AJM BES VOL. 17, NO. 2, 2015 (ISSN 0972-3005)

Asian Journal of Microbiology, Biotechnology & Environmental Sciences

MICROBIOLOGY

BIOTECHNOLOGY

ENVIRONMENTAL SCIENCES

Special Issue–Proceedings of
International Conference on Biodiversity Crisis (ICBC Indonesia)

4-5 September, 2014
Bogor, Universitas Negeri, Jakarta, Indonesia

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Asian Journal of Microbiology, Biotechnology & Environmental Sciences (AJMBES)

Quarterly International Journal (ISSN 0972-3005)

(www.envirobiotechjournals.com)

ABSTRACTED IN : Chemical Abstracts, USA, Ecological Abstracts, Cambridge Science Abstracts, Ecodisc CD-ROM, Geological Abstracts, Pollution Abstract, International Development Abstracts, (Elsevier), Paryavaran Abstracts India, Indian Science Abstracts, Current Awareness in Biological Sciences, Word Textile Abstracts Fluid Abstracts, Oceanography Literature Review, EBSCO, USA, Covered in SCOPUS.

NAAS Impact Rating 3.07, SCOPUS H Index - 11.00

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Asian Journal of Microbiology, Biotechnology & Environmental Sciences Journal Papers

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NURMASARI SARTONO, DERY NOVIANTO, ERLANDY ULFA, A.B. SUSANTO AND RINI PUSPITANINGRUM

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Asian Jr. of Microbiol. Biotech. Env. Sc. Vol. 17, No. (1) : 2015 : 1-4

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POTENTIAL TEST OF VARIOUS LOTION FORMULA FROM ZODIA'S (*EVODIA SUAVIOLENS SCHERF*) LEAF OIL AS REPELLENT AGAINST *CULEX QUENQUEFASCIATUS* MOSQUITO CAUSES ELEPHANTIASIS

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Key words : *Zodia, Evodia suaviolens Scherf, Repellent, Culex quenquefasciatus.*

Abstract - The research was conducted on phytochemicals test of zodia's leaf essential oil by GC-MS, showed that the leaf oil contains 3 dominant compounds is menthofuran 26.92%, evodone 17.36%, and dl-Limonene 12.09%. The potential of formula with 5% concentration of zodia's leaf oil on liquid paraffin is 78% against *Culex quenquefasciatus* mosquitoes. The next stage is distillation of mature zodia's leaf using steam distillation. Essential oils are tested with GC-MS containing menthofuran 40.69%, 0.27% ß-myrcene, benzofuranone 20.26%, 14.51% D-limonene. The zodia's leaf oil was formulated in 4 types. Potential test showed that all formulas have the power of protection against *Culex quenquefasciatus* mosquito above 90% for 7 hours.

INTRODUCTION

Mosquitoes are insects that have an important role in human life. Several types ofbeneficial insects to humans such as honeybees, silkworms, insect pollinators, but there are also insectsthat can be harmful to human life that is destructive plants and mosquitoes as vectors diseases.Culex quenquefasciatus as filariasis vector.

Commonly to avoid mosquito bites by using repellent. According to Patel and Oswal (2012), repellent derived from plants or plant-based insecticides are often better than synthetic insecticides, and be an alternative as a mosquito repellent because it does not interfere with the health and environmentally friendly. One of the types of medicinal plants as mosquito repellent considerable potential for development is zodia (*Evodia suaveolens* Scherf). This herb has been used by people in Papua as a traditional medicine, especially as repellent, the leaves are used as a tonic to increase stamina and bark decoction as a reliever malaria fever. Zodia plants produce essential oils which are believed to contain evodiamine and rutaecarpine (Syarifa, 2002).

According Kardinan (2004), oil is distilled from the zodia leaves also contain linalool 46% and 13.26% apinen not preferred by insects. According Moerfiah *et al*., (2013) that the zodia's oil contains menthofuran, evodone, L-Carveol, 1-Naphthalenol with menthofuran content of 26.92%, and has been testing the effectiveness of oil zodia as repellent mosquitoes causeselephantiasis. The test results showed that the oil has a brushed zodia at a concentration of 5% at 78.92%.

