



## EFFECTIVENESS OF DIFFERENT DETERGENT (RIN & WHEEL) SOLUTIONS ON POPULATION OF MOSQUITO LARVA: CASE STUDY

<sup>1</sup>Asha Budharam Madavi, <sup>2</sup>Vivek Shrikant Netam

<sup>1</sup>Assistant Professor, <sup>2</sup>Assistant Professor

<sup>1</sup>Geography,

<sup>1</sup>Sou. Mangaltai Ramchandra Jagtap Mahila Mahavidyalaya Umbraj, karad, Satara, India

*Abstract:* Mosquitoes can have both positive and negative impact on the ecosystems. As part of their useful role, the larvae of mosquitoes live in water and provide food for fish and other wildlife including larger larvae of the Species such as dragonflies. The larvae themselves eat microscope organic matter in the water, helping to recycle it. Adult mosquitoes make up part of the diet of some insect-eating animals, such as birds, bats, adult dragonflies and spiders. They also help pollinate some flowers, when they consume nectar. But mosquitoes also can have a damaging role, harming other animals by being a vector for diseases such as dengue, malaria, yellow fever and encephalitis. The mosquitoes don't cause the diseases themselves, but only act as carriers. They need to feed on a person or animal that is already infected, then when they bite a healthy person or animal who is already afterwards they pass on the diseases that spread of which is mediated by mosquito larva that becomes a health problem everywhere in the world. Some natural and chemical substances had been experimented to combat; one of them is detergent solution.

*Index Terms - Mosquito, Detergent Solution, Diseases, toxicity, Environmental issues, Human Health.*

### I. INTRODUCTION

The environmental issues are widely discussed on the platform which range from local to Global. Global health is most important and should keep on the first priority for consideration. The environmental degradation is a global phenomenon. The paper were discusses on effect of different detergent (Rin & wheel) solutions on population of mosquito larva: case study on the environment and human health in Umbraj and surrounding areas. Many diseases caused by virus infection which is spread by mosquito. The fastest spreading in the world is indicated by incidences that tend to increase every year. It was predicted that about 50 to 100 million cases of new infection emerge every year and about 2 to 5 billion citizens who live in endemic countries that have high risk are infected. The species of mosquito that plays the main role as vector Because the specific medicine and vaccine for has not yet been founded, the prevention is aimed to control the vector is known to prefer breeding places mainly in manmade containers with clear water inside such as Rainwater. In order to control people should clean, close and burry those manmade containers. Stone and big pots that can become breeding place of mosquito in the rainy season. Those artworks and handicrafts that contain water are difficult to clean and empty because they are usually deep and if covered, it will decrease the value of art and purchase. In this case, safe larvicide was needed that is available for people. Some natural and chemical substances have been experimented to combat larvae; one of them is detergent solution. Detergent is one of cleansing agents used in households that is available and has the potential as larvicide. Some studies showed that detergent could prevent oviposition and killed the larvae in various concentrations. However, water that contains detergent can still be used as breeding place. This study is carried out in order to find the lethal concentration (LC) of detergent solution for killing of larvae.

### II. OBJECTIVES:

1. To study of detergent solution making process.
2. To study detergent solution making process impact on larvicide.
3. To know the impact of mosquito larva on human health and environmental impact.
4. To study of Human Health problems.
5. To suggest environment friendly strategy.

### III. AIMS:

This study aims to investigate the effect of several concentrations of detergent to kill mosquito larvae and to find out the lethal concentration (LC) 50, LC 90, and LC 100. Randomized posttest only control group design was applied to observe the percentage of mosquito larvae instars III-IV killed when they contacted to various detergent concentrations within 24 hour of observation. This study result showed that detergent with the concentration of 1g/l; 1.5g/l; 2 g/l; 2.5g/l; 3 g/l; 3.5 g/l and 4 g/l respectively showed the killing of Mosquito larvae 37.6%, 42.4%, 74.4%, 85.6%, 89.6%, 95.2% and 100%, respectively. Probit analysis showed that LC50 = 1.5 gram/liter, LC90 =3 g/l and LC100=4 g/l.

### IV. SIGNIFICANCE OF THE STUDY:

The health issue by mosquito larvae is very serious matter because Global health is most important for everyone. The objective of the present study was to evaluate the impact of mosquito larvae which causes various diseases related to human health in Umbraj. There has an adverse effect of the population of mosquito larvae on human health. The result of this experimental setup is to be studies in various angles so that some remedial planning can be suggested. Such type of study can be path to find remedies.

