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October 18-20, 2016

"Conserving Sumatran Wildlife Heritage for Sustainable Livelihood"

Institute for Research and Community Service
University of Lampung

3rd INTERNATIONAL WILDLIFE SYMPOSIUM

"Conserving Sumatran Wildlife Heritage for Sustainable Livelihood"

PROCEEDING

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RESEARCH AND DEVELOPMENT CENTER OF ENVIRONMENT
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2016

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WELCOMING SPEECH FROM CHAIR PERSON OF THE ORGANIZING COMMITTEE

Distinguished guests,

- Minister of Environment and Forestry Republic of Indonesia, Dr. Siti Nurbaya or representing,
- Rector University of Lampung, Prof. Dr. Ir. Hasriadi Mat Akin, M.P.
- Honorable Keynote Speaker, Invited Speakers, participants, sponshorships, ladies and gentlemen

Assalamu'alaikum warohmatullohi wabarokatuh.
May God bless all of us.
Tabik pun.

It gives me great pleasure to extend to you all a very warm welcome to the 3rd International Wildlife Symposium (IWS 2016), here in Bandar Lampung.

Ladies and gentlemen, it is gratifying to note that symposium is designed to improve awareness on wildlife conservation and sustainability in order to improve the welfare of society. To increase the consciousness and understanding on the potenstial, economic value, and sustainable management of tropical wildlife through bioengineering application and to strengthen international scientific network of biological and related scientiests to share and exchange progress in various fields of wildlife research.

No matter how much we can do by ourselves on the institutional and national level, it is never enough. International level of collaboration work would be the best answer. Therefore I wish that this event which is attended by distinguished speaker and attendants from Malaysia, India, US, and Indonesia, would be a great opportunity for us to establish scientific collaboration between scientist internationally.

Hereby, on the behalf of Organizing Committee I acknowledge Dr. Siti Nurbaya, Minister of Environment and Forestry Republic of Indonesia or representing, and also to Mrs. Siti Nur Hidayati, Ph.D. (Middle Tennessee State University), as a keynote speaker, and also to the following invited speakers, Dr. Ashley Brooks (WWF Tigers Alive Initiativ), Dr. Barney Long (Global Wildlife Conservation), and drh. Dedi Candra (Way Kambas National Park) for willingness to share their valuable knowledge and scientific information.

To make this symposium happen, I would like to gratefully acknowledge to the valuable contributions from personal and institutional sponshorships including University of Lampung, Doctor Coffee, Aska Jaya, PT. Nestle Indonesia, Levi's Indonesia, and Rumah Kolaborasi (Ru-Ko). In particular, thanks a lot to the World Wide Fund (WWF) for supporting the financing of this symposium.

I would like also to take this opportunity to express my sincere thanks to the Head and Secretary of Research Institution and Community Service University of Lampung, for giving us opportunity and support to organize this symposium. Heartfelt thank is delivered to

steering committee, academic reviewers, organizing committee, for all participation and hard works. All of them have been working since the begining of the planning stage and they are still here today for all of us.

Despite our best efforts, it is inevitable that there is a lack in organizing this symposium and I proudly apologize to all invited speakers, oral and poster presenters, attendants, donators, and committee members.

Finally, I would like to offer my best wishes for a highly enjoyable, succesful, productive and fruitful symposium.

Thank you so much.

Dr. Erdi Suroso
Chair Person of the Organizing Committee

OPENING REMARKS FROM THE HEAD OF RESEARCH INSTITUTION AND COMMUNITY SERVICE, UNIVERSITY OF LAMPUNG

Distinguished guests

- Minister of Environment and Forestry Republic of Indonesia, Dr. Siti Nurbaya or representing,
- Rector University of Lampung, Prof. Dr. Ir. Hasriadi Mat Akin, M.P.
- Honorable Keynote Speaker, Invited Speakers, participants, sponshorships, ladies and gentlemen

Assalamu'alaikum warohmatullohi wabarokatuh.
May God give us health and happiness.
Tabik pun.

It is my great pleasure to welcome all speakers and participants to the 3rd International Wildlife Symposium 2016 (IWS-2016) held in Meeting Room 2nd floor Rektorat University of Lampung, Bandar Lampung, Indonesia. I recognize that this symposium is principally designed to enhance and strengthen the contribution of researchers to the wildlife conservation. The theme of this event is "*Conserving Sumatran Wildlife Heritage for Sustainable Livelihood*". Therefore, I wish that this event will be a great opportunity and wonderfull venue to lay down a cooperative framework and to internationally establish scientific collaboration among scientiests.

