool to compare an investment to "doing nothing" (Gajanan, 2013).

2.1.2 Net Income

A company's total earnings (or profit). Net income was calculated by taken the revenues and adjusted the cost of doing business, depreciation, interest, taxes and other expenses. This number was found on a company's income statement and was important to measure of how profitable the company over a period of time (Branka and Bojan, 2005). To calculate earnings per share these measure are also used.

Often referred to as "the bottom line" since net income is listed at the bottom of the income statement. In the u.k., net income is known as "profit attributable to shareholders" (Gajanan, 2013).

An individual's income after deductions, credits and taxes are factored into gross income. Deductions and credits are subtracted from gross income to arrive at taxable income, which is used to calculate income tax. Income tax subtracted from taxable income was net income.

By started with a company's total revenue the net income was calculated. From this, the cost of sales, along with any other expenses that the company incurred during the period, is removed to reach earnings before tax. Tax was deducted from this amount to reach the net income number. Like other accounting measures, net income was susceptible to manipulation through such things as aggressive revenue recognition or by hiding expenses (Gajanan, 2013). It was important to review the quality of the numbers that were used to arrive at this value when basing an investment decision on net income numbers.

2.1.3 Gross Income

An individual's total personal income before taking taxes or deductions into account were determined s gross income. A company's revenue minus cost of goods sold also called "gross margin" and "gross profit. How much you make before taxes was your gross income. It was the figure people are looked for when they ask how much you gross a month. These were important number when analyzing a company; it indicates how efficiently management used labor and supplies in the production process. The gross income varies significantly from industry to industry (Branka and Bojan, 2005).

2.1.4 Benefit Cost Ratio - BCR

A ratio attempting to identify the relationship between the cost and benefits of a proposed project were determined as benefit cost ratio (BCR). The most often used in corporate finance to detail the relationship between possible benefits and costs, both quantitative and qualitative, of undertaking new projects or replacing old ones were BCR.

Long-term BCR's, such as those involved in climate change, were very sensitive to the discount rate used in the calculation of net present value, and there was often no consensus on the appropriate rate to use (Gajanan, 2013). Benefit-cost ratio (BCR) was an indicator, used in the formal discipline of cost-benefit analysis, which attempts to summarize the overall value for money of a project or proposal. The ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms were BCR (Branka and Bojan, 2005). All benefits and costs should be expressed in discounted present values.

The account which are taken from BCR was the amount of monetary gain realized by performing a project versus the amount it costs to execute the project. The higher the BCR led to the better the investment. If the benefit is higher than the cost the project is a good investment was the general rule of thumb.

2.2 Pest Attack

Insect pest has been damaged the stored grains in large quantities that was resulted into economic loses (Patil et al., 2014). The fact of crop production was the presence of pests (Engindeniz and Cosar, 2013). During crop growth period dry weather increases the intensity of infestation of insect pest (Sarkar et al., 2013). However, they are appearing many problems such as negative effect to the beneficial insecticides (Sibel and Recep, 2010).

Refer to Engindeniz and Cosar (2013) successful crop production requires that crop pests be managed so that their effects on the plants are minimized. The pest problems managed was directed at preventing pest populations from becoming too large and uncontrollable was mentioned. Thus, to prevent and protect from serious pest and disease farmers used all available options and strategies. Refer to Mari et al. (2013) result surveyed from Asian Vegetable Research and Development Centre (AVRCD) in Asia, the major insect pests of chilly crops is aphids, whiteflies, thrips have been identified as key sucking pest of chilly crops.

Refer to Khalid et al. (2013) the whitefly *Bemisia tabaci* (Gennadius) (Homoptera: Aleyrodidae) was the important vegetables pest in Malaysia. It was a major vector of plant viruses that caused serious crop yield losses. They also state these species were probably introduced from Europe during the importation of ornamental plants. Whitefly infection, especially in tomato, chili causes yield lost of up to 50%.

