

# INCREASE GROWTH AND PRODUCTION OF CHILI PEPPER THROUGH THE EXTRACTS OF BANANA HUMP AND MIMBA LEAVES

*By Oktavianus*

## **INCREASE GROWTH AND PRODUCTION OF CHILI PEPPER THROUGH THE EXTRACTS OF BANANA HUMP AND MIMBA LEAVES**

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### **ABSTRACT**

The growth and production of curly chili pepper plants are determined by some of the main variables, namely: cultivation techniques, among others from the administration of banana hump extract and Mimba leaf extract as well as pest and disease attacks. Another determining mediation is local weather conditions in Taman Sari District Bogor West Java. The research on Chili pepper is still limited, whereas most people in Indonesia from Sabang to Merauke consume chili in large quantities. The writing of this research article aims to explore the diversity of Indonesia's contribution to Indonesian, among others, the stage of banana and Mimba leaf extracts that can stimulate the growth and results of curly chili peppers. Data analysis uses a group's random design with two variables and 3 times the repetition. The first variable of banana hump extract consists of 4 levels: 0%, 15%, 30%, 45% and the second variable of Mimba leaf extract consists of 4 levels: 0%, 15%, 30%, 45%. Mimba leaf extract provides positive mediation on heading diameters, while the Mimba leaf extract and banana hump provide positive mediation on diameters of headers, leaf area and the number of productive branches. Both of these variables do not provide positive mediation on the production of wet and dried fruit weights due to research taking place in the dry season long from March to July 2019, where rainfall is low and the temperature is relatively high, resulting in Evaporation on the high fruit. The results of this study were supported by previous research stating the 20 to 90% of chili peppers were determined by moisture content. Major diseases and pests are low, the results of the research are supported by previous research that Mimba leaf extract can act as a mediation of pests and diseases.

**Keywords:** growth and production of chili, extracts, banana hump, and Mimba leaves

## INTRODUCTION

Chili peppers include fruit vegetables which are an additional flavoring ingredient with a spicy flavor. Almost all people need chili sauce after being processed from chili raw material. This condition causes the demand for chili pepper to occur in continuity. Chili cultivation often gets the problem of the presence of major pest attacks aphid and diseases of anthracnose in chili Peppers caused by *Colletotrichum capsici* fungus.

The decline in chili pepper production can be caused by many factors, among them, caused by some adverse fungi that are anthracnose chili peppers caused by *Colletotrichum capsici* and other fungi spotting chili leaves (*Cercospora capsici*), Fusarium wither (*Fusarium oxysporum* F. SP Capsici), the cause of nursery disease (*Sclerotium rolfsii*) (Yanti et al., 2019). The production of chili pepper can be drastically decreased by both of the body of the bully, so in this study sought an alternative in pressing the attack through the administration of banana hump and mimba leaves. The level of national chili needs to be increased from April to June 2019. Based on the Ministry of Agriculture's record, the level of national chili needs in April 2019 reached 73,999 tons, in May 75,877 tons, and in June around 77,755 tons. Meanwhile, when compared to the national average production level, these needs are still relatively met. Ismail noted, the national average chili production rate per month reached more than 100 thousand tons. The details of national production were recorded, in April 2019 amounting to 110,707 tons, in May 113,032 tons, while in June it reached 115,357 tons (Damayanti dan Nidia, 2019).

Research on the Chili Planting Movement program has not provided results against the demand for household-level chili, which is seen from: (1) There is no difference in the volume of purchase of chili pepper between before and after the chili Planting movement in the recipient group, and (2) Absence of difference in purchase volume of chili pepper after the program period between the recipient group and no receiver. The main cause of many dead chili plants, which are distributed not by consumer preferences, and chili pepper is an inelastic commodity. This program can take place, if: (1) The type of chili in the program is tailored to the consumer's liking, and (2) the development of systems and institutional order to ensure the sustainability of the program includes the seed sharing system, Group determination Recipient, pre-and post-division mentoring, as well as the technical supply of

cultivation to the recipient group (Nugrahapsari et al., 2019). The development of the export volume of processed chili during the period 2006-2014 increased with an average value of 43.55% per year. The number of exports of Indonesian chili pepper was increased from 1.54 thousand tons 2006 to 14.35 thousand tons in 2015 although in 2011 was decreased to 8.6 thousand from 2010 that is as much as 8.7 thousand tons. While on the other hand, the development volume of imported chili peppers during the period 2006-2015 experienced an increase in the average value of 12.97% per year (Yanuarti Astri Ridha and Mudya Dewi Afsari 2016). The prevention of the main pest and disease of chili Peppers with synthetic pesticides can decrease the level of attack, but the residue negatively affects the environment, such as water, soil, and air. An alternative to overcome the danger of residue through the use of vegetable pesticide origin of plants. Plant-based vegetable fungicide is environmentally friendly so it is not harmful to humans, easily degradable. The use of vegetable pesticides is relatively inexpensive, easy to obtain and easy to use (Suleiman 2010; Andani 2017).

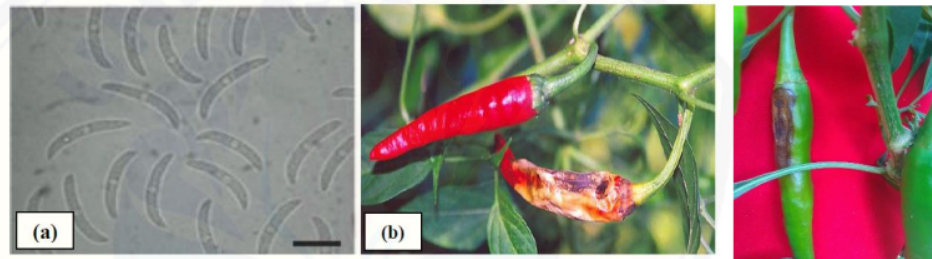
The combination of Mimba leaves (*Azadirachta indica*) with cayenne pepper (*Capsicumshot frutescens*) gives the result of green tick mortality (*Aphis gossypii*). The concentration of a combination of mimba leaves with chili pepper against Green Flea mortality (*Aphis gossypii*) The best result of 15% concentration obtained nymph mortality 85% (Rajab, 2019).