Hereby, I appreciatively acknowledge Dr. Siti Nurbaya, Minister of Environment and Forestry Republic of Indonesia, and also to Mrs. Siti Nur Hidayati, Ph.D. (Middle Tennessee State University), as a keynote speaker, and also to the following invited speakers, Dr. Ashley Brooks (WWF Tigers Alive Initiativ), Dr. Barney Long (Global Wildlife Conservation), and drh. Dedi Candra (Way Kambas National Park) for delivering their valuable scientific information.

My appreciation also goes to the Steering Committee, Academic Reviewers, and the Organizing Committee that spend almost their valuable time to review, manage and organize this symposium effectively. I also would like to gretefully acknowledge to the valuable contributions from personal and institutional sponshorship and funding to make this program happen.

Finally, I wish you all best wishes to have meaningfull and useful symposium. Thank you.

Wassalamu'alaikum warohmatullohi wabarokatuh.

Warsono, Ph.D.
Head of Research Institutions and Community Service

KEYNOTE SPEAKER
MINISTER OF ENVIRONMENT AND FORESTRY
REPUBLIC OF INDONESIA

AT 3rd INTERNATIONAL WILDLIFE SYMPOSIUM
Bandar Lampung, 18 October 2016

Distinguished Participants,
Ladies and Gentlemen

Assalamu'alaikum wr.wb
Good morning and May God bless us.

It is my great honor and pleasure to attend to this event and deliver my speak. Let me express my appreciation to University of Lampung in collaboration with WWF Indonesia for organizing this symposium. Hopefully from this symposium which brings together scientific community and field experts, where we share knowledge, experience and concern, can enhance and synergize our efforts to cope issues in various aspects.

Ladies and gentlemen,

Indonesia should be proud to be a country which has rich biodiversity, reported it reaches 47.910 species, that makes Indonesia is well known as mega biodiversity country. At the same time, Indonesia is responsible to promote sustainable use of biodiversity to improve society and country's well-being.

This responsibility will be challenging for Indonesia, considering our country as one of the hot spot of biodiversity loss. The threat mainly coming from habitat loss caused by encroachment, forest fragmentation and forest fires as well as coming from illegal logging, and trade.

Plants and wildlife are one of supporting elements for human life, which their existence hold important and irreplaceable roles. Having that said, I would like to take this opportunity to encourage all of us to protect and conserve the sustainability of wildlife and plants as heritage for the next generation and sustainable livelihood.

Ladies and gentlemen,

Strategy and policy of Indonesian Government to secure the biodiversity are directed into three focuses namely protection, preservation and sustainable use of ecosystem, species and genetic resources. National regulation has been enacted, to mention some, including UU 5/ 1990, UU 41/ 1999, UU 32/ 2009, PP 7/ 1999, PP 8/ 1999 as well as strategic and action plan of several endangered and umbrella species such as sumatran tiger, orangutan, rhino, sumatran elephant, javan eagle, tapir, proboscis monkey (*bekantan*), maleo, banteng and babyrousa.

Our global commitment on biodiversity conservation also reflected on ratification of several conventions such as Convention on Biodiversity (CBD) through UU 5/1994, Ramsar through Keppres No 48/1991, UNFCCC through UU No. 6/1994 and protocols such as Kyoto Protocol through UU No. 17/ 2004, Nagoya Protocol through UU 11/ 2013 and Cartagena Protocol through UU 2/ 2014.

We also aware that in this global era, efforts on the conservation of biodiversity always in the spotlight of international attention. Threats on the biodiversity, for example illegal killing of endangered species have and will always be connected with the issues of deforestation and habitat destruction and these will be the entry points for discrediting and black-campaigning against Indonesia, that in turn can be impacted to Indonesia's products in the global market. Thus saving the biodiversity requires active participation from all stakeholders including private sector.

Biodiversity including ecosystem and genetic resources can and should be utilized in a sustainable manner for human welfare such as for source of food, clothes, medicine, water, energy, and oxygen, for controlling climate and disease, ecosystem balance as well as for leisure.

Sustainable use of biodiversity, for example as I mention before for source of food has been a main discussion in many forums. With the growth of human population, it is a must to conduct study and formulate strategy to maintain our natural resources that can be utilized not only for our generation but also for our kids' generation and further. With this regard, Indonesia as mega-biodiversity country plays an important role as source of germplasm which may contain useful substance for human health or important for bioprospecting to increase country's revenue.