According to Akashe et al. (2007) due to its fast rate of development and high potential in reproductive process of aphid made it were difficult to control.

2.3 Chemical Control

Farmers practice using chemical pesticides that served as their control treatment (Pawar et al., 2012). The poisons of chemical that kill insects are known as insecticides was mentioned. Pesticides are the only effective means of controlling insect pests was pesticides (Engindeniz and Cosar, 2013). The application of chemical pesticides has been the primary method used to control pests (Khalid et al., 2013).

Chemical control was more preferred according to other methods in the control of pests in agriculture because of easy application and effects shown in a short time (Sibel and Recep, 2010). Refer to Engindeniz and Cosar (2013) prolific used of chemical insecticides significantly curtailed the insect pests in the past but in due course it resulted in, insects developing resistance to insecticides, decrease of environmental and higher in cost of cultivation.

According to Sarkar et al. (2013) state economic yield may be loss around 11-75% quantitatively and around 60-80% qualitatively in the event of serious infestation. They also state that the farmers applied minimum of 5 to 6 round of pesticides sprays to produce the infestation reduction with insect pest, thus the increase of spraying number will occur and cost of pesticides usage is making high.

As insect remains a regulated pest, chemical control was the only options (Espinosa et al., 2010). Thus, to overcome these unfavorable situations, Integrated Pest Management (IPM) strategies were advocated (Engindeniz and Cosar, 2013).

CHAPTER 3

METHODS AND MATERIALS

3.1 Location

Jasin's Uitm, Melaka was the target area for this project. The starting placed conducted at the rain shelter station the through the share farm of Faculty of Plantation Agro technology. The research was carried out from the start of seedling until the growth of crops will be taken.

3.2 Crop preparation

3.2.1 Seedling

Chilly seed sowed in the pods to make sure the seed is successful germinated in poly tray. The seed watered 2 times daily from 7 am and 5 pm. After two weeks in seedling tray, the chilly was transplant into planting bed.

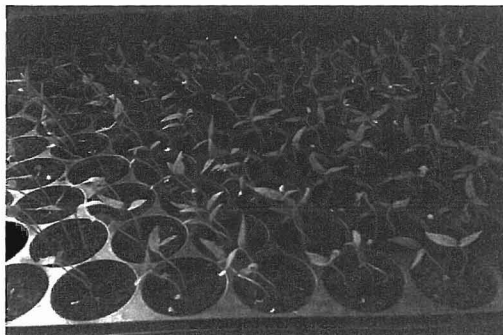


Figure 3.2.1 The seed was been germinated and ready for transplanting

3.2.2 Transplanting

After seed emergence and suitable to be transplanted, the good seedling were selected to be transplanted. To reduce the possibility of seed that cannot emerge and reducing plant infection by disease was the reason why the seed should be transplant.

3.2.3 Preparing of plot

The plot was done before the planting of seedling occur. In this project was the open system cultivation (conversional system), so that beds (plot) have be prepared. Each bed is 12ft x 4ft was measured. Each plot has 10 plants of chilly. The total number of plant chilly is 22425 per hectare.

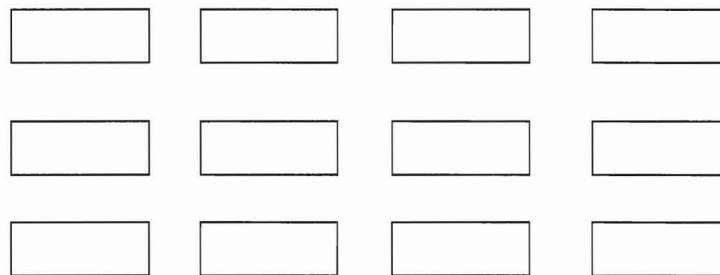


Figure 3.2.3 Example plot of chilly cultivation 4x12 ft

3.2.4 Planting distance

The growers followed the chilly planting space of 2ft x 2.4ft and the bed is 4ft width x 12 ft length. To have the advantage to plant canopy develop and produce more yields, the distance is important. The step guard line farmer practices in planting distance that they normally use in plantation of chilly were followed.