In this research formulatedessential zodia's leaf oil asa lotion, because lotion is suitable preparations for delivering the active oil substance. Lotion is used for external on the skin as a protection for the drug or because the active ingredient. The liquid consistency that allowevenly and rapidlyto be used on large skin surfaces. The zodia's leaves oil smell very pungent and unpleasant; therefore there is a challenge in this research to produce a formula that does not pungent but containing essential oil of zodia at an effective concentration, as repellent against *C. quenquefasciatus*.

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MATERIAL AND METHODS

Zodia's Leaf Oil Lotion Preparation: Twenty-three pounds of fresh old zodia'sleaves are sliced, then distillated by the method of distillation (water-steam) for 5 hours. The ingredients of the distillation were analyzed, and then formulated atvarious formulas to the main content of 5% the zodia's leave soil. Materials for the lotions are shown in Table 1.

Table 1. Materials of lotions

Material	Percentage(%) in formula			
	1	2	3	4
Zodia's oil	1.0	5.0	5.0	5.0
Stearic acid	5.7	3.9		3.0
Span 60	1.0			
Tween 60	2.0			
Cetyl alcohol	0.7	1.0		0.5
Lanolin	1.4	3.0		1.0
Glycerin	2.0	4.1		2.0
Isopropyl palmitat	1.0		2.0	
Trietanolamin	0.7	1.0	1.0	0.1
Methyl paraben	0.2	0.2	0.1	0.1
Seto stearyl alcohol		1.0		
Olive oil		3.0		
Propilyn glycol		3.0		
Gliceryil monostearat			3.2	
Oleic acid			2.0	
Sorbitol			2.0	
Alcohol			4.0	
Parfume	qs	qs	qs	qs
Distillated water(add)	100	100	100	100

Zodia's leaf oil as repellent: 125 female mosquitos' *C. quenquefasciatus* are divided into 5 pieces cages (each cage containing 25 mosquitoes). Further more prepared 5 people as volunteers aged 21-23 years old uniform. Each left hand smeared with general productas the positive controland with 4 formula lotiontreatments respectively of 3 mL, while the right hand isnot smeared and served as the control. Landing mosquitoeson each left and right hand are calculated. Carried out for 6 hours, at every hour be repeated 6 times with intervals of 30 seconds. Repellencyor protection calculated following the formula below.

$$\text{Protection (P)} = \frac{(C - T)}{C} \times 100\%$$

C = number of attachment mosquitoes in the hand control

T = number of attachment mosquitoes in the hand treatment

RESULTS AND DISCUSSION

Zodia's Leaf Essential Oil Distillation (*Evodia suaveolens* Scheff.) : Zodia'sOil obtained from 23 kg of oldzodia'sleaves (*Evodia suaveolens* Schaff) is as much as 97 ml with the yield obtained was 0.4385%. Distillation method used is steam distillation and water (Figure 1). This method is a method of distillation with a low saturated vapor pressure due to temperature saturated steam which is used at a pressure of 1 atmosphere (at atmospheric pressure vapor temperature was never more than 100 °C) and for this reason the oil damage is smaller, compared with the oil obtained from direct steam distillation results, especially the high-pressure steam or vapor overheat (superheated steam) which will cause burns or dry material (Guenther, 1987).

Phytochemical test by GC-MS : According Kardinan (2004), a compound that contained in the zodiaplant (*Evodia suaveolens* Scherf.) Is compound by 46% Linalool and a-pinene 13.26%, but the results of GC-MS chromatogram old zodia'sleaf essential oil obtained a-pinene levels of 0.09% and 0.07% Linalool. The highest content of compounds in the essential oil of old leaves is Menthofuran by 40.69%, 20.26% Benzofuranone and d-Limonene by 14.51% (Table 2).

