

## Potential of Mud Ball From Biolarvacide From Fermented Malaysia's Ulam Herbs

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**Abstract:** Effective Microorganisms originally discovered by Professor Dr. Teruo Higa, consists of effective, beneficial and non-pathogenic microorganisms, comes in a liquid form. This microorganism were used in the making of EM Mud ball, which worldly known as successful way in solving environmental treatment regarding the polluted rivers, drains, ponds, lakes and so many more. In this work, Malaysia's Ulam herbs was added into the original EM Mud ball as the finding that this plants contains derivative compounds which have a potential to killed mosquito's larvae. This new modified EM Mud ball can solved environmental problems and at the same time can killed the mosquito's breed in serving the safe environment for human while safe for all others aquatic's life. The experiment was run by added the different percentage of plant's extract and the best result shown for died mosquito's larva in 25% which killed the larvae just after first day applied.

**Key words:** *Effective Microorganism, Mud ball, Malaysia's Ulam Herbs, Mosquito.*

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### INTRODUCTION

It is a fact that the environment will affects human's health. The clean environment not only ensure for life's comfort, but also for well-being of all community. Human average life span has almost doubled over the past century or so mainly because of having clean, manageable environment that supply safe drinking water. In case parts of the environment, such as air and water, or soil become polluted, it can lead to health problems (Erik Lichtenberg and David Zilberman, 1988). In the other hands, an unmanageable environment can also lead to the human health's threatening by providing the suitable condition for the breeding of mosquito.

Mosquitoes are considered one of the most dangerous creatures on the planet because of their ability to spread deadly diseases (R. Kumar *et al*, 2003). Mosquitoes require stagnant water to breed (black flies need fresh, running water). Stagnant water sources can be easily found in buckets, tires, pools, marshes or containers left around a property. Mosquitoes have four stages of development which called complete metamorphosis that consists of stages known as egg larva, pupa and adult. Eggs need to be near water to hatch because of both the larval and pupa stages are aquatic. The Adult stage is when the mosquito is able flies away. Female mosquitoes choose the suitable locations to lay their eggs where there will be perfect conditions for the larval stage to develop. The characteristics of the eggs follow one of three patterns where the first is an egg laid singly on the water surface and will hatch two or three days later. The second pattern of egg lying is when eggs are glued together and float on the surface of the water, these are called egg rafts and also break apart and hatch two or three days later. The final pattern is an egg laid singly out of the water where it will adapt to withstand dry conditions until there are floods and they can hatch. The pattern of egg lying is depending on the definite type of Mosquito (Hinman, E.H., 1930).

Mosquito borne disease has been brought under control over the world, but the danger of new and devastating outbreaks is always present for the main reasons that mosquitoes and the pathogens they carry are able to evolve shield to chemical pesticides and drugs. In order to against such shield, consecutive surveillance is necessary, together with the employment of a combination of control measurement including physical, chemical, biological and social (F.S.P. Ng FASc and H.S. Yong FASc., 2000). Larval control is a major component in mosquito control programs and the successful of this work can help in reducing the popularities of mosquito that led to the safety condition for human's life.

Phytochemicals that usually found in botanical derivatives are tested against various life stages of mosquitoes, have potential uses as growth and reproduction inhibitors, repellents and as oviposition deterrents. In the previous done studied, the effect of plant extracts on mosquito had shown that these materials are good replacement for synthetic chemical pesticides. These studies successful determined that some botanical compounds such as alkaloids, nicotine, anabasin and lupitin in the extracts produced high mortality against

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mosquito larvae. Mosquito species, life stage, the plant parts and solvent used for extraction, phototoxic activity and the geographical origin of a plant compound are important factors in the efficacy of a phytochemical (M. Shahi, A.A *et al*, 2010).

Malaysia are one of the country in the world that rich of beneficial plants called, Ulamherb, that was found to have compounds derivatives which can be used as mosquito larvae killer. This Ulam herb's extraction was added into the composition of the original multipurpose smart effective microorganism mud ball to give extra benefit's function when applied to the target areas.

As to control the population of mosquito, the best effective way is by killing them from the beginning stage of their life's cycle which is at larva stage. It is important to know where they live and breed as it is the key to ensure they were killed before they become old enough to bite. Mosquitoes usually choose areas with standing water as their home. The used of effective microorganisms to kill the mosquito at their early stage of life as it can produces toxins that can be fatal to insects such as mosquitoes (F.G. Priest, 1992).