3.2.5 Fertilizer

The N.P.K Blue and N.P.K Green was used as was the normal farmer practices for fertilizer on chilly cultivation. The green function of growth the leaf and NPK fertilizer was primarily composed of three main elements: Nitrogen (N), Phosphorus (P), and Potassium (K), each of these being essential in plant nutrition. Among other benefits, plants grow quickly by helped of Nitrogen, and also increases the production of seed and fruit, and bettering the quality of leaf and forage crops. Nitrogen was also a component of chlorophyll, the substance that gave plants their green color, and also aids in photosynthesis. The chicken manure was used before planting the plant to the beds.



Figure 3.2.5 The NPK green ready to applied to chilly trees

3.2.6 Watering practices

The sprinkler and manual by watering can was used in this research to ensured the planting plot in field was fulfill the capacity condition in early morning and late evening.

3.2.7 Maintenances

Based on farmer practices, this chilly crop same as vegetable cultivation maintenances such as weeding, watering and others.

3.2.8 Harvesting

Harvesting season of this chilly usually expected in early January until early May. Secateurs garden tools were used as manual harvesting approaches to protect plants injuries when using hand. Usually yield was collected every weeks by the farmers (based on farmer practices).



Figure 3.2.8 Chilies were collected and placed before sale

3.2.9 Labor

Labor was the important to keep the chilly produced better production of yield and good in services of labor gave advantage with the crop to increase the net income for farmers. In this case, just one labor was used to keep the chilly maintenance and only 8 hour/day needed in early morning and late evening. The payment for the labor was only RM3/hour.

3.3 Application pesticides

Through of 5 treatments the research was conducted and four of them were chemical and one was untreated (water) for controlled. The types of chemical were Confidor 200SC, Mospilan 20SP, Pegasus 500SC and the other one is Benevia. Then, the treatments were applied to the chilly that has been planted in the field. The application of chemical to the plant was based on guideline (application technique) given from the treatment where different chemical have different application.

Table 3.3.1 Chemical properties of the experimental chilly

Treatment name	Rate use a.i	Active ingredient	Apply/season
1 Benevia	500 mL/ha	Cyazypyr	2 times
2 Confidor 200SC	300 mL/ha	Imidacloprid	1 time
3 Mospilan 20SP	1 L/ha	Acetamiprid	2 times
4 Pegasus	600 mL/ha	Diafenthiuron	2times
5 Untreated (water)	0	Control	-

Table 3.3.2 Cost of chemical each bottle

	Treatment	Value/bottle (RM) 250mL
1	Benevia	125
2	Confidor 200SC	190
3	Pegasus OD	68
4	Mospilan 20SP	57
5	Untreated (water)	-

3.4 Research/Experimental design

The experiment in this study was to analysis and compare the cost selected chemical whether influenced to the chilly cultivation on yield based on benefit-cost ratio, net income and payback period was estimated. The Microsoft excel was used in conducting the research based on information that had been collected to evaluate and analyze the data that collected from the field planting.

3.5 Parameter

The yield was the parameter of this project. The cost cultivation, gross income, net return, payback period and benefit cost ratio were evaluated from the production of yield on chilly produced from the farm with different treatment (pesticides). The price of the inputs that must be prevailing at the time of their use were considered for working out the cost of cultivation and the net return per hectare was calculated by deducting cost of cultivation per hectare from gross income per hectare.