Table 2. GC-MS analysis of oldzodia'sleaf

Chemical Components	R.T. min	Area	Similarities
a-Pinene	5,39	0,09	97
ß-myrcene	6,24	0,27	92
D-Limonene	7,30	14,51	99
Linalool	8,85	0,07	91
Menthofuran	11,03	40,69	91
Benzofuranone	16,17	20,26	91

Potential Test: Test the entire power protection lotion formula is done starting at 0 up to 7 hours. At 4 hours to the entire formula made still shows 100% protection power. At 5 hours to formula 1 and 2 still showed power protection 100%, while the formulas 3 and 4 shows decline to 85.7% protection. However, at 3 hours to 7 formulas still shows the highest power protection than other formulas are

Fig. 1 Distillation zodia'sleaves.

made and also one of the existing market products (Table 3, Figure 2).

This is due to the formula 3 containing glycerin monostearate, sorbitol and oleic acid which can increase the homogeneity of lotion so it can be more evenly distributed in its use, as well as the presence of alcohol which can increase overall repellency. However from 0 up to 7 hours the repellencyof entire formulas still effective above 90%. The effectiveness of repellent may increase as the content of compounds in it and because of carrier substances, Striabutra and Soonwara (2013) stated that the clove oil in coconut oil have repellent

Table 3. Protection of Lotion Formula for 7 hours

Time (hour)	Protection of Lotion Formulafor 7 hours (%)				
	F1	F2	F3	F4	F(+)
0	100.00	100.00	100.00	100.00	100.00
1	100.00	100.00	100.00	100.00	100.00
2	100.00	100.00	100.00	00.00	100.00
3	100.00	100.00	100.00	100.00	100.00
4	100.00	100.00	100.00	100.00	92.86
5	100.00	100.00	85.71	85.71	80.95
6	85.71	92.86	85.71	78.57	57.14
7	71.43	85.71	88.09	64.29	71.43
Jumlah	57.14	78.57	759.52	728.57	702.38
Rata-rata	94.64	97.32	94.94	91.07	87.80

effectiveness by 57% while in the oliv oil has amounted to 85.5% effective repellent. In this research repelency of zodia's oil (88%) after 7 hours, better than the ether extract of Blumea (76.2%) after 6 h (Singh and Mittal, 2014).

Female mosquitoes detect odor stimuli such as fatty acids and carboxyl acids through mosquito olfactory organs, ie antenna and maxillary Palpa. Mosquito olfactory organ consists of Olfactory Receptor Neurons (ORN) is wrapped by sensila (Ghaninia *et al*., 2007). ORN expresses a specific type of odor receptor protein and projecting its axoninto the same glomerulus so that will form a map activity in the antenna lobe or bulb olfaktory (Couto *et al*., 2005). The smell distortion occurs because the waves generated by the stimuli. Gustatory Receptor Neurons have the Sensila (GRNs) that translates the action potential of the stimulus as a repellent desire to eat (feeding deterrents). There are at least 3 types of GRNs in

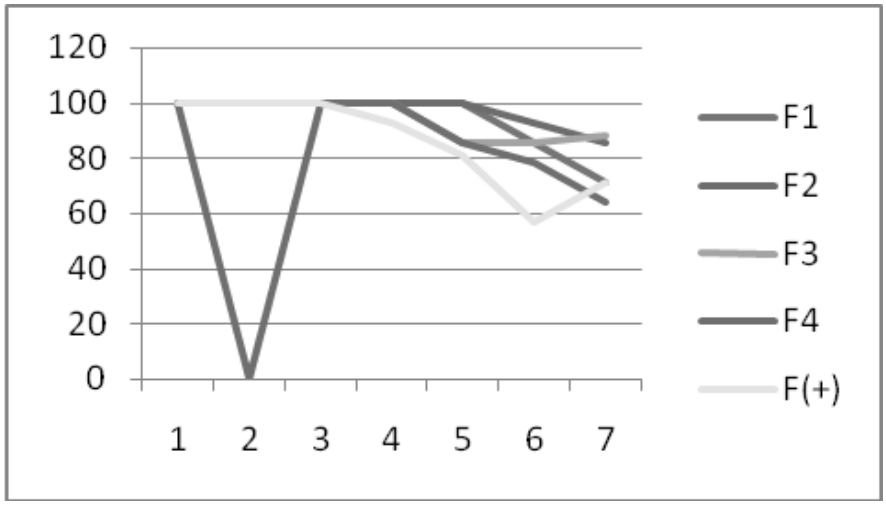

Fig. 2 Protection of Lotion Formula for 7 hours.