To illustrate, global trade on medicinal herbs reach approximately US$ 60 billion/year. While protection of coral to support genetic resources for research on medicine can provide revenue US$ 55-1.110 per ha/year in South East Asia (source: CBD). Indonesia revenue on export from traditional medicine (jamu) reach US$ 113 million, while for domestic reach US$ 100 million (source: BPOM 2007).

Ladies and gentlemen,

Despite having all of potency and opportunity, there are also threats and challenges facing our existing biodiversity:

Globally, these includes pressure from human population growth which require demand for land, food, energy and clean water; climate change; and increasing demand of genetic resources for food and energy.

Nationally, these includes illegal logging, forest fire, encroachment, illegal trade, declining of wildlife population, loss of habitat, invasive alien species, as well as low resources capacity and quantity (human and fund) and lack of integrated database.

Hence enormous efforts have been taken by Government Indonesia namely:

a. public awareness and campaign by involving religious leader and other groups for promoting religious and local wisdoms as well as local engagement.
b. to restore and protect the population at local level in their habitat to prevent further damage to the population.
c. Strengthen coordination among government institutions and networking with CSO's.

Currently Ministry of Environment and Forestry Indonesia with relevant law enforcement institutions (Police, General Attorney, Financial Transaction Reports and Analysis Center, and Financial Services Authority) have commitment to support "multi door law enforcement". By implementing multi door law enforcement initiative including applying of

corruption and money laundry act in line with environmental, conservation and forestry act is expected that it could strengthen deterrent effects.

Ladies and gentlemen,

As we are all aware, illegal activity related to environmental and forestry including wildlife illegal trafficking is now even more sophisticated, organized and transnational crime, which involves a large network of actors that make up its own chain. We cannot stop it alone. Therefore collaborative among relevant actor/ stakeholder is badly needed to tackle these issues in effectively.

We believe that global collaboration through bilateral, regional and multilateral cooperation can increase the effectiveness in combating illegal activities such as wildlife trafficking. Hence, Indonesia has involved in global collaboration such as:

a. Bilateral cooperation with Vietnam and USA
b. Regional cooperation in the framework of the ASEAN-WEN (Wildlife Enforcement Network)
c. London Conference, Kasane Conference, The Hague Conference on wildlife
d. Multilteral Cooperation: Interpol, CITES, Global Wildlife Programme
e. We also have cooperation with International and National NGO concern in combating wildlife crime, such WWF, WCS, etc.

In this moment, I would also inform that we are in the progress renewing our conservation act in order to increase effectiveness of conservation efforts including wildlife law enforcement.

Distinguish ladies and gentlemen,

To develop strategy on biodiversity conservation and sustainable use require strong research and scientific evidence which will be needed to convince government agency and related stakeholder to be aware and act on the right approach. Thus, active participation of scientific community in communicating their knowledge should be appreciated and facilitated such as through this event.

To conclude, the efforts for the conservation of biodiversity required the involvement of us all, not just the governmental institutions only, but also private sectors, NGOs, civil societies and scientific community. I sincerely hope that this symposium can provide a media for us all to share knowledge, experience and concern, and to synergize all efforts.

Wasalamualaikum Warahmatullohi Wabarohkatuh

Bandar Lampung, 18 October 2016

Minister of Environment and Forestry,

Dr. Siti Nurbaya

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DEVELOPMENT OF BOTANICAL INSECTICIDE FROM FLAVONOID OF COMPOUND LEAF EXTRACT *GLIRICIDIA MACULATA* TO CONTROL COFFEE MEALYBUG *PLANACOCCUS CITRI*

Apriliyani[1], Nismah Nukmal[2,3]and Emantis Rosa[2.]

[1]) Biology Magister Student [2]) Biology Department, [3]) Coresponding Author e-mail: nismah.nukmal@fmipa.unila.ac.id