3.5.1 Payback period need to work out as follow:

$$PP = \frac{\text{initial outlay}}{\text{annual cash flows}}$$

3.5.2 Gross income need to work out as follow:

$$GI = \text{sales} - \text{cost of cultivation (not include cost operation)}$$

3.5.3 Net income need to work out as follow:

$$NI = \text{Gross profit} - \text{cost of operation}$$

3.5.4 Benefit cost ratio need to work out as follow:

$$\text{Benefit: cost ratio} = \frac{\text{Gross return (Rm/ha)}}{\text{Cost of cultivation (Rm/ha)}}$$

The decision criteria:

- | | | |
|----|---------|------------------------------|
| If | BCR > 1 | Investment in worthwhile |
| | BCR < 1 | Investment is not worth wile |
| | BCR = 1 | Neutral case |

3.6 Data collection

Data collection was done on early May 2015. The dependent of this research was the yield and their independent was the weight of yield, cultivation cost, gross income, net income, payback period and benefit cost ratio.

3.7 Data Analysis

The cost evaluated based on cost used per hectare from the yield production of chilly. This can be analyzed after chemical pesticides applied on crops to see the effect pest on yield. At the end of experiment, the result was analyzed by used analysis system in excel which was being result the benefit of selected chemical of pest on chilly. To identify which one of selected chemical are most the best and achieve the objective of this project analysis, the benefit cost ratio used. Thus, to t reduce the cost and increase the yield especially on profit to farmers, the most economic treatment might be suggested.

CHAPTER 4

RESULT

The result was end collected on early May 2015 show the comparative cost of chemical pesticides that were selected affecting the yield and also benefit-cost ratio. These be approved with the result that were collected on half of year. The result can be show at below table

Table 4.0.1 Result of Cost comparative

Treatment	Yield (kg/ha)	Cost of cultivation (RM/ha)	Cost of operation (RM/ha)	Sales (RM/kg)	Gross income (RM/ha)	Net income (RM/ha)	B:C ratio	Payback period
Benevia	18994.58	30897.67	25480	113967.48	83069.81	57589.81	2.69	1.16
Confidor	15348.53	30625.67	25480	92091.18	61465.51	35985.51	2.01	1.28
Untreated	11760.42	30397.67	25480	70562.51	40164.84	14684.84	1.32	1.35
pegasus	16956.14	30723.67	25480	101736.84	71013.17	45533.17	2.31	1.23
mospilan	16648.92	30853.67	25480	99893.52	69039.85	43559.85	2.24	1.25

In table above, the explanation of yield, cost \cultivation, sales, gross income, net income, BCR and payback period be described at the point below .

4.1 Yield

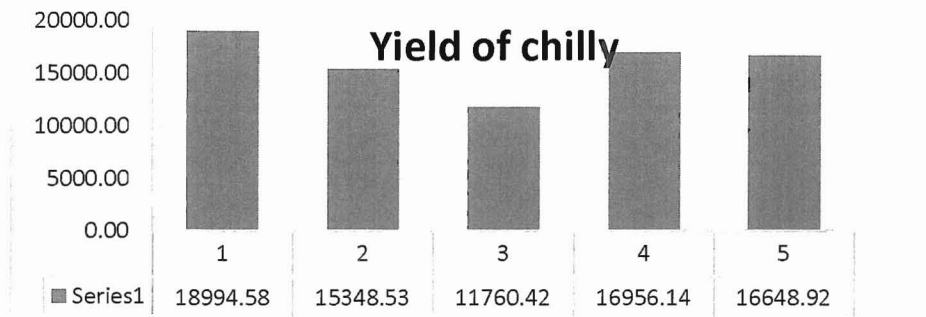


Figure 4.1 The chart show the number of yield in kg/ha

Application of Benevia pesticides registered that produce the highest yield 18994.58 kg/ha in the season of cultivation of chilly which was 2038.44 kg/ha 5 per week different with Pegasus. The average yield was determined to be 1461.12 kg/ha per week. The Confidor shown 15348.53 kg/ha of yield and average was determined 1180.66kg/ha per week that show the second lowest of yield after untreated control. The pegasus was show the second highest after Benevia determined 16956.14 kg/ha and averaged 1304.32 kg/ha per week. The Mospilan show 16648.92 kg/ha of yield and determined averaged was 1280.86 kg/ha per week. Mospilan and Pegasus show a little bit different of yield that determined only 307.22 kg/ha on yield collection. Untreated control which was 11760.42 kg/ha show the lowest yield produced in the season.