The use of pesticides in agriculture has begun several centuries ago that began with the use of organic substances derived from plants such as pyrethrum and nicotine, and other crops. The Mimba leaf extract test with concentration (0, 0.5, 1, 1.5, 2, 2.5)% against the golden Conch gives the following results: 1. The highest mortality at a concentration of 2.5%, 2. The higher the concentration of given Mimba leaf extract will be high-level Mortality, 3. The lower the concentration of a given mimba leaf extract will increase the breakdown of rice crops (Karyadi, 2018). The liquid formulation of *Azadirachta* seed extract Indica 50 EC is more toxic compared to the formulation of liquid extract *Kalanchoe pinnata* 50 EC against the *Spodoptera* larva Oriental. Also, the liquid formulation of seed extract A. Indica 50 EC resulted in decreased larvae weight and feed consumption, extending the time of development of larvae, and lowering the success rate of larvae evolved into a pupa and Imago (Paramita et al., 2018).

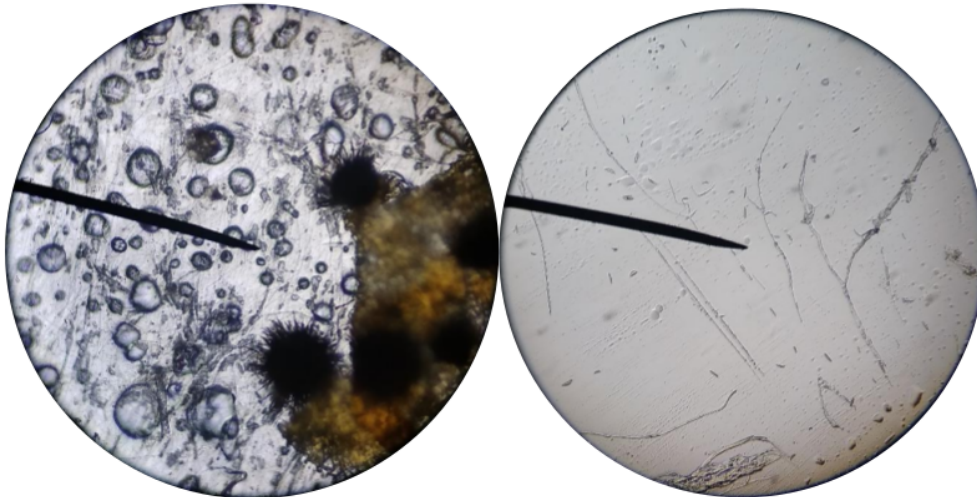
Test result Mimba leaf extract 0%, 1%, 5%, 10%, 15%, 20% against the colony diameter *Colletotrichum capsici* of the Potato dextrose to obtain the lowest diameter *C. Capsici* at a concentration of 20% is 44.25 mm from other concentrations. Classification of *C. Capsici*,

Ningsih (2013) as follows: Divisio: Ascomycota Class: Pyrenomycetes order: Sphaeriales  
Familia: Polystigmataceae Genus: Colletotrichum species: Colletotrichum capsici.

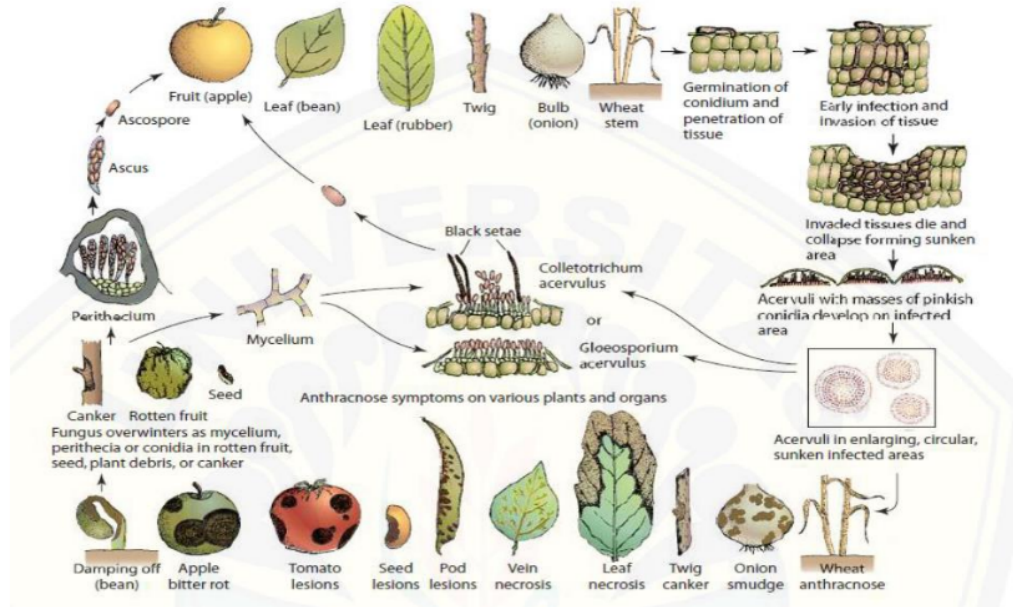
Conidia *C. Capsici*, symptoms of anaphorical disease, and chilies that are affected by the disease in the field are shown in picture one. While the conidia and setae *Colletotrichum capsici* a microscope's field of view 10x10, and the life cycle is shown in picture two.



**Figure:** 1a. Conidia *C. Capsici* (Than et al. 2008), 1b. Symptoms of anaphorical diseases that are said to be *C. Capsici* (Prakash, 2000), 1c. Chili Peppers affected by antrnosa disease.