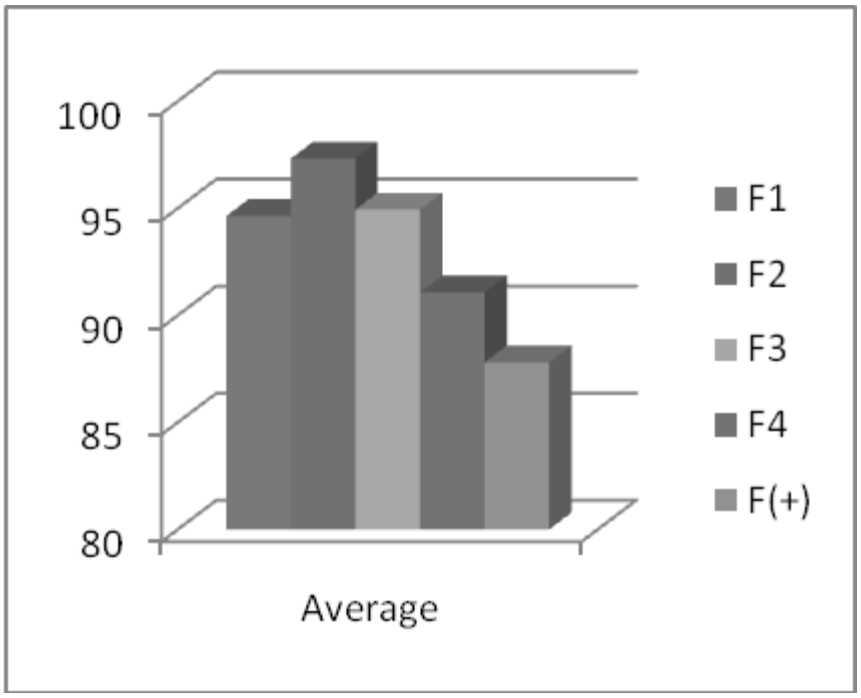

Fig. 3 Average of Protection of Lotion Formula for 7 hours.

the sensila and GRNs each activated by different stimuli. GRNs receiver steeper amplitude activated by an increase in NaCl, GRNs amplitude being the recipient responds to sucrose and low amplitude receiver GRNs activated by quinine, loss of appetite, and compounds such as repelent DEET, IR3535, picaridin, and citronelal. Activation GRNs low amplitude receiver causes the mosquitoes do not want contact with the arm (Dickens & Bohbot, 2013).

REFERENCES

Couto, A., Alenius, M. and Dickson, B.J. 2005. Molecular, anatomical and functional organizations of the drosophila olfactory system.*Curent Biology*. 15 : 1537-1547.

Departemen Pertanian, 1995. Metode standar Pengujian Efikasi Pestisida yang dikeluarkan oleh komisi Pestisida.

Dickens, J.C. and Bohbot, J.D. 2013. Mini review: mode of action of mosquito repelents.*Pesticide Biochemistry and Physiology*. http:/dx.doi.org/10.1016/ j.pestbp. 2013.02.06.

Ghaninia, M., Ignel, R. and Hanson, B.S. 2007. Functional clasification and central nervous projections of Olfactory receptor neurons housed in antenal trichoid sensila of female yellow fever mosquitoes, *Aedes aegypti*. *European Journal of Neuroscience*. 26 : 161-1623.

Kardinan, A. 2004. Tanaman Pengusir dan Pembasmi Nyamuk . PT.Agro Media Pustaka Depok

Levine, N.D. 1990. Parasitologi Veteriner. Gadjah Mada University Press.

Mattjik, A.A. and Made Sumertajaya, I. 2000. Perangcangan Percobaan Jilid I Edisi Kedua Dengan Aplikasi SAS dan Minitab.

Patel, E.K., Gupta, A. and Oswal, R.J. 2012. A Review on: mosquito repelent methods. *IJPCBS*. 2 (3) : 310-317.