4.2 Cost

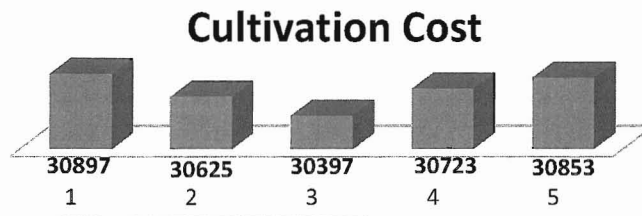


Figure 4.2 The chart show the cost of cultivation in RM/ha

In cost cultivation of chilly shown the most highest was Benevia RM30897.67/ha rather than untreated control which was the lowest cost RM30397.67/ha. The costs were not much different because the same location that data collected and the similar method planting from beginning planted. Therefore, the cost of cultivation for Confidor pesticides used was RM30625.67/ha, Pegasus was RM30723.67/ha and Mospilan was RM30853.67/ha had not much different, which are only treatment were gave different into the cost of cultivation.

4.3 Sales

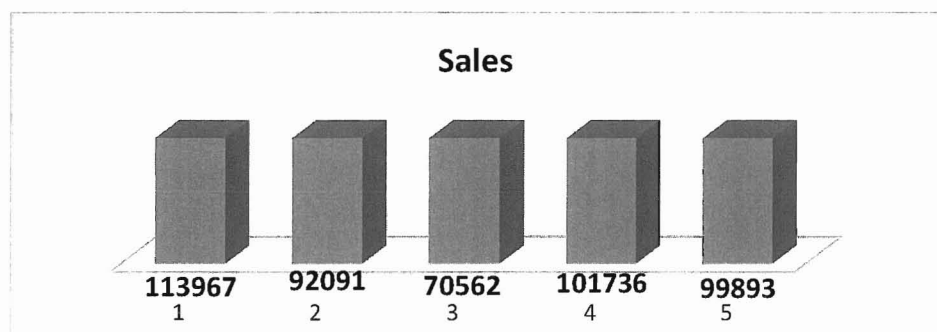


Figure 4.3 The chart show the sales of yield on chilly cultivation

Sales was calculate by multiplying the yield of chilly with RM6 as the price of the chilly per kilogram. The application of Confidor pesticides obtained RM92091.20/ha in the season of cultivation of chilly while the untreated control obtained RM70562.51/ha. The Pegasus and Mospilan were determined that only RM1843.32/ha different sales which are Pegasus was RM101736.84/ha more higher than Mospilan was RM99893.52/ha. However, the highest sales obtained by Benevia which is RM113967.48/kg.