ABSTRACT

Coffee is an important commodity in Indonesia, its production continues to decrease from year to year. One of important pest is the mealybug (*Planococcus citri*), the production lost due to a severe attack can reach 90%. Farmers still using synthetic insecticides to control the pest, which have negative effect on the environment and humans buying. To reduce its, necessary to find the environment friendly insecticides (botanical insecticide). One of the plant can be used as botanical insecticide is *Gliricidia maculata*. The purpose of the study to obtain flavonoid compound from polar extract (water and methanol) of *G. maculata* leaves, as botanical insecticide throught out isolation and purification. To compare the effective concentration of the flavonoid compounds from polar extract (water and methanol) of powder leaveas *G. maculata* on mortality coffee mealybug. A set of laboratory experiment was conducted by using block design. Water and methanol extracs (WE and ME) with 5 levels concentration i.e. 0%, 0.01%, 0.02%, 0.03% and 0.04%, and 3 replications. Mealybug mortality observed at 12, 24, 48, 72 hours after treatment. Analisys Probit were used for Determine LC50 values, ANOVA and Tukey's test was used to determine an effective formula botanical insecticide. The results showed that the polar extract (water and methanol) Gliricidia leaves contains flavonoids that act as insecticides against coffee mealybug (*P.citri*) with LC50 72 hours water extract 0,033% and metanol extract 0,039%.

Keywords: Botanical insecticide flavonoids, powder leaves (*Gliricidia maculata*), coffee mealybug (*Planococcus citri*).

1. INTRODUCTION

Coffee is one of the results of agricultural commodity that has economic value that is high enough among other plantation crops and plays an important role as a source of foreign exchange. Coffee not only plays an important role as a source of income but also a source of income for not less than one and a half million coffee farmers in Indonesia (Rahardjo, 2012). Coffee production in Indonesia is still low which is third in the world. The low level of productivity of coffee plants one of them caused by the pest is relatively high, one of the pests that can reduce the production of coffee is mealybug (*Planococcus citri*). This pest attacks coffee plants on the young fruit, dark fruit, twigs, buds and young leaves (Wicaksono, 2013).

Pest control on the coffee plants at the farm level is generally still use synthetic insecticides. The use of synthetic insecticides are not right will bring dampakyang bad, can cause pest resistance, emergence of secondary pests, environmental pollution and product rejection due to a problem of residues exceeding the tolerance threshold. In addition the use of synthetic insecticides intensively, also provides a wide range of undesirable effects, such as damage to ecosystems agricultural land, disruption of the existence of flora and fauna around the farms and farmers' health impacts due to the use of insecticides. How to control a simple, inexpensive and environmentally friendly, such as by the use of plant-based insecticide to use the plants and the use of natural enemies (Siswanto and Karmawati, 2012). One of the plants that can be used as an insecticide plant is Gliricidia leaves. Gliricidia leaves contain the active ingredient coumarin which are insecticides, rodenticides and bactericidal (Ministry of Agriculture, Animal Husbandry and Health Directorate, 2009).

This study aims to Acquire flavonoid extract water and methanol extract of leaves of Gliricidia nature as an insecticide plant by means of isolation and purification.

2. Literature review

Hama is any organism that is damaging or potentially damaging to plants, plant products, products and foodstuffs, livestock and humans. Pest is very harmful because it can reduce the availability, quality or source of biological material (Koswara, 2006).

One of the alternatives that can be used as a pest controller is to use plant-based insecticides that are environmentally friendly. In addition, vegetable insecticides from plants readily biodegradable and relatively safe to non-target organisms. (Siswanto and Karmawati, 2012).

Herbal vegetable insecticide is extracted from plant material into a concentrate with no change in the structure of this kimianya.Insektisida easily decomposed or degraded so as not persistent in nature or in materials of vegetable makanan.Insektisida safe for the environment, to support organic agriculture in an effort to reduce the use of synthetic insecticides and the price is cheaper (Indriani, 2006).

2. RESEARCH METHODS

A. Tools and Materials

The tools used to make the water extract powder Gliricidia leaves that filter Bunchner for separating the precipitate and filtrate, Freezedrayer to dry the filtrate, UV-Vis, FTIR, GC-

MS. AmberliteXAD KK-4 for purification filtrate. TLC to monitor purification. Other tools used are jars for powder extraction Gamal, container for soaking the coffee fruit and jars to put the coffee cherries soaked gauze leaf extract Gamal as well as cover the jars, electric heating, capillary pipette. Digital camera as a documentation tool and stationery to write the data obtained.

The materials used to make the water extract of leaf powder is Gliricidia Gliricidia plants, mealybugs (Planococcus citri) as an insect host, feed coffee fruit as current treatments. N- hexane, dichloromethane (DCM), and methanol with a brand J.T Beker, distilled water to make a water extract of leaf powder Gamal. Plate TLC (thin layer chromatography) of aluminum with adsoben silica gel Merck 60 F254, Reagent AlCl3, CeSo4, NaOH and H3BO3. Fourth reagent serves to identify the presence of flavonoids contained in the sample.