**Figure:** 2a Image of Conidia and setae *Colletotrichum capsici* observations on the field of view microscope 10 x 10



**Figure:** 2b of the cycle of anthracnose disease caused by *Glomerella cingulata* and *Colletotrichum* or *Gloeosporium* sp. (Agrios, 2015).

The growth and production of chili pepper can be stimulated through the provision of natural growth regulator of the banana hump extract and the result contains Giberelin and cytokine. According to Alfandi and Deden (2016), the combination of regulator growth of Giberelin (0, 50, 100, 150) ppm and mole (10, 20, 30) ML/L is a real effect on the fruit quantity per polybag and fruit weight per chili pepper plant. The concentration of the cuffs 10 ml/l gives a noticeable effect on the high level of chili plants aged 20 HSPT and the average height of 10.56 cm at 60 HSPT. The flowering phase of the beans is also susceptible to abortion, so to prevent from the preventing flower can be applied plant regulating substances, a type of hormone gibberellin (GA3). Gibberellin hormone can stimulate the growth of flowers and the formation of the fruit and strengthen the stem condition of the plant beans. In addition to the flowering phase, the Giberelin hormone also has a role in preventing the loss of interest (Senja, 2019).

## MATERIALS AND METHODS

The research starts from March to July 2019 in Gapoktan Repeh Rapih Land, Sukamantri village, Tamansari District, Bogor Regency, West Java. Farmer groups strive to plant around the research land by planting a type of red chili, long beans, Petsai, and Keladi Bogor. Pests

and anaphylactic diseases are available as a natural source of the snake. The research land used in chili pepper plants in the preparation of polybag 15 cm x 25 cm Unuk Place of seedbed further planting chili seed varieties, the preparation of Polybag media 40 cm x 45 cm for planting, the preparation of Mimba leaf extract and the cuffs of tillers Banana Sword of Kepok, analysis of the type and content of each extract. The observed changes include: height of the plant (cm), Diameter of the stem (cm), leaf area (cm<sup>2</sup>), number of fruit cropping, wet and dried fruit crop (g), the weight of wet and dried plants (g): For the sacrificial plant 4 times the observation and plant samples 1 observation at the end of the study, percentages/events (%) and intensity/severity (%) From pests and diseases. The Data on the termination of the treatment is analyzed using a random design of factorial group with two factors, Mimba leaf extract consists of four levels: 0% (MO), 15% (M1), 30% (M2), 45% (M3), and banana hump extract consists of four levels: 0% (PO), 15% (P1), 30% (P2), 45% (P3). The Data obtained at any time of the change is to be determined in the future if there is a difference in the 5% level tested in advanced using Duncan Multiple Range Test. Linear method of Design random (RAK) Group of factorial are:

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$$Y_{ijk} = \mu + A_i + B_j + (AB)_{ij} + C_k + \epsilon_{ijk}$$

$Y_{ijk}$ : The response value of the i-mimba extract of the b-banana hump extract of the k-j group

$\mu$ : General Middle Value

$A_i$  : Te effect of mimba extract i

$B_j$  : The effect of banana hump extract j

$(AB)_{ij}$ : The interaction effect of the i-mimba extract of j-banana hump extract

$C_k$ : the influence of the k-th group

$\epsilon_{ijk}$ : Trial errors at the age of the mimba extract i and the k-banana hump extract.

## RESULTS AND DISCUSSION

### A. Results

**Table 1. Average height of plants**

Average plant height of the day after planting (cm)						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>						
M0	24,94	37,29	42,26	44,80	46,28	47,27
M1	25,41	38,30	44,64	47,92	49,79	50,19
M2	24,24	37,20	41,78	44,83	45,89	47,90
M3	22,79	35,42	40,52	45,06	46,64	46,87
<b>Banana Hump Extract</b>						
P0	23,07	35,54	40,17	43,39	45,33	46,74
P1	23,57	36,87	43,10	45,42	47,27	47,65
P2	25,49	38,04	42,79	46,30	47,41	48,09
P3	25,24	37,76	43,14	47,48	48,59	49,76

Based on table 1 indicates that the extract treatment of mimba leaves or extracts Banana hump for all treatments do not give results, but the average height of the plant for each of the treatment of Mimba leaf extract and banana hump extract ranging from the age of 14 DAP , 24 DAP, 34 DAP, 44 DAP, 54 DAP, 64 DAP occurs Higher crop rise. This is due to the content of active ingredients found in Mimba leaf extract and banana hump extract can stimulate crop height growth. According to WEA (2018) Application of organic fertilizer liquid block banana saba concentration 10%, 20%, 30% does not affect the height of plant stem okra.

**Table 2. Average diameter of plant stem**

Average stem diameter of the day after planting (cm)						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>						
M0	0,44	0,50	0,64	0,71	0,78	0,83
M1	0,45	0,52	0,64	0,74	0,83	0,88
M2	0,41	0,51	0,63	0,72	0,82	0,89
M3	0,42	0,48	0,63	0,74	0,83	0,88
<b>Banana Hump Extract</b>						
P0	0,41	0,47	0,59	0,70	0,78	0,84
P1	0,43	0,51	0,66	0,74	0,83	0,88
P2	0,45	0,52	0,64	0,74	0,81	0,86
P3	0,44	0,51	0,65	0,73	0,84	0,91