Singh, S.P. and Mittal, P.K. 2014. Mosquito repellent action of *Blumea lacera* (Asteraceae) againts *Anopheles stephensi* and *Culex quenquefasciatus*. *International Journalof Mosquito Research*. 1 (1): 10-13.

Sritabutra, D. and Sonwera, M. 2013. Repellent activity of herbal essential oils against *Aedes aegypti* (Lin.) and *Culex quinquefasciatus* (Say.). *Asian Pacific Journal ofTropical Disease*. 3(4): 271-276.

Syariefa, E. 2002. Zodia Penghalau Nyamuk. *Majalah Trubus*. 393 : 21.

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Jumlah Penulis : 3 orang
Status Pengusul : Penulis Utama
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a. Nama Jurnal : Asian Journal of Microbiology, Biotechnology & Environmental Sciences (AJM)
b. ISSN : 0972-3005
c. Vol. No. Bulan, Thn : Volume 17, issue 2, September 2015
d. Halaman/Penerbit : 325-328 / Global Science Publications : India
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Abstrak : sudah sesuai dan sudah menjelaskan latar belakang, tujuan matrial dan Metode, hasil penelitian

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Latar belakang Telah didukung Referensi dan telah mendukung sebagai dasar analisis

Matrial & Metodologi :
Tahapan Metodolasi cukup jelas serta didukung data-data serta sudah sesuai standar penulisan Metologi karya Ilmiah

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sudah menyawab Tujuan analisis didukung hasil analisis secara Kuantitatif dan sudah komprehensif

Reviewer 2

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Paper 2

by Prasetyorini Unpak

Asian Jr. of Microbiol. Biotech. Env. Sc. Vol. 17, No. (1) : 2015 : 1-4

ISSN-0972-3005

POTENTIAL TEST OF VARIOUS LOTION FORMULA FROM ZODIA'S (*EVODIA SUAVIOLENS SCHERF*) LEAF OIL AS REPELLENT AGAINST *CULEX QUENQUEFASCIATUS* MOSQUITO CAUSES ELEPHANTIASIS

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Key words : *Zodia, Evodia suaviolens Scherf, Repellent, Culex quenquefasciatus.*

Abstract - The research was conducted on phytochemicals test of zodia's leaf essential oil by GC-MS, showed that the leaf oil contains 3 dominant compounds is menthofuran 26.92%, evodone 17.36%, and dl-Limonene 12.09%. The potential of formula with 5% concentration of zodia's leaf oil on liquid paraffin is 78% against *Culex quenquefasciatus* mosquitoes. The next stage is distillation of mature zodia's leaf using steam distillation. Essential oils are tested with GC-MS containing menthofuran 40.69%, 0.27% ß-myrcene, benzofuranone 20.26%, 14.51% D-limonene. The zodia's leaf oil was formulated in 4 types. Potential test showed that all formulas have the power of protection against *Culex quenquefasciatus* mosquito above 90% for 7 hours.

INTRODUCTION

Mosquitoes are insects that have an important role in human life. Several types ofbeneficial insects to humans such as honeybees, silkworms, insect pollinators, but there are also insectsthat can be harmful to human life that is destructive plants and mosquitoes as vectors diseases.Culex quenquefasciatus as filariasis vector.

Commonly to avoid mosquito bites by using repellent. According to Patel and Oswal (2012), repellent derived from plants or plant-based insecticides are often better than synthetic insecticides, and be an alternative as a mosquito repellent because it does not interfere with the health and environmentally friendly. One of the types of medicinal plants as mosquito repellent considerable potential for development is zodia (*Evodia suaveolens* Scherf). This herb has been used by people in Papua as a traditional medicine, especially as repellent, the leaves are used as a tonic to increase stamina and bark decoction as a reliever malaria fever. Zodia plants produce essential oils which are believed to contain evodiamine and rutaecarpine (Syarifa, 2002).

According Kardinan (2004), oil is distilled from the zodia leaves also contain linalool 46% and 13.26% apinen not preferred by insects. According Moerfiah *et al.*, (2013) that the zodia's oil contains menthofuran, evodone, L-Carveol, 1-Naphthalenol with menthofuran content of 26.92%, and has been testing the effectiveness of oil zodia as repellent mosquitoes causeselephantiasis. The test results showed that the oil has a brushed zodia at a concentration of 5% at 78.92%.