As the larvae feeds on organic material, they consume the EM spores which deliver the toxins to the digestive system, starving the mosquito larvae. EM is safe to fish, pets, wildlife and humans. It can be used in many standing water applications safely such as fish ponds, watering troughs, or other areas that fish, animals and other wildlife thrive (Subbiah Poopathi *et al*, 2004).

## **MATERIALS AND METHOD**

### **2.1 Isolation of Microorganisms:**

The method involved during this research begun with the steps of getting the effective microorganism from livestock rumen. The effective microorganism is own isolated to ensure that the product is 100 % 'halal' guarantee by using technique of screening and isolating of effective microorganisms and where in sample strains of microorganism involved the numbers of steps (Mohd Mustafa Al Bakri Abdullah *et al*, 2011).

### **2.2 Media Preparation:**

The Preparation of a mediais by heated 20g of nutrient agar mixed into 1 liter of distilled water for about 1 hours before its being placed in autoclave for 15minutes at 121°C. The liquid media solution was allowed to be cold before transferring into a petri dish (Vanessa Walter,ChristophSyldatk, and Rudolf Hausmann, 2010).

### **2.3 Growth of Microorganisms:**

The samples strains of microorganism are diluted in distilled water to obtain 1:10<sup>6</sup> ratios. It needs to spread evenly on the nutrient agar surface before placing into the incubator for overnight at 30°C (Vanessa Walter, Christoph Syldatk, and Rudolf Hausmann, 2010).

The growing of microorganism can be observed after 24hours of incubation. The identification and isolation is done in order to get the single colony of effective microorganism. Those isolated and identified effective microorganism are then cultured for stock growing (Vanessa Walter, Christoph Syldatk, and Rudolf Hausmann, 2010).

### **2.4 EM Mudball Preparation:**

This production of effective microorganism is thereafter used in the production of a multipurpose smart effective microorganism mud ball which contains the mixture of rice bran and soil by thoroughly kneading them and forming into the predetermined sizes. The mud ball is ready to be used directly for multipurpose application after it got dried. The smart effective microorganism mud ball is configured to slowly dissolve in water allowing the incorporated effective microorganism to escape into the water (Zuraini Zakaria, Sanjay Gairola and Noresah Mohd Shariff, 2010).

### **2.5 Ulam Herbs EM Mudball Preparation:**

The fresh leaves of selected Malaysia's Ulam herbs that was studied to have the derivative compound which can help in killing the mosquito's larvae were washed in tap water and dried by using direct sun. The leaves were grinded into a small particles size and immediately ground with acid-washed sand using a mortar and pestle. The ground of material was filtered through filter paper and filtrate of crude extract was added into the composition of multipurpose smart effective microorganism mud ball to make the new product of Biolarvacidemultipurpose smart effective microorganism mud ball (Green *et al*, 1991).

### **2.6 Efficiency Test:**

The study was conducted in laboratory by putting the numbers of mosquito larvae into the 1000ml beakerwith contains 800ml of water . The experiment was done by comparing the efficiency of Biolarvacide multipurpose smart effective microorganism mud ball with original multipurpose smart effective microorganism

mud ball and the commercially available EM Mud ball. The changed in the remains number of larvae was observed and recorded.

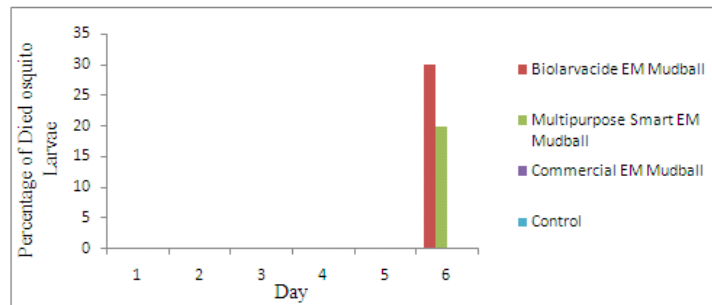
**RESULT AND DISCUSSION**

**3.1 Effect of Different Type of EM on Mosquito’s Life:**

After the output product of EM Ulam Herbs Mudball are ready to be used after been allowed to get dried of about 1 weeks, it was undergoes laboratory test to evaluate their efficiency. Randomly, 5 day time interval was decided to run the test with using three differences type of EM Mudball. The numbers of mosquito larvae placed in each type of beakers are same and the result are shown in table 1 below :