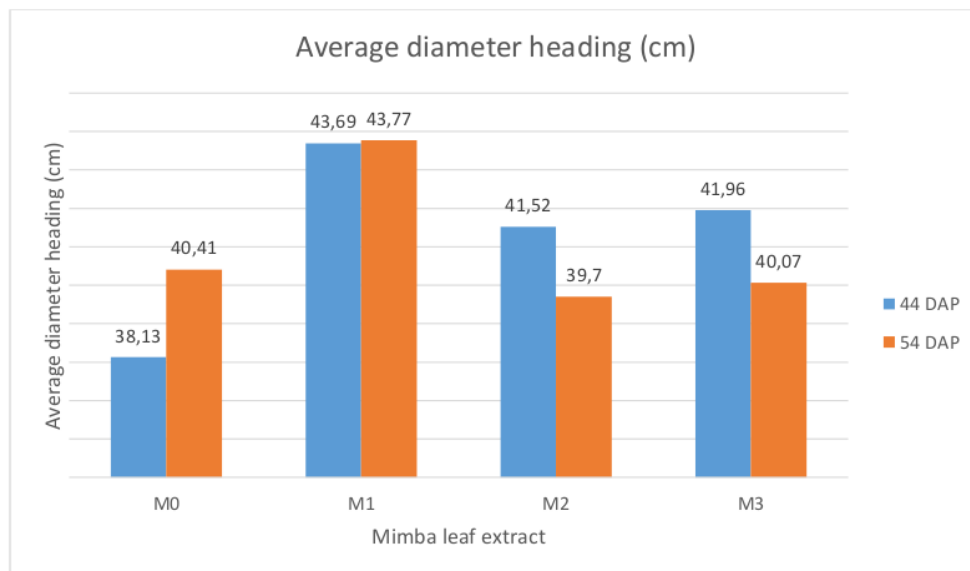


Average diameter of the plant stem for each Mimba leaf extract treatment and banana hump extract at all ages did not provide results, but the average diameter of the stem for each of the Mimba leaf extract treatment and banana hump extract Starting from age 14 DAP, 24 DAP, 34 DAP, 44 DAP, 54 DAP, 64 DAP rise steadily. The compound content of Mimba leaf extract and banana hump extract can stimulate the addition of stem diameters.

**Table 3. Average diameter heading**

Average canopy diameter of the day after planting (cm)						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>						
M0	23,97	32,09	35,00	38,13a	40,41a	36,51
M1	25,02	33,23	38,94	43,69b	43,77b	39,68
M2	23,43	33,94	36,21	41,52b	39,70a	38,24
M3	22,80	31,79	34,15	41,96b	40,07a	37,91
<b>Banana Hump Extract</b>						
P0	23,50	30,92	33,69	39,83	39,62	37,77
P1	23,64	34,67	36,75	40,66	40,51	37,59
P2	24,58	32,88	38,06	41,48	41,54	37,66
P3	23,50	32,58	35,81	43,32	42,28	39,33

Description: The average value in the same row followed by the same letter does not differ according to the DMRT test at 5% level



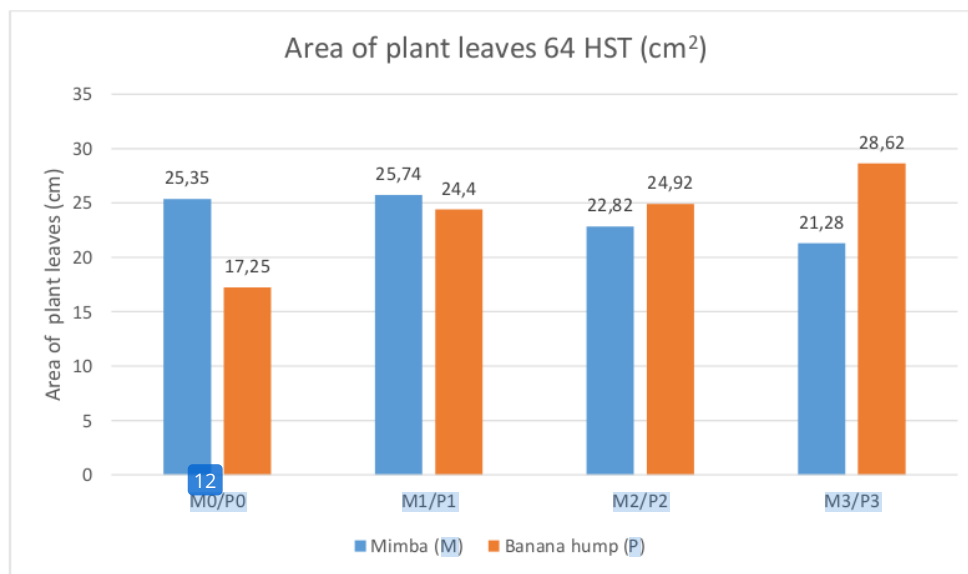
**Figure 3:** The average diameter of the heading is 44 and 54 days after planting

The average result of a mimba leaf extract treatment for the diameter of the heading's head diameters 44 DAP and 54 DAP Ascendant for other ages there is no difference, while the average banana hump extract treatment is no different. The compound content of Mimba leaf extract and banana hump extract stimulated at the age.

**Table 4 Average area of plant leaves**

Average leaf area the day after planting (cm <sup>2</sup> )						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>						
M0	18,40	20,38	31,09	34,66	26,83	25,35b
M1	17,89	21,60	29,89	33,01	26,71	25,74b
M2	17,77	19,99	29,67	35,06	27,85	22,82a
M3	15,77	20,37	28,71	34,03	27,45	21,28a
<b>Banana Hump Extract</b>						
P0	16,72	20,81	30,44	33,74	27,57	17,25a
P1	17,04	18,69	28,95	35,11	27,71	24,40b
P2	17,64	22,00	31,03	33,31	26,86	24,92b
P3	18,43	20,83	28,95	34,60	26,70	28,62c

Description: The average value in the same row followed by the same letter does not differ according to the DMRT test at 5% level