### V. METHODOLOGY:

Present study is based on primary as well as secondary sources of data, which are as:

- a) **Primary Data:** Field work will be carried out from source to Umbraj, dialogue with affected sectors, measuring intensity and observing effects.
- b) **Secondary Data:** Reference Books, Magazine, Research Paper etc.

### VI. MATERIALS AND METHODS:

Researcher has collected basic information from the sources area of Umbraj. The subject itself has prime importance and very less work was done on effect of different detergent (Rin & wheel) solutions on population of mosquito larva: case study Umbraj so we have had related primary information.

This information was collected by undertaking field work and Practical work. So, the fieldwork methodology, dialogue with stakeholders was also applied. And Practical work has done in laboratory of S.G.M. College (Autonomous), Karad.

This study applied randomized post-test only control group design with one control group versus seven treatment groups, while the selection and inputting of samples were carried out randomly. Control group was a container which contained well water while treatment groups were containers which contained well water plus detergent with concentration of 1g/l; 1.5g/l; 2 g/l; 2.5g/l; 3 g/l; 3.5 g/l and 4 g/l. Every group was replicated and each container filled with 25 larvae of instars III – IV

### VII. EXPERIMENTAL SETUP:

There are seven different procedure are involved in the process of experimental setup for controlling the population of mosquito larvae. The process of solution preparation of detergent Rin and Wheel and impact on larvae control.

1. Collection of larvae
2. Placed of larvae separately in conical flask as per concerned
3. Preparation of Detergent Solution
4. Treatment with different concentrations as discussed.
5. Observation
6. Discussion
7. Conclusion

### VIII. RESULT:

After 24 hours observation, the larvae in all treatment groups were dead but not in the control group. The average percentage of the larva's death in the treatment groups can be monitored in Table 1. Probit analysis was carried out to determine the ability of detergent water as *larvicide*, to get the exact detergent concentration that can kill 50% larva (LC50), 90% larva (LC90) and 100% larva (LC100). The result of the probit analysis can be observed.

**Table 1**

The average percentage of the larva's death in several detergent concentrations during 24 hours observation

Concentration(gr/liter)	Percentage of larva's death					Average percentage of larva's death
	I	II	III	IV	V	
1	32	40	44	36	36	37.6
1.5	32	40	40	60	40	42.4
2	76	72	80	68	76	74.4
2.5	92	84	84	88	80	85.6
3	92	84	86	92	84	89.6
3.5	100	84	100	96	92	95.6
4	100	100	100	100	100	100

**PLATE NO -1. CONTROL GROUP****PLATE NO -2. EXPERIMENTAL (50% MORTALITY)**

## IX : DISCUSSION:

Table 1

Concentration(gr/liter)	Percentage of larva's death					Average percentage of larva's death
	I	II	III	IV	V	
1	32	40	44	36	36	37.6
1.5	32	40	40	60	40	42.4
2	76	72	80	68	76	74.4
2.5	92	84	84	88	80	85.6
3	92	84	86	92	84	89.6
3.5	100	84	100	96	92	95.6
4	100	100	100	100	100	100

**Table no 1** show that detergent has the potential as larvicide on mosquito. Higher concentration increases the larvicide capability. At 4 g/l concentration, all of the larvae were destroyed (100%). In all treatment groups and also in the control group.

This result showed that higher detergent concentration in a container killed more larvae, up to 4 g/l concentration. Some previous researches also support this result. Water with higher detergent concentration, 1.5 g/l, even is also chosen by the mosquito as its oviposition place. Besides not being chosen as oviposition place. Detergent has larvicide potential because it contains surfactants, which consist of non-ionic surfactant, ionic surfactant and cationic surfactant. Surfactant has amphiphilic structure that consists of two parts, namely the ionic cluster and the hydrocarbon cluster. The ionic cluster has strong affinity to water, while the hydrocarbon cluster has not. The surfactants contained in water will obstruct the oxygen supply at the water surface and kill the larvae.