4.4 Gross income

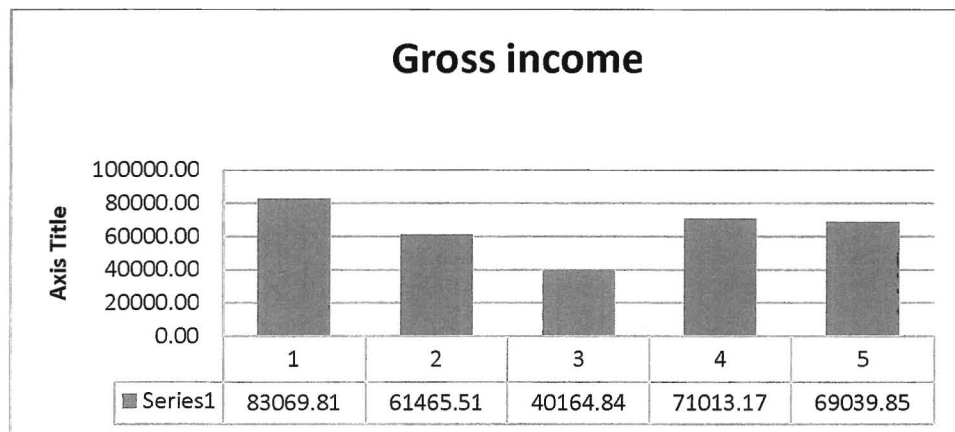


Figure 4.4 The chat show the gross income of chilly

The gross income for chilly cultivation by used of Benevia, Confidor, Pegasus, Mospilan and untreated was RM83341.81/ha, RM61193.53/ha , RM71013.17/ha, RM69039.85/ha and RM40164.84/ha respectively. These shows the gross income for Benevia was the highest followed by Pegasus, Mospilan then Confidor and the lowest gross income was the untreated control. The different between Pegasus and Benevia was RM12056.64/ha and the difference between Confidor and untreated control was RM21028.69/ha.

The higher the gross income shows the efficient the management of production of chilly. These showed the Benevia was the best pesticides used when looking on gross income rather than five (5) treatment.

4.5 Net income

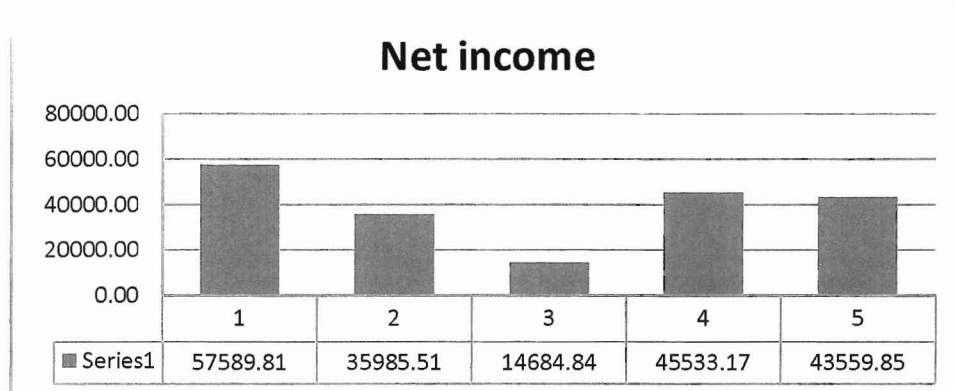


Figure 4.5 The chart show the net income each treatment on chilly

According to the result obtained from the chilly cultivation, it shown the untreated control RM14684.84/ha of net income was the lowest net income and Benevia was the highest which was RM57589.81/ha, respectively. Confidor stated that second lowest treatment of net income and followed by Mospilan and Pegasus which were RM35985.51/ha, RM43559.85/ha and RM45533.17. Under the circumstances, the Benevia used was the better compared to all treatment.

4.6 Benefit-cost ratio(B:C ratio)

The Benefit-cost ratio (B:C ratio) of the chilly cultivation was calculated to be 2.69 for Benevia, 2.01 for Confidor, 2.24 for Mospilan, 2.31 for Pegasus and 1.32 for untreated control. The B:C ratio was calculated by dividing the gross income with the cost of cultivation. The higher the B:C ratio the better the investment, based on the result, the Benevia B:C ratio was the better as it was the higher than others.

4.7 Payback period

It is apparently clear from the results that payback period for Pegasus pesticide, Mospilan pesticide, Confidor pesticide, Benevia pesticide and untreated control. The payback period is important to determine the length of time required to recover the cost of cultivation. The Benevia was the better payback period as it was the shorter period, 1.16 while the untreated control was the worse payback period as it was the longer payback period which is 1.35. The Pegasus has 1.23 shorter payback period than other treatment except Benevia. The Mospilan and Confidor pesticide has 1.24 and 1.28 payback period which were shorter than untreated but still cannot be the better as it was still longer compared to Benevia and Pegasus.