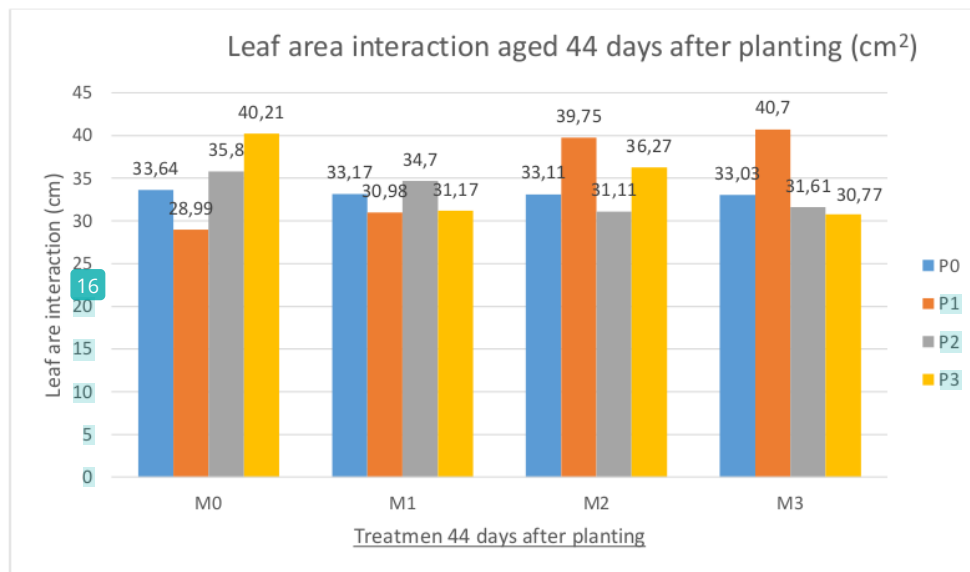
**Figure 4:** The average leaf area is 64 days after planting

The average self-treatment of Mimba leaf extract and a prominent banana hump extract on the area of the Leaf age 64 DAP. The compound content of Mimba leaf extract and banana hump extract stimulated the leaf area at age 64 DAP.

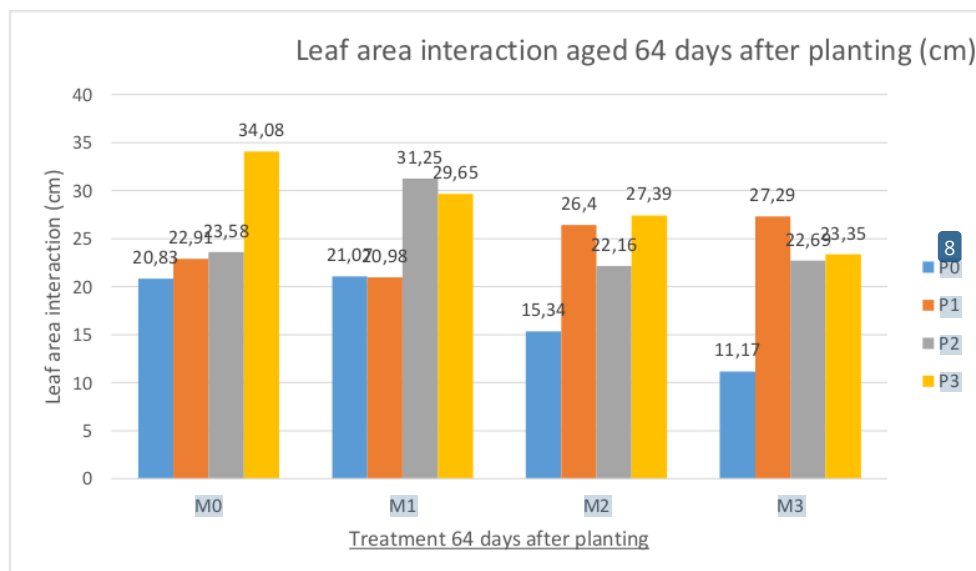
**Table 5. Average interaction of leaves area of plants**

		Average interaction of leaves area of plants (cm <sup>2</sup> )			
	Treatment	P0	P1	P2	P3
Age 44 DAP	M0	33,64abcd	28,99a	35,80bcde	40,21de
	M1	33,17bcde	30,98ab	34,70bcde	31,17ab
	M2	33,11abc	39,75cde	31,11ab	36,27bcde
	M3	33,03ab	40,70e	31,61ab	30,77ab
Age 64 DAP	M0	20,83b	22,91bcd	23,58bcde	34,08h
	M1	21,07b	20,98b	31,25gh	29,65fgh
	M2	15,34a	26,40cdef	22,16bc	27,39efg
	M3	11,17a	27,29defg	22,69bc	23,35bcd

Description: The average value in the same row followed by the same letter does not differ according to the DMRT test at 5% level



**Figure 5:** The average interaction leaf area of the plant is 44 days after planting



**Figure 6:** The average interaction leaf area of the plant is 64 days after planting

On average, the treatment of Mimba leaf extract and banana hump extract shows the interaction of real difference at the age of 44 DAP and 64 DAP. The content of compounds found in Mimba leaf extract and an influential banana hump at age 44 DAP and 64 DAP.

**Table 6. Average number of fruits**

Treatment	Average number of fruits (g)		
	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>			
M0	4,86	8,78	5,14
M1	5,97	11,61	8,19
M2	4,89	8,94	6,36
M3	5,44	10,08	6,58
<b>Banana Hump Extract</b>			
P0	4,44	9,39	6,44
P1	5,42	9,72	6,31
P2	5,47	8,19	5,28
P3	5,83	12,11	8,25

The average treatment of Mimba leaf extract and banana hump extract on the amount of fruits for all ages does not indicate a difference.