In this research formulatedessential zodia's leaf oil asa lotion, because lotion is suitable preparations for delivering the active oil substance. Lotion is used for external on the skin as a protection for the drug or because the active ingredient. The liquid consistency that allowevenly and rapidlyto be used on large skin surfaces. The zodia's leaves oil smell very pungent and unpleasant; therefore there is a challenge in this research to produce a formula that does not pungent but containing essential oil of zodia at an effective concentration, as repellent against *C. quenquefasciatus*.

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MATERIAL AND METHODS

Zodia's Leaf Oil Lotion Preparation: Twenty-three pounds of fresh old zodia'sleaves are sliced, then distillated by the method of distillation (water-steam) for 5 hours. The ingredients of the distillation were analyzed, and then formulated atvarious formulas to the main content of 5% the zodia's leave soil. Materials for the lotions are shown in Table 1.

Table 1. Materials of lotions

Material	Percentage(%) in formula			
	1	2	3	4
Zodia's oil	1.0	5.0	5.0	5.0
Stearic acid	5.7	3.9		3.0
Span 60	1.0			
Tween 60	2.0			
Cetyl alcohol	0.7	1.0		0.5
Lanolin	1.4	3.0		1.0
Glycerin	2.0	4.1		2.0
Isopropyl palmitat	1.0		2.0	
Trietanolamin	0.7	1.0	1.0	0.1
Methyl paraben	0.2	0.2	0.1	0.1
Seto stearyl alcohol		1.0		
Olive oil		3.0		
Propilyn glycol		3.0		
Gliceryil monostearat			3.2	
Oleic acid			2.0	
Sorbitol			2.0	
Alcohol			4.0	
Parfume	qs	qs	qs	qs
Distillated water(add)	100	100	100	100

Zodia's leaf oil as repellent: 125 female mosquitos' *C. quenquefasciatus* are divided into 5 pieces cages (each cage containing 25 mosquitoes). Further more prepared 5 people as volunteers aged 21-23 years old uniform. Each left hand smeared with general productas the positive controland with 4 formula lotiontreatments respectively of 3 mL, while the right hand isnot smeared and served as the control. Landing mosquitoeson each left and right hand are calculated. Carried out for 6 hours, at every hour be repeated 6 times with intervals of 30 seconds. Repellencyor protection calculated following the formula below.

$$\text{Protection (P)} = \frac{(C - T)}{C} \times 100\%$$

C = number of attachment mosquitoes in the hand control

T = number of attachment mosquitoes in the hand treatment

RESULTS AND DISCUSSION

Zodia's Leaf Essential Oil Distillation (*Evodia suaveolens* Scheff.) : Zodia'sOil obtained from 23 kg of oldzodia'sleaves (*Evodia suaveolens* Schaff) is as much as 97 ml with the yield obtained was 0.4385%. Distillation method used is steam distillation and water (Figure 1). This method is a method of distillation with a low saturated vapor pressure due to temperature saturated steam which is used at a pressure of 1 atmosphere (at atmospheric pressure vapor temperature was never more than 100 °C) and for this reason the oil damage is smaller, compared with the oil obtained from direct steam distillation results, especially the high-pressure steam or vapor overheat (superheated steam) which will cause burns or dry material (Guenther, 1987).

Phytochemical test by GC-MS : According Kardinan (2004), a compound that contained in the zodiaplant (*Evodia suaveolens* Scherf.) Is compound by 46% Linalool and a-pinene 13.26%, but the results of GC-MS chromatogram old zodia'sleaf essential oil obtained a-pinene levels of 0.09% and 0.07% Linalool. The highest content of compounds in the essential oil of old leaves is Menthofuran by 40.69%, 20.26% Benzofuranone and d-Limonene by 14.51% (Table 2).