CHAPTER 5

DISCUSSION

Within the season of cultivation, the plant got the same amount of fertilizer, quality of seeds, quantity of water, weather, temperature and cultivation site. The yield of the chilly production was different as five type of treatments used to treat the plants during the cultivation season. The treatments used was Benevia, Pegasus, Mospilan, Confidor and untreated control. The major factors to the different yield each treatment were detected are chemical pesticides because the result of data collection per season determined that totally different. The lowest yield that not use any chemical pesticides show the lowest yield because of many of chilly plant infected by disease that believed they was from pest infestation that brought to plant death. Refer to the Engindeniz and Cosar (2013) stated pesticides are the only effective means controlling insect pest. The economic yield maybe loss around 60-80% qualitatively in the event of serious infestation Sarkar et al. (2013).

Other than that, I assume that the Confidor pesticide stated the lowest yield collected rather than 3 of chemical were being applied into the chilly plants was believed that low of dosage gave some impact to the yield. These support by Hiremath and Hilly (2012) mention Low coverage of plant may result heavy incident from pest attacked and was the reason for low yield in chilly. Mospilan pesticide was the higher dosage of chemical. It was also believed that over dosage of chemical influenced to gave adverse to the yield production of chilly. According to Sarwa (2014) mention that when overusing of chemicals led to several agriculture problems such as poor

system that may reduce the yield. Thus yield are totally affect the sales to the market that may return the net of income.

Benevia pesticide stated the highest yield was collected in the experimental project of chemical application but this chemical was the most highest of cost compared to 4 other treatment that being used in this project. This chemical identified the most better net return and benefit-cost ratio which are the most highest that got to cover the higher of cost. This chemical also show the lowest payback period per month to recover the investment of initial outlay of cultivation. Benevia and Pegasus use the moderate of dos compared to other treatment and applied of 2 times each season cultivation. The proper using of chemical application identified was important to ensure the advantage of lower in cost and higher production of yield and income that affected to the better economic management (Sarkar et al., 2012).

The different of yield had effecting the other of income especially in net return after deducting gross income with cost of operation but in the benefit cost ration show the all of treatment have more than one which means the decision criteria was positive and registered that all treatment are investment in worthwhile and not in worth wile. The lowest BC ratio was untreated control which mean the investment in worthwhile. Thus, the untreated also show the good in cost ratio which mean chilly was also gave some benefit impact to profit despite not much compared to applying chemical control. The yield of chilly cultivation in my project was collected and show got the total of chilly yield lower rather than normal yield per hectare. This support by Asma et al., (2013) stated that the normal yield of *Capsicum annum* in Malaysia average was 1 kilogram per tree for open system rather than my yield collection was 0.8 kilogram per tree. The different place planted may result different collection of yield. The factor problem are soil nutrient and weather. I believed that the nutrient of soil gave some

problem to the farmers to produce better and higher of yield. This support to the Rajkovich et al., (2012) and Wassie Haile (2014) mention that the same variety of a crop for example vegetable when grow different soils differ in nutritional and the soil affecting the quality of crop. In my experiment project, the collection of yield interrupted because of the heavy rain the early flowering season made lower collection than expected.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

Many consumers often don't like to buy vegetable that damaged by insect or that have disease spots. This reason tend to use a lot of pesticides on their cultivation for protection of infestation from the beginning of the season. Using the pesticides increase the cost of production that be use by farmers. Many consumers are willing to pay a higher price for slightly damaged chilly because it is then use of pesticides was low and so residue are also low. Other than that, some time chilly have been grown with high use of pesticides but customer are become aware and aware of the effects of pesticides on their health. The farmer must be alert on using pesticides when growing of vegetable that practice to reduce amount of chemical must a lot of attention.