**Table 7. Average main branch**

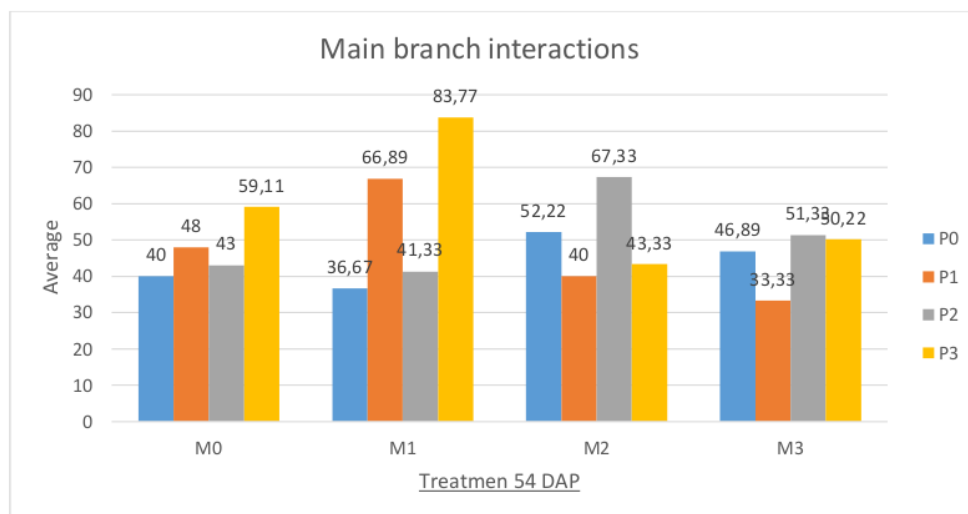
Average main branch						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>						
M0	2,47	7,83	24,42	39,14	47,53	30,17
M1	2,94	9,22	27,94	47,56	57,17	34,06
M2	1,67	8,67	21,33	33,89	50,72	28,06
M3	1,69	8,39	23,56	40,94	45,44	28,83
<b>Banana Hump Extract</b>						
P0	1,89	7,22	21,00	36,67	43,94	30,83
P1	2,03	8,33	24,50	37,22	47,06	25,05
P2	2,58	9,89	25,64	39,58	50,75	31,17
P3	2,28	8,67	26,11	48,06	59,11	34,06

The average treatment of Mimba leaf extract and banana hump extract on average main branches for all ages does not give different results.

**Table 8. Main branch interactions**

Main branch interactions					
	Treatment	P0	P1	P2	P3
54 DAP	M0	40,00ab	48,00abc	43,00abc	59,11bc
	M1	36,67ab	66,89c	41,33ab	83,77d
	M2	52,22bc	40,00ab	67,33c	43,33abc
	M3	46,89abc	33,33a	51,33abc	50,22abc

Description: The average value in the same row followed by the same letter does not differ according to the DMRT test at 5% level



**Figure 7. Main Branch Interactions**

**Table 9 Average fruit dry weight and fruit wet weight**

Treatment	Average fruit dry weight				Average fruit wet weight			
	44 DAP	54 DAP	64 DAP	74 DAP	44 DAP	54 DAP	64 DAP	74 DAP
<b>Neem extract</b>								
M0	21,63	13,68	13,42	6,33	26,63	18,04	16,00	11,96
M1	20,79	22,74	17,94	9,69	24,42	26,40	21,88	16,60
M2	16,31	21,31	16,10	9,92	20,53	25,76	20,40	17,29
M3	22,63	15,07	15,00	9,38	26,74	19,74	19,14	18,50
<b>Banana hump extract</b>								
P0	17,51	19,61	12,67	11,32	22,10	24,81	16,74	19,60
P1	22,17	19,40	16,79	8,00	26,54	23,72	20,13	14,83
P2	22,04	16,47	16,17	7,92	26,81	20,17	20,18	14,58
P3	19,63	17,32	16,83	8,08	22,86	21,25	20,38	15,33

The average treatment of Mimba leaf extract and banana hump extract does not give different results for all the wet weight of the fruit and dry weight of the fruit. The compound content in both extracts on average treatment does not stimulate the results on the wet and dry weight of the fruit.

**Table 10 Average root dry weights and root wet weights**

Treatment	Average root dry weights				Average root wet weights			
	44 DAP	54 DAP	64 DAP	74 DAP	44 DAP	54 DAP	64 DAP	74 DAP
<b>Neem extract</b>								
M0	0,33	1,73	2,22	3,42	3,35	5,67	7,08	9,08
M1	0,36	1,78	2,08	3,67	3,58	6,50	6,50	11,42
M2	0,47	1,81	2,59	3,75	4,95	6,58	8,08	10,83
M3	0,49	1,85	2,22	4,33	4,99	7,25	6,75	12,00
<b>Banana hump extract</b>								
P0	0,40	2,01	2,13	3,42	4,25	6,83	6,50	10,25
P1	0,41	1,50	2,21	3,75	3,98	6,67	7,67	10,67
P2	0,39	2,00	2,71	3,75	4,21	6,33	7,42	10,42
P3	0,45	1,67	2,07	4,25	4,44	6,17	6,83	12,00

The average self-treatment of Mimba leaf extract and banana hump extract does not affect all root dry-weight changes and root wet weights.

**Table 11 Average crown dry weight and crown wet weight.....**

Treatment	Average crown dry weight				Average crown wet weight			
	44 DAP	54 DAP	64 DAP	74 DAP	44 DAP	54 DAP	64 DAP	74 DAP
<b>Neem extract</b>								
M0	1,90	10,69	7,53	10,44	18,20	29,42	37,33	37,33
M1	1,75	19,57	9,03	15,03	17,04	40,42	43,75	43,42
M2	2,14	15,38	9,64	12,71	21,60	31,92	46,83	38,67
M3	1,98	13,80	8,57	14,78	19,28	31,17	39,67	44,33
<b>Banana hump extract</b>								
P0	2,00	17,72	7,73	11,68	19,58	41,17	37,08	39,92
P1	1,74	10,33	8,46	14,98	17,08	25,58	42,33	43,75
P2	2,22	16,03	9,38	14,15	21,40	34,75	41,42	39,08
P3	1,82	15,38	9,19	12,17	18,05	31,42	46,75	41,00

Average self-treatment of Mimba leaf extract and banana hump extract does not affect the results of all time observation of header dry weights and heading wet weights.