**Table 1:** Percentage of larvae died by different type of Effective Microorganism Mud ball.

Day	BiolarvacideMud ball	Multipurpose Smart EM mud ball	Commercial EM mud ball	Control
0	0%	0%	0%	0%
1	0%	0%	0%	0%
2	0%	0%	0%	0%
3	0%	0%	0%	0%
4	0%	0%	0%	0%
5	30%	20%	0%	0%



**Fig. 1:** Percentage of Died Mosquito Larvae for Different Type of EM Mudball.

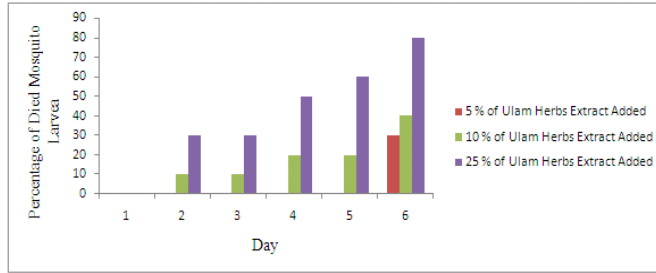
From the collected result of this experiment, one EM mudball from each three type of mud ball with weight about 20 grams that contains same percentage of liquid effective microorganism applied was added into 800ml of water contains 10 mosquito larva. Based on table 1, Biolarvacidemultipurpose smart EM mud ball, with contains 5 % of ulam herb’s extract were used and from the recorded result above, only on the day 6 the mosquito larva started to die and just a few numbers of them have being killed. From this experiment, as Biolarvacide multipurpose smart EM mud ball successfully killed most effective mosquito larvae compared to others two type of mudball and going to be used for the further test.

The further experiment was run to figure out the effects of different percentage Ulam herbs extract added into the mud ball composition on their effectiveness of killing the mosquito larvae. The result obtained are represented in the table 2 below :

**Table 2:** Percentage of larvae died by different percentage of added Ulam’s herbs extract for biolarvacide EM Mud ball.

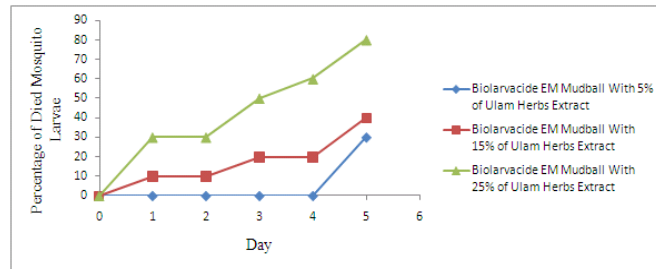
Day	BiolarvacideMud ball With 5 % Ulam’s hers extract added	BiolarvacideMud ball With 10 % Ulam’s hers extract added	BiolarvacideMud ball With 25 % Ulam’s hers extract added
0	0%	0%	0%
1	0%	10%	30%
2	0%	10%	30%
3	0%	20%	50%
4	0%	20%	60%
5	30%	40%	80%

The experiment was repeated by using different percentage of added Ulam’s herbs extract for biolarvacide EM Mud ball, which is 10 % and 25 % while the other parameters are keep constant. From the recorded result above, on the first day, the mosquito larvae from both 10% and 25% of added Ulam’s herbs extract are started to give a positive result with the increasing in the numbers of killed mosquito larvae. At the end of the experiment, 40 % of mosquito larvae are being killed for 10% of added Ulam’s herbs extract, while for the 25% of added Ulam’s herbs extract, 80 % of mosquito larvae are being killed.



**Fig. 2:** Percentage of Died Mosquito Larvae for Different Percentage of Ulam Herbs Extract Added.

Evaluation of collected result goes to the conclusion that the ability of killing the mosquito larvae by Biolarvacide smart EM mudball increased by the increasing of their percentage of Ulam herbs extract added as from the table 2 above 25 % of added ulam herbs extract killed higher number of mosquito larvae, which is up to 80 %.