Table 2. GC-MS analysis of oldzodia'sleaf

Chemical Components	R.T. min	Area	Similarities
a-Pinene	5,39	0,09	97
ß-myrcene	6,24	0,27	92
D-Limonene	7,30	14,51	99
Linalool	8,85	0,07	91
Menthofuran	11,03	40,69	91
Benzofuranone	16,17	20,26	91

Potential Test: Test the entire power protection lotion formula is done starting at 0 up to 7 hours. At 4 hours to the entire formula made still shows 100% protection power. At 5 hours to formula 1 and 2 still showed power protection 100%, while the formulas 3 and 4 shows decline to 85.7% protection. However, at 3 hours to 7 formulas still shows the highest power protection than other formulas are

Fig. 1 Distillation zodia'sleaves.

made and also one of the existing market products (Table 3, Figure 2).

This is due to the formula 3 containing glycerin monostearate, sorbitol and oleic acid which can increase the homogeneity of lotion so it can be more evenly distributed in its use, as well as the presence of alcohol which can increase overall repellency. However from 0 up to 7 hours the repellencyof entire formulas still effective above 90%. The effectiveness of repellent may increase as the content of compounds in it and because of carrier substances, Striabutra and Soonwara (2013) stated that the clove oil in coconut oil have repellent

Table 3. Protection of Lotion Formula for 7 hours

Time (hour)	Protection of Lotion Formulafor 7 hours (%)				
	F1	F2	F3	F4	F(+)
0	100.00	100.00	100.00	100.00	100.00
1	100.00	100.00	100.00	100.00	100.00
2	100.00	100.00	100.00	00.00	100.00
3	100.00	100.00	100.00	100.00	100.00
4	100.00	100.00	100.00	100.00	92.86
5	100.00	100.00	85.71	85.71	80.95
6	85.71	92.86	85.71	78.57	57.14
7	71.43	85.71	88.09	64.29	71.43
Jumlah	57.14	78.57	759.52	728.57	702.38
Rata-rata	94.64	97.32	94.94	91.07	87.80

effectiveness by 57% while in the oliv oil has amounted to 85.5% effective repellent. In this research repelency of zodia's oil (88%) after 7 hours, better than the ether extract of Blumea (76.2%) after 6 h (Singh and Mittal, 2014).

Female mosquitoes detect odor stimuli such as fatty acids and carboxyl acids through mosquito olfactory organs, ie antenna and maxillary Palpa. Mosquito olfactory organ consists of Olfactory Receptor Neurons (ORN) is wrapped by sensila (Ghaninia *et al.*, 2007). ORN expresses a specific type of odor receptor protein and projecting its axoninto the same glomerulus so that will form a map activity in the antenna lobe or bulb olfaktory (Couto *et al.*, 2005). The smell distortion occurs because the waves generated by the stimuli. Gustatory Receptor Neurons have the Sensila (GRNs) that translates the action potential of the stimulus as a repellent desire to eat (feeding deterrents). There are at least 3 types of GRNs in

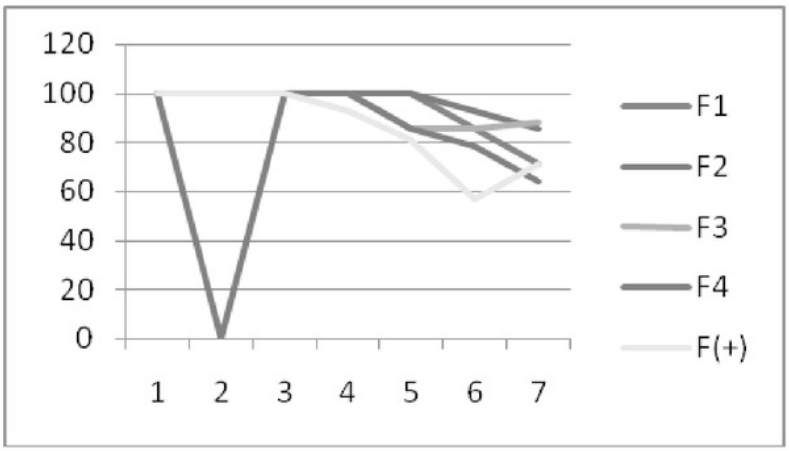

Fig. 2 Protection of Lotion Formula for 7 hours.