**Table 12. Average incidence of disease in the fruit**

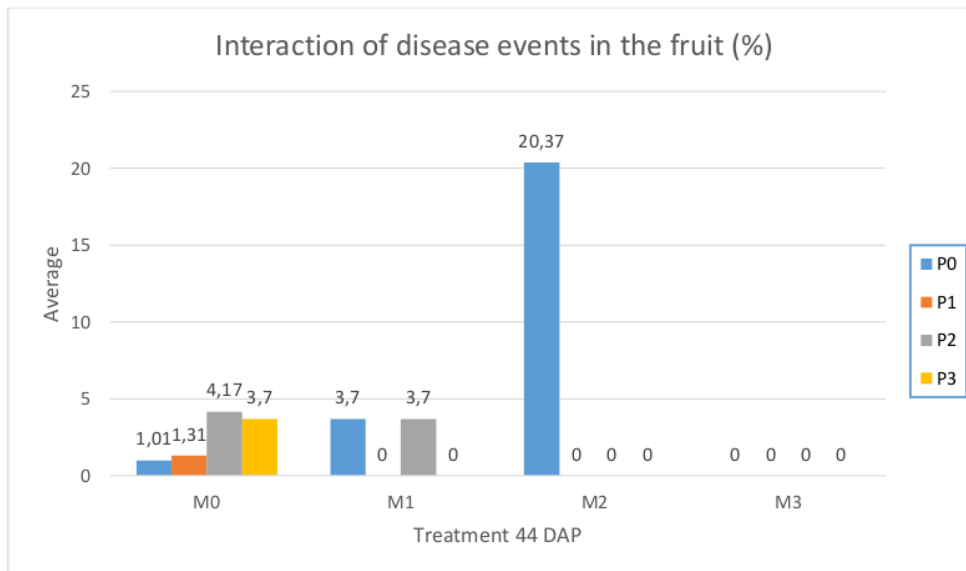
Treatment	Average incidence of disease in the fruit (%)					
	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
<b>Mimba Leaf Extract</b>						
M0	0,00	0,00	0,00	2,55	2,78	5,05
M1	0,00	0,00	0,00	1,85	0,46	1,55
M2	0,00	0,00	0,00	5,09	1,56	0,92
M3	0,00	0,00	0,00	0,00	0,00	2,49
<b>Banana Hump Extract</b>						
P0	0,00	0,00	0,00	6,27	0,63	1,20
P1	0,00	0,00	0,00	0,33	0,00	5,05
P2	0,00	0,00	0,00	1,97	2,78	2,52
P3	0,00	0,00	0,00	0,93	1,39	1,25

The average self-treatment of Mimba leaf extract and banana hump extract has no effect on all time observation of disease events on the fruit.

**Table 13. Average interaction of disease events in the fruit**

Interaction of disease occurrence in the fruit (%)					
Perlakuan		P0	P1	P2	P3
44 DAP	M0	1,01a	1,31a	4,17a	3,70a
	M1	3,70a	0,00a	3,70a	0,00a
	M2	20,37b	0,00a	0,00a	0,00a
	M3	0,00a	0,00a	0,00a	0,00a

Description: The average value in the same row followed by the same letter does not differ according to the DMRT test at 5% level



**Figure 8:** Interaction of disease events on the fruit

The average combination treatment (interaction) of Mimba leaf extract treatment and the extract of a banana's hump affect the incidence of disease at 44 DAP observation.

**Table 14. Average-the severity of disease in the fruit**

The average response severity of the disease in the fruit (%)
---



Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
Mimba Leaf Extract						
M0	0,00	0,00	0,00	0,88	2,08	3,27
M1	0,00	0,00	0,00	0,46	0,12	1,31
M2	0,00	0,00	0,00	3,70	0,39	0,79
M3	0,00	0,00	0,00	0,00	0,00	1,23
Banana Hump Extract						
P0	0,00	0,00	0,00	4,00	0,16	1,20
P1	0,00	0,00	0,00	0,33	0,00	2,77
P2	0,00	0,00	0,00	0,49	2,08	1,70
P3	0,00	0,00	0,00	0,23	0,35	0,93

The average self-treatment of Mimba leaf extract and banana hump extract has no effect on all time observations of disease severity in the fruit.

**Table 15. The average incidence of pest attack**

The average incidence of pest attack (%)						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
Ekstrak mimba						
M0	2,51	3,94	3,72	4,63	6,52	4,94
M1	0,52	1,14	1,24	2,97	3,01	2,95
M2	2,85	4,16	2,64	5,06	4,94	5,01
M3	1,48	2,12	2,35	3,47	5,35	2,94
Banana Hump Extract						
P0	1,60	2,43	2,22	4,84	4,65	4,06
P1	2,94	3,98	3,38	4,12	5,16	3,85
P2	1,66	3,37	2,71	4,09	5,70	4,34
P3	1,17	1,58	1,63	3,07	4,32	3,59

The average self-treatment of Mimba leaf extract and banana hump extract does not affect all the occurrences of pest attack.

**Table 16. Average severity of Pest attack**

Average severity of Pest attack (%)						
Treatment	14 DAP	24 DAP	34 DAP	44 DAP	54 DAP	64 DAP
Mimba Leaf Extract						
M0	2,51	1,67	6,34	2,33	2,60	2,33
M1	0,52	0,54	0,88	0,85	1,06	1,15
M2	2,85	1,71	2,72	2,21	2,10	2,25
M3	1,48	0,89	3,87	1,62	1,79	1,41
Banana Hump Extract						

P0	1,60	1,03	4,44	2,00	2,10	1,79
P1	2,94	1,54	5,78	1,76	2,14	2,02
P2	1,66	1,55	1,43	2,05	2,16	2,02
P3	1,17	0,68	2,17	1,20	1,15	1,31

The average self-treatment of Mimba leaf extract and banana hump extract does not affect all the severity of pest attack.