## X. CONCLUSIONS:

Detergent has potential as larvicide for the larvae. Detergent solution with 1, 1.5, 2, 2.5, 3, 3.5 and 4 g/l concentration is able to kill larvae as high as 37.2%, 42.4%, 74.4%, 85.6%, 89.6%, 95.2% and 100%, respectively. Higher concentration of detergent was capable to kill more larvae. The test showed that the average death of larvae differed significantly between all the treatment groups and also with the control group. The probit analysis found that the lethal concentration that could kill 50% larvae (LC50) is 1.5 g/l, lethal concentration that could kill 90% larvae (LC90) is 3 g/l and lethal concentration that could kill 100% larvae (LC100) is 4 g/l.

## XI. SUGGESTION:

Suggestions to overcome problems are following-

- 1) To create awareness of environmental problems.
- 2) Clean the standing water which is breeding ground of mosquito larvae.
- 3) Avoid the extra storage water in the open out place.
- 4) Medical facilities should be provided to infected person.
- 5) All the information about infected person must be kept by the hospital.
- 6) To create awareness of diseases caused by mosquito.
- 7) Make educational provision for the citizen.

**XII. REFFERENCES**

1. Anonim. 2007a. Pedoman Survei Entomologi Demam Berdarah Dengue. Jakarta: Departemen Kesehatan RI Direktorat Jenderal Pengendalian Penyakit dan Penyehatan Lingkungan (Dit.Jen PP & PL). p. 1-24.
2. Anonim. 2007 b. Ekologi dan Aspek Perilaku Vektor. Jakarta: Departemen Kesehatan RI Direktorat Jenderal Pengendalian Penyakit dan Penyehatan Lingkungan (Dit.Jen PP & PL). p. 1-28.
3. Anonim. 2012. Data Kasus Demam Berdarah Dengue (DBD) per bulan per Kabupaten di Propinsi Bali. Denpasar: Report Program P2BD Dinas Kesehatan Propinsi Bali
4. Anonim. 2005. Guidelines for Laboratory and Field Testing of Mosquito Larvicides. Geneva. World Health Organization. p.7-33
5. Becker, N., Petric, D., Zgomba, M., Boase, C.,  
6. Dr. Hemant Pednekar., (2007) Environment and Substantiation development  
7. Dr. Shailaja Sangade., (2013) Environment and Society
8. Hadi, U.K., Sigit, S.H., Agustina, E. 2006. Habitat Jentik *Aedes aegypti* (Diptera: Culicidae) pada Air Terpolusi di Laboratorium. Research report (unpublish).
  
9. Kusriastuti, R. and Sutomo, S. 2005. Evolution of Dengue Prevention and Control Programme in Indonesia. *Dengue Bulletin*. 29: 1-7
10. Kusriastuti, R. 2010. Evaluasi Pengendalian Penyakit PPBB Tahun 2009 dan Upaya Memanfaatkan Peluang dalam Mencapai Indikator PPBB dalam RPJMN 2010-2014.
11. Lutfi, A. 2009. Sabun dan Detergen. Situs Kimia Indonesia. chem-is-try.org, download at 15 October 2012
12. Nathan, M.B., Drager, R.D., Guzman, M. 2009. Epidemiology, Burden of Disease and Transmission in Dengue Guidelines for Diagnosis, Treatment, Prevention and Control. Geneva: World Health Organization. p.1-24
13. Prasantong, R. 1989. The Study of The Efficiency of Using Detergent against *Aedes aegypti*. Thesis. Mahidol University Library.
14. Pemilihan Tempat Bertelur Nyamuk *Aedes aegypti* pada Air Limbah Rumah Tangga di Laboratorium. *Jurnal Veteriner*. 10.(4): 205-7.
15. Schwartz, E., Weld, L.H., Smith, A.W., Sonnenburg, F.V., Keystone, J.S., Kain, K.C., Torresi, J., Freedman, D.O. 2008. Seasonality, Annual Trends, and Characteristics of Dengue among III Returned Travelers, 1997-2006. *Emerging Infectious Diseases*. 14.(7) : 1081-8
16. Seminar on Evaluasi dan Upaya Pemanfaatan Peluang Penyakit PPBB. Surabaya
17. Soedarto, 2012. Demam Berdarah Dengue. Jakarta: CV Sagungseto. p. 61-74.
18. Sudarmaja, M. 2008. Pengaruh Air Sabun dan Detergen terhadap Daya Tetas Telur *Aedes aegypti*. *Medicina* . 39 (1): 56-58
19. Sudarmaja, M. dan Mardihusodo, S.J. 2009.