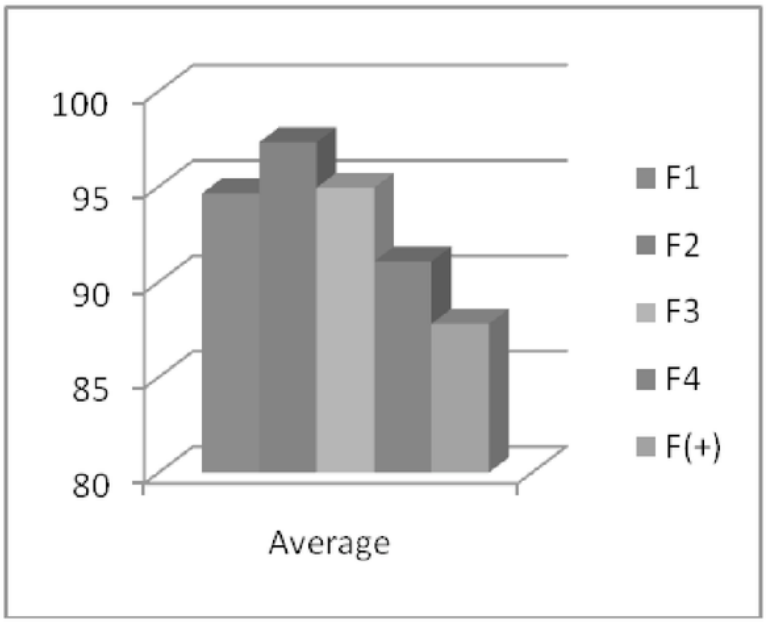

Fig. 3 Average of Protection of Lotion Formula for 7 hours.

the sensila and GRNs each activated by different stimuli. GRNs receiver steeper amplitude activated by an increase in NaCl, GRNs amplitude being the recipient responds to sucrose and low amplitude receiver GRNs activated by quinine, loss of appetite, and compounds such as repelent DEET, IR3535, picaridin, and citronelal. Activation GRNs low amplitude receiver causes the mosquitoes do not want contact with the arm (Dickens & Bohbot, 2013).

REFERENCES

Couto, A., Alenius, M. and Dickson, B.J. 2005. Molecular, anatomical and functional organizations of the drosophila olfactory system.*Curent Biology*. 15 : 1537-1547.

Departemen Pertanian, 1995. Metode standar Pengujian Efikasi Pestisida yang dikeluarkan oleh komisi Pestisida.

Dickens, J.C. and Bohbot, J.D. 2013. Mini review: mode of action of mosquito repelents.*Pesticide Biochemistry and Physiology*. http:/dx.doi.org/10.1016/ j.pestbp. 2013.02.06.

Ghaninia, M., Ignel, R. and Hanson, B.S. 2007. Functional clasification and central nervous projections of Olfactory receptor neurons housed in antenal trichoid sensila of female yellow fever mosquitoes, *Aedes aegypti*. *European Journal of Neuroscience*. 26 : 161-1623.

Kardinan, A. 2004. Tanaman Pengusir dan Pembasmi Nyamuk . PT.Agro Media Pustaka Depok

Levine, N.D. 1990. Parasitologi Veteriner. Gadjah Mada University Press.

Mattjik, A.A. and Made Sumertajaya, I. 2000. Perangcangan Percobaan Jilid I Edisi Kedua Dengan Aplikasi SAS dan Minitab.

Patel, E.K., Gupta, A. and Oswal, R.J. 2012. A Review on: mosquito repelent methods. *IJPCBS*. 2 (3) : 310-317.

Singh, S.P. and Mittal, P.K. 2014. Mosquito repellent action of *Blumea lacera* (Asteraceae) againts *Anopheles stephensi* and *Culex quenquefasciatus*. *International Journalof Mosquito Research*. 1 (1): 10-13.

Sritabutra, D. and Sonwera, M. 2013. Repellent activity of herbal essential oils against *Aedes aegypti* (Lin.) and *Culex quinquefasciatus* (Say.). *Asian Pacific Journal ofTropical Disease*. 3(4): 271-276.

Syariefa, E. 2002. Zodia Penghalau Nyamuk. *Majalah Trubus*. 393 : 21.

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