**Table 17. The average diameter of a mushroom colony *Colletotrichum capsici* on the media PDA days after inoculation (DAI = Days After Inoculation)**

Treatment	The average diameter of a mushroom on a PDA (cm)			
	2 DAI	4 DAI	6 DAI	8 DAI
Mimba Leaf Extract				
M0	6,79	7,79	8,23	8,37
M1	6,48	6,92	7,17	7,30
M2	6,37	7,27	7,31	7,34
M3	6,75	7,38	7,45	7,45

The average concentration treatment of mimba leaves in the age of the termination of the MO treatment compared with the treatment of M1, M2, M3 occurred the repression of colony diameter, although there is no difference in each treatment. The inhibitory percentage of diametre colonies, according to Kumar (2007) with the formula:  $THR = (D1-D2)/D1 \times 100\%$ , where: THR: The relative resistance level of the test pathogenic colony with treatment D1 = Colony diameter Test at control D2 = Colony diameter on treatment.

Furthermore, the level of isolation of the isolates of *Colletotrichum* spp. On the active ingredient fungicide can be seen from the relative barrier level (THR), Kumar et al. (2007) to determine the criteria: very sensitive (SS):  $THR > 90\%$ , sensitive (S):  $75\% < THR \leq 90\%$ , Medium Resistance (RS):  $60\% < THR \leq 75\%$ , resistance (S):  $40\% < THR \leq 60\%$ , very resistant (SR):  $THR \leq 40\%$ .

Based on the formula obtained inhibitory colony diameter in table 18.

**Table 18. Average inhibition of mushroom colony diameter in PDA media**

Treatme nt	The average inhibition of colony diameter <i>Colletotrichum Capsici</i> on PDA media (CM)				Total	Rata-rata
	2 DAI	4 DAI	6 DAI	8 DAI		
Ekstrak mimba						
M1	6,19	11,17	12,88	12,78	43,02	10,76
M2	6,37	6,67	11,18	12,30	36,52	9,13

M3	0,59	5,26	9,48	10,99	26,23	6,58
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The barrier level relative diameter of the largest colony is ordered starting treatment of M3, M1, M2. The relative resistance levels of the three treatments include the very resistant categories.

## **B. Discussion**

### **Banana Hump Extract**

The results of laboratory analysis of Banana's hump are obtained by a growth regulator consisting of Zeatin and Kinetin, and the regulatory substances grow gibberellin. The growing regulator can stimulate the growth and production of curly chili plants. From the research results, visible self-influence regulators grow the origin of the banana hump that can spur the area of the leaf. There is the influence of the joint treatment (interaction) of regulators growing banana and mimba leaves in the spur of growth in the area of chili pepper. The average treatment of regulator grows cytokine and gibberellin origin of banana hump extract and pesticide origin of Mimba leaf extract can stimulate the growth of the leaf area. The average height of the plant and the diameter of the rod to extract banana hump continues to increase every observation time starting from 14 DAP up to 64 DAP. The average number of fruits rose from 44 DAP to 55 DAP and dropped 66 DAP. The average wet weight of fruit and dry weight of fruit does not affect. According to Sari et al. (2012), the administration of 0%, 8%, 16%, 24%, 32%, 40% mol jackfruit bananas are influential in the production of Rosella flower amount, but have no effect on the wet weight of flowers because the research was conducted in the dry season with the bulk Low rainfall. Furthermore, according to Widiastuti et al. (2004), an increase in light intensity from 75% to 100% resulted in a reduced heading dry weight, with the increased light intensity it would increase the environmental temperature of the plant, resulting in respiration Crop increases. The dry weight of the roots and the wet weight of the roots continues to increase every observation time from 44 DAP to 66 DAP. Average dry-weight headers and wet-weight headers tend to rise from the time of observation. The average number of main branches successfully influenced jointly by the Mimba leaf extract treatment and banana hump extract.

### **Mimba Leaf Extract**

Results of laboratory analysis of Mimba leaf extract obtained natural pesticide compounds. Pesticides found in Mimba leaf extracts can spur the broad growth of the leaves, also affecting the diameter of the plant headers. There is a joint influence (interaction) between

Mimba leaf extract and banana hump extract in spurring the vast growth of chili leaf plants. The wide addition of the leaves is influenced by both treatments because independently of each treatment stimultheaded the area of the leaf. The addition of the leaf area will spur the rate of crop photosynthesis. The average height of the plant and the diameter of the stem for Mimba leaf extract increases steadily every observation time starting from 14 DAP up to 64 DAP.

The average number of main/productive branch fruits rises from 44 DAP to 55 DAP and down 66 DAP. The average wet weight of fruit and dry weight of fruit does not affect. The dry weight of the roots and the wet weight of the roots continues to increase every observation time from 44 DAP to 66 DAP. Average dry-weight headers and wet-weight headers tend to increase over time of observation.

## CONCLUSION

Based on the results of research and discussion can be concluded:

1. The concentration of Mimba leaf extract and banana hump extract stimulates growth but does not stimulate the production of chili Peppers in the dry season
2. The curly chili plants that are given the concentration of Mimba leaf extract and the banana hump extract show different results.
3. Addition of heading diameter, the number of productive branches and broad leaves can be optimized through the administration of Mimba leaf extract and banana hump extract.
4. The concentration of Mimba leaf extract and banana hump extract gives the result of a joint influence on the area of the leaves and productive branches.
5. The wet weight and dry weight of the fruit that is given the concentration of Mimba leaf extract and the banana hump extract has not given the results differently, but tabulated observations 44 DAP higher than observations 54 DAP and 64 DAP.
6. The incidence of disease at the age of 44 DAP is influenced by the concentration of the extract of Mimba leaves and the concentration of extract of banana hump 0% (P0).
7. The severity of the disease in the fruit is not affected by the concentration of Mimba leaf extract and banana hump extract.
8. Administration of Mimba leaf extract concentration and banana hump extract provides fluctuating numbers on the incidence and severity of disease and pest attack.

## POLICY IMPLICATIONS

This research by modifying the different variables can be developed collectively in some areas of Indonesia to increase the growth and production of chili plants, especially in the rainy season.

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