B. Implementation Research

Making Extract (Isolation and Purification of Flavonoid Compounds Group)

Making water extract using multilevel maceration method, by soaking the leaf powder gliricidia using hexane solvent, dichloromethane, methanol and water. Furthermore, to sever the bond glycosides present in flavonoids done by hydrolysis. The results of the water extract of hydrolyzed by HCL and methanol solvent, then heated for 1 hour at a temperature of 600C and separated by a separating funnel with a solution of ethyl acetate and saturated NaCl. Water extract of dried Gliricidia leaves that show the deposition of amorphous shape was filtered with a Buchner filter to separate the precipitate (EA) and the filtrate (FA) it. Deposition (EA) was purified by recrystallization method and filtrate (FA) with freeze drayer.

Making the methanol extract us- ing maceration method stratified, by soaking the leaf powder gliricidia using hexane solvent, dichloromethane and methanol.

The methanol extract of dried Gliricidia leaves containing chlorophyll fractionated by column chromatography method (KK) using silica KK and isocratic to remove chlorophyll. The filtrate methanol been cleared of chlorophyll (FM) direkfraksinasi using the method of using the column AmberliteXAD KK-4. Fractions were collected based on the volume and content of each fraction was analyzed by TLC flavonoidnya.

Data analysis

The data were then analyzed using probit analysis to determine LC50 values, test Anara and continued with Tukey's test was used to determine an effective solution as vegetable insecticide.

3. RESULTS AND DISCUSSION

A. Compounds Flavonoids Extract Water and Methanol Leaf Extract Gamal

Extraction of Crude Extract Water and Methanol

Results maceration storied performed using 500 grams of powdered leaves of Gliricidia, obtained extract as much as 6 liters of water, 500 ml in frezdryer and water extract obtained in the form of pasta as much as 4 grams, the rest of which is not yet in frezdryer stored in the refrigerator.

Results maceration storied performed using 500 grams of powdered leaves of Gliricidia, obtained methanol extract as much as 6 liter, 6 liter evaporation results obtained 82 grams of methanol extract concentrated extract. Extract concentrated in frezdryer for 72 hours, the extract obtained in the form of pasta as much as 25 grams.

KLT Water and Methanol Crude Extract

The crude extract water and methanol crude extract obtained TLC test was done to determine the compounds contained in the extract. The results of TLC analysis showed the presence of crude extract of brown and yellow spots on the TLC plate after visualization CeSo4 sprayed with the solvent, AlCl3, NaOH and H3BO3.

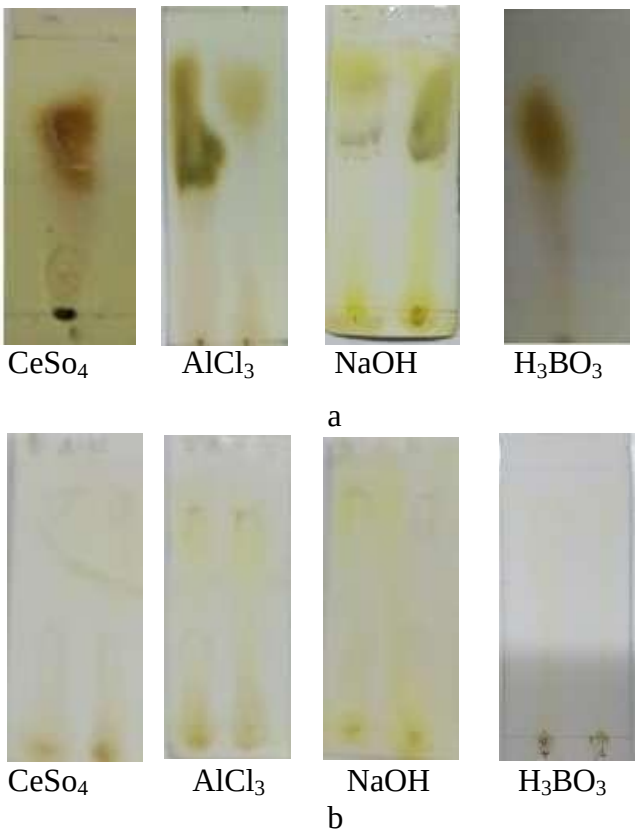

Figure 1. Kromotogram results of TLC analysis of the crude extract with water and methanol solvent CeSo4 visualization, AlCl3, NaOH and H3BO3 a) the methanol extract b) water extract

Purification of Water and Methanol Crude Extract

Hydrolysis of 2.5 grams of water extract obtained Deposition (EA) in crystalline form as much as 1 gram and filtrate (FA) in the form of 15 ml of water phase and phase 7 ml of ethyl acetate. TLC results showed that the water extract hydrolysis only filtrate (water phase), which is pure flavonoid compounds.