The majority of the farmers selected varieties that were susceptible to pest and believed that their pesticides use practices were not threat to their ground water. Most of farmers believed that when they do not use of other chemical they can achieve the low of yield and fail to gain the level target would lose more than half yield if pesticides were not available to control pest. But the farmers use an excess amount of most pesticides were contributed to higher in cost of production that may reduce the profit gain. The effective of chemical control need to be share to the farmers to reduced the cost and increase the net return of vegetables. The important to compare the cost of pesticides were to show how the cost influenced the yield and benefit cost ratio. Therefore its particularly important for comparative of cost selected chemical application since the farmers use excessive chemical pesticide was common, and the farmers have depended on pesticides.

As a conclusion, with the better selecting pesticides such example of active ingredient of Benevia which is cyrazypyr can influencing the higher of yield production of vegetable especially on chilly to increase the net income. This research study can give further knowledge and information to the farmers about chemical pest to protect the yield to them.

In recommendation, the selection of pesticides which was Benevia gain high of return on yield in the chilies cultivation sector. This will help the consumer to increase their product that needed to society. Other than that, the more study and research are needed to identify the more of pesticides application that farmers use to find the benefit about cost that they had been used in vegetable cultivation.

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APPENDICES

COST OF PROJECT CHILLY			
No	Detail	Unit	RM
1	Plastic silver shine (250 metre) 44 metre	1	60
2	Peat moss	1	5.5/5 kg
3	Chilly seed (10g/1000seeds)	1	80
4	Tray	2	2
5	Pesticide: Benevia (250ml) a.i 500ml/ha	1	125/bottle
	mospilan		68/b
	pegasus		57/b
	Confidor (250ml) a.i 300ml/ha	1	190/bottle
6	Fertilizer N.P.K Blue (50kg) 5g/tree	1	140
	N.P.K Green (50kg) 5g/tree	1	137
7	Laminate	12	2
8	Wood	12	0.3
9	Labor	1	3/hour

Cost						
Physical and Chemical Properties of Cultivation Chilly						
		Benevia	Confidor	Untreated	mospilan	pegasus
No.	Particulrs Cultivation	Value (RM/ha)	Value (RM/ha)	Value (RM/ha)	value	value
1	Plastic silver shine	1968.51	1968.51	1968.51	1968.51	1968.51
2	Peat moss	370.02	370.02	370.02	370.02	370.02
3	Chilly seed	1794	1794	1794	1794	1794
4	Tray	431	431	431	431	431
5	Pesticide	500	228	0	456	326
6	Fertilizer N.P.K Blue	313.95	313.95	313.95	313.95	313.95
	N.P.K Green	307.23	307.23	307.23	307.23	307.23
	Dung	112.15	112.15	112.15	112.15	112.15
7	irrigation system (water sprinkler)	25100.81	25100.81	25100.81	25100.81	25100.81
	Total	30897.67	30625.67	30397.67	30853.67	30723.67
	Cost operation					
	Labor RM390/month	25480	25480	25480	25480	25480
	Total	56377.67	56105.67	55877.67	56333.67	56203.67

CURRICULUM VITAE

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2. EDUCATIONAL BACKGROUND

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Universiti Teknologi MARA, Jasin	B. Sc. (Hons) Plantation Technology and Management	2013
Universiti Teknologi MARA, Kuala Pilah	Diploma in Planting Industry Management	2009
SM Teknik Port Dickson	Sijil Pelajaran Malaysia (SPM)	2008
SMK. Seri Jempol	Penilaian Menengah Rendah (PMR)	2006
SK Serting Tiga Felda	Ujian Penilaian Sekolah Rendah (UPSR)	2003

3. WORKING EXPERIENCE

Company	Position	Year
TH Plantation Sdn. Bhd.	Practical Trainee	2014
Roscorn plantation Sdn. Bhd.	Practical Trainee	2012
Jabatan Landskap, Seremban Negeri Sembilan	Practical Trainee	2011
Jabatan Pertanian Negeri Sembilan	Practical Trainee	2010