**Fig. 3:** Graph of percentage of larvae died by different percentage of added Ulam's herbs extract for Biolarvacide EM Mud ball.

The graph shown the result for different percentage of Ulam herb's extraction added into the solution of experiment. From the graph, the conclusion goes to accept the hypothesis that percentage of killed mosquito larvae is increased with the increasing of percentage of added Ulam herb's extract. From the above data, 25% of added ulam herbs extract killed most higher mosquito larvae within 6 days which is up to 80%.

The mission to make humans less attractive to mosquitoes has fuelled decades of scientific research on mosquito behaviour and control. The search for the perfect topical insect repellent or insect killer continues as peoples are now becomes alert with the dangerousness of this creature (Dr. Bhoopendra Singh, Prakash Raj Singh and Manoj Kumar Mahanty, 2013).

As reported from the study done by AnupamGhosh *et al*, 2012, they concluded that one of the totpotential alternative approaches under the biological control programme is to have a look on the floral biodiversity and enter the field of using safer insecticides of botanical origin as a simple and sustainable method of mosquito control. Different from conventional insecticides which are based on a single active ingredient, plant derived insecticides comprise botanical blends of chemical compounds which act concertedly on both behavioural and physiological processes. Those facts cause a very little chance of pests developing resistance to such substances. Identifying bio-insecticides that are efficient, as well as being suitable and adaptive to ecological conditions, is imperative for continued effective vector control management. Botanicals have widespread insecticidal properties and will obviously work as a new weapon in the arsenal of synthetic insecticides and in future may act assuitable alternative product to fight against mosquito borne diseases (Anupam Ghosh, Nandita Chowdhury & Goutam Chandra, 2012).

Referred as written by AnupamGhosh *et al*, 2012, human beings have used plant parts, products and secondary metabolites of plant origin in pest control since early historical times. Vector control has been practiced since the early 20th century. Previous study also found that the efficacy of phytochemicals against mosquito larvae can vary significantly depending on plant species, plant parts used, age of plant parts (young, mature or senescent), solvent used during extraction as well as upon the available vector species (AnupamGhosh, NanditaChowdhury&Goutam Chandra, 2012).

The Phytochemicals are botanicals which are naturally occurring insecticides obtained from floral resources. Applications of phytochemicals in mosquito control were in use since the 1920s8 , but the discovery of synthetic insecticides such as DDT in 1939 side tracked the application of phytochemicalsin mosquito control programme. After facing several problems due to injudicious and over application of synthetic insecticides in nature, re-focus on phytochemicals that are easily biodegradable and have no ill-effects on non-target organisms

was appreciated. Since then, the search for new bioactive compounds from the plant kingdom and an effort to determine its structure and commercial production has been initiated. At present phytochemicals make up to 1 per cent of world's pesticide market (Anupam Ghosh, Nandita Chowdhury & Goutam Chandra, 2012).

Based on the seriously study on phytochemicals contains in plants that was found as the important compound that should be present in the making of insecticides, the search for Malaysia's ulam herbs that contains this compound were done. There is a proven of the existent of plant origin in Malaysia that can be used for insecticides purpose but only 5 - 15% of more than 250000 species of higher plants with therapeutic potential have been studied. Hence, there is a vast potential to reveal plant resources with useful phytochemicals (Yik L Chew *et al*, 2011). This study comes out with the usage of Malaysia's ulam herbs as many it was proven with the present of phytochemicals.

Recently, bio-pesticides with plant origins are given for use against several insect species especially disease transmitted vectors, based on the fact that compounds of plant origin are safer in usage, without phytotoxic properties; also leave no scum in the environment (Schmutterer H., 1990).

#### 4.0 Overall Conclusion:

In order to improve the ability of Effective microorganism solution to kill the mosquito larva, further research and experiment should be proceeded. The properties of Effective microorganism solution maybe needed for some new elements that should be added.

For example, BTI or *Bacillus thuringiensis israelensis* maybe the suitable new microbes that needed to be added in the combination of new EM solution as BTI is known as a larvacide used for biological mosquito control. It is clinically tested as natural and safe to everything but highly toxic to mosquito larvae (Subbiah Poopathi and Brij K Tyag, 2004).

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