Results fractionation 2 grams of methanol extracts using KK Amberlite XAD-4 obtained 42 fractions. The results of TLC into 42 fractions known of the fractions that contain the same compounds that can be combined into one and gained seven factions. TLC results of seven factions are known to only a fraction of the fraction 19 already pure flavonoid compound.

TLC Extract Pure Water and Methanol

The content of flavonoid compounds in pure water and methanol extract of leaves of Gliricidia and results from the TLC analysis that showed the presence of yellow and brown on a TLC plate (kromotogram) after being sprayed with the solvent visualization CeSo4, AlCl3, NaOH and H3BO3 (Figure 2).

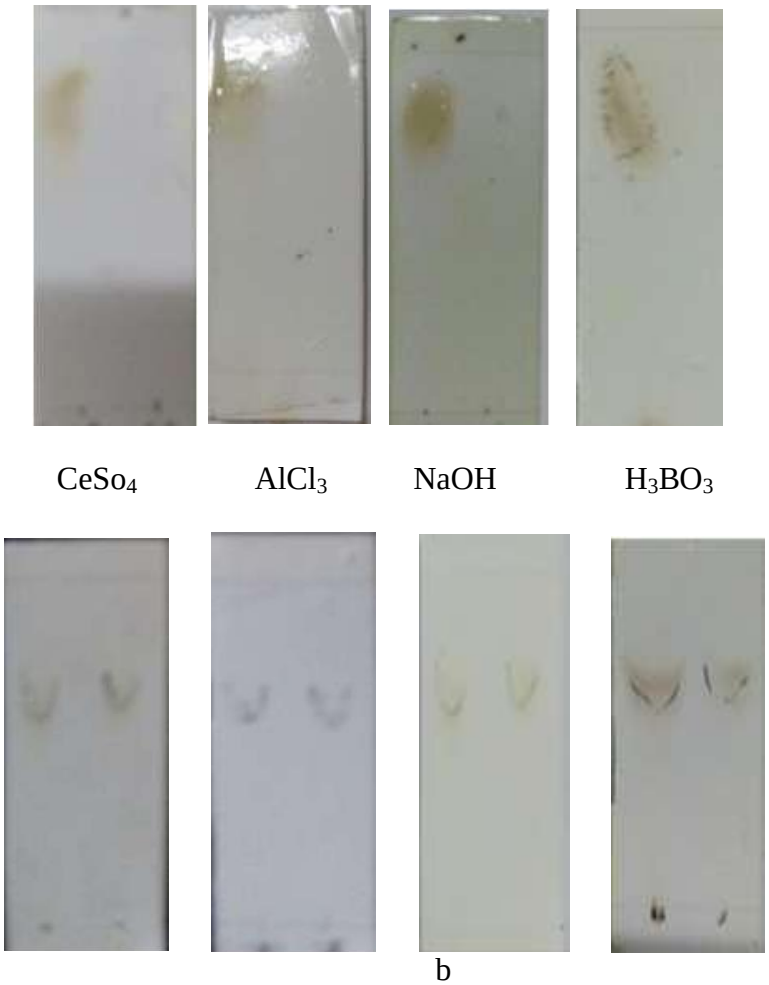

Figure 2. Kromotogram pure extract TLC analysis results of water and methanol with a solvent visualization CeSo4, AlCl3, NaOH and H3BO3, a) the methanol extract b) water extract.

TLC results showed that the pure water and methanol extracts of leaves of Gliricidia contains flavonoids with their yellow and brown spots on kromotogram. Nukmal research results, et al (2010), known secondary metabolites, compounds contained in extracts water Gliricidia leaves macerated results storey are alkaloids, terpenoids, steroids, and flavonoids. The flavonoid compound most commonly found in the water extract. So that the compound is responsible for insecticidal properties gamal leaf vegetable.

B. Mortality Mite Pests White Water Treatment Pure Extract and Pure Methanol Leaf Extract Gamal

Bioassay results indicate that both types of pure water and methanol extracts are used to give effect to the pest mealybug death. The average percentage mealybug pest death with pure extract treatment of water and methanol can be seen in Figures 3 and 4.

