

UNIVERSITI TEKNOLOGI MARA

**EFFECT OF RADIO FREQUENCY
ON HATCHING RATE AND
DEVELOPMENT PERIOD OF *Aedes
aegypti* (Linnaeus) (Diptera: Culicidae)**

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ABSTRACT

The study of effects of radiofrequency (RF) on *Aedes aegypti* is important to determine the severity and relationship of upcoming technologies with their morphological characteristics. Rapid expansion of technologies namely the evolvement of fourth generation networks (4G) to fifth generation networks (5G) in wireless telecommunication has put vector control and management on alert due to its unknown effect. Until now, there are scarce studies of RF radiation effect on *Aedes* population whereas significant research is done on other insects such as honeybee and vertebrae like birds. *Aedes aegypti* which mainly found in the dwelling areas and centralized more on dense city area are chosen to monitor the effect of RF on its hatching rate and development time. The study found that low dose RF (900 MHz) has significantly increased the hatching rate of *Aedes aegypti* eggs by 17.4% compared to unexposed (Control) eggs. The hatching rate for high dose of RF caused significant increase albeit less than 900 MHz when compared to Control by 7%. The development time of *Aedes aegypti* was also slightly affected after exposed to RF. The overall development time was shortened to 900 MHz which concluded that exposure to RF is indeed dangerous to human population. However, higher dose of RF showed a slight lay back in adult emergence compared to Control which can be concluded that high dose of RF radiation might impair *Aedes aegypti* ability for growth.

Keywords: *Aedes aegypti*, radiofrequency, high-dose, low dose, hatching rate, development time

CHAPTER 1

INTRODUCTION

1.1 Background Study

It is estimated that 3 billion people globally are at the risk of infection with mosquito-borne disease, attributing millions of demises annually (Wilke et al., 2017). *Aedes* spp. mosquito being the carrier or known as vector are responsible to transmit the life-threatening arboviral diseases cause by dengue virus namely dengue, chikungunya, yellow fever and Zika. One of the fastest growing infectious diseases worldwide is dengue fever (DF) and constantly being a global public health issue for the last few decades (Norli & Azmi 2008; Palanivel et al. 2012). The symptoms exhibited are varies raging from a non-specific febrile illness, muscle and bone pain [as in Dengue Fever (DF)] to more severe illness with bleeding tendency, thrombocytopenia, severe headache, and plasma leakage [dengue haemorrhagic fever (DHF)] (Mia et al., 2013).

Total number of dengue cases reported to WHO has increased 8-fold from 505,430 cases in 2000, to over 2.4 million in 2010, and 5.2 million in 2019 (WHO 2022) depicting that DF is literally an apparent hazard and the most widespread re-emerging arboviral disease. DF has been declared as endemic in Malaysia and the first case were identified in Penang in 1902 (Packierisamy et al. 2015) and dengue