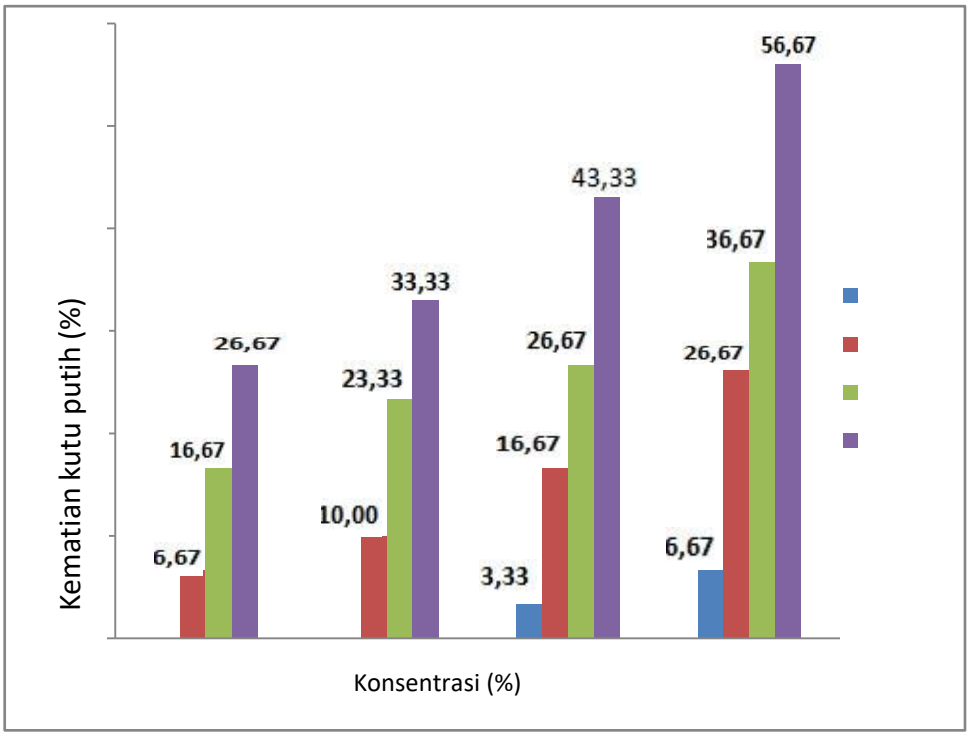

Figure 3 Average percentage mealybug pest death with pure water extract treatment Gliricidia leaves on the concentration and time of observation different

In Figure 3. and 4. it can be seen that the mortality rate mealybug in the water extract of leaves of Gliricidia higher than the methanol extract, which at a concentration of 0.04 after 72 hours of treatment the mortality rate mealybugs on water extract reached 56.67% while the extract methanol amounted to 46.67%. The increase in the percentage of deaths mealybug along with increased treatment time and concentration used. The longer the treatment time and the higher the concentration of extract used, the higher the percentage of deaths mealybug pests, since the higher the concentration of toxins that enter the body mealybug and the longer time it will cause

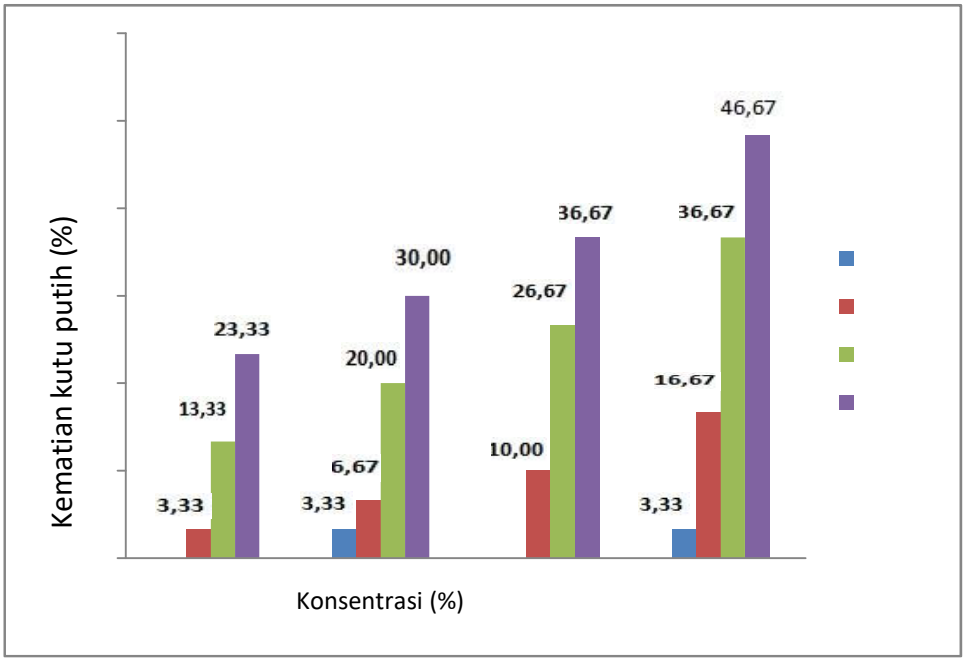

Figure 4. Average percentage mealybug pest death with pure methanol extract treatment Gliricidia leaves on the concentration and time of observation different

A lot of damage in the body mealybug.

The average mortality mealybug pest after further Tukey's test at 5% level can be seen in Table 3.

Table 3. Average mortality mealybug (tail ± sd) after being treated with an extract of pure water and pure methanol extract of leaves of Gliricidia 72 hours after treatment

Concentration (%)	**The average mortality mealybug (tail) ± sd**	
	Extract Pure Water	**Extract Pure Metanol**
0,00	0,00 ± 0,00 c A	0,00 ± 0,00 c A
0,01	2,67 ± 0,58 b A	2,33 ± 0,58 b A
0,02	3,33 ± 0,58 b A	3,00 ± 1,00 b A
0,03	4,33 ± 1,00 ab A	3,67 ± 0,58 ab A
0,04	5,67 ± 0,58 a A	4.67 ± 1,00 a A

Description: The average value followed by the same small letter in the same column and in capital letters on the same line are not significantly different at the level of a = 5% by Tukey's test

The death rate mealybugs on pure extract water Gliricidia leaves faster than a pure extract of methanol. This is because the water extracts performed hydrolysis to break the glycosides of flavonoid aglycone. Flavonoid aglycone has a higher toxicity than the flavonoid glycosides, the methanol extract is not done hydrolysis. Flavonoid aglycone flavonoid without sugar bound contained in various forms of structure (Markham, 1988).

Flavonoid aglycone generally have antioxidant and radical catchers is higher than the flavonoid glycosides because of the flavonoid glycosides phenolic hydroxyl group is an active group of antioxidants or radical catchers have binding force sugar (Harborne 1987).

LC50 and LT50 Values pure extract probit analysis results of water and methanol after treatment is shown in Table 5 and Table 6.

Table 5. Value LC50 results probit analysis extract pure water and pure extract of methanol at 12-72 hours after treatment.

Time after treatment (hour)	LC50 value (%)	
	Extract Pure Water	Extract Pure Metanol
12	0,063	0,123
24	0,059	0,067
48	0,048	0,051
72	0,033	0,039

In Table 5 it can be seen that the LC50 value pure extract water at all hours after treatment was lower than pure methanol extract is between 0.03% - 0.60%. So it can be said to extract pure water is more effective than pure methanol extracts kill insects in the test (P.citri).

Both kinds of extracts had LC50 values below 5% concentration, showed that both types of extracts can be said to effectively kill pests mealybug. This was confirmed by Prijono (2005) which states that a plant-based insecticide with organic solvents is said to effectively kill insects when the test has a concentration of <5%.

Table 6. Value LT50 results probit analysis extract pure water and pure methanol extracts at different concentrations.

Concentration (%)	LT50 value (%)	
	Extract Pure Water	Extract Pure Metanol
0,00	-	-
0,01	94,849	96,979
0,02	85,298	93,970
0,03	71,460	80,309
0,04	63,113	70,143

LT50 values pure extract water at all concentrations lower than pure methanol extract of between 2.1 to 8.6 hours means the time of the death of test insects occurs faster in water than the pure extract treatment pure methanol extract, so the water pure extracts are more effective than pure extract methanol.

Based on the LC50 and LT50 Values in Tables 5 and 6 can be said to be a pure extract water more effectively than pure methanol extract. This is supported by research Nukmal, et al (2011), found water with maceration extract storied effective in shutting down the papaya mealybug pests compared to extract water without maceration terraced, with LC50 = 0.75%.

4.CONCLUSION

Extract the polar (water and methanol) Gliricidia leaves contains flavonoids that act as insecticides against pests vegetable mealybug (Planacoccus citri) of the coffee plant.

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