

UGM Lecturer of Faculty of Veterinary Medicine Designs the Detection Kit of Aedes Aegypti Permethrin Resistant

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Dr. med.vet. drh. Penny Humaidah Hamid, M.Biotech., a UGM lecturer and researcher at the Faculty of Veterinary Medicine (FKH), has succeeded in developing a kit to detect Aedes Aegypti mutations, particularly those that are strictly related to permethrin resistance.

"The kit formulation with an adjusted reaction and producing a positive reaction can reveal that mosquitoes in an area are resistant to permethrin group compounds," she explained on Friday (14/8).

This innovation development aims to solve the problem of resistance to the Aedes Aegypti mosquito, a vector of the dengue virus that causes dengue fever. She mentioned that efforts to control Aedes Aegypti mosquitoes by using chemicals in their habitat, larvae, and adults did not have a significant impact because cases of dengue outbreak always occur every year. In fact, many reports of mosquito immunity against various insecticides such as the pyrethroid group are often used.

"The resistance factor of mosquitoes to insecticides is crucial because almost all of the dengue vector control strategies use the active ingredient," he said.

Meanwhile, Dengue virus infection has increased in the past decade. Transmission of diseases often found in countries in tropical and subtropical regions such as Southeast Asia is rapidly circulating to South China, Pacific Ocean countries, America, and even now threatens Europe. In 50 years, dengue infection transmitted by the bite of the *Aedes aegypti* mosquito has spread to many countries with an increase in cases of up to 2.5 billion victims in endemic countries. Meanwhile, the infection rate that occurs is around 70% or the equivalent of 1.8 billion people in Southeast Asia and the West Pacific region.

Due to this condition, Penny and his team conducted research. They innovated developing a kit to detect *Aedes Aegypti* mutations closely associated with resistance to permethrin in Indonesia. The designed kit is ready-to-use consisting of specific primary compositions, real-time PCR reaction materials, fluorophore-labeled probes, positive control DNA, and negative control DNA.

This practical kit formulation developed since 2016. There has also been an examination or a test for its effectiveness in detecting *Aedes aegypti* mutations that are resistant to permethrin from the areas of Bali, Jakarta, Makassar, and Banjarmasin. Reaction results can indicate resistance in less than 24 hours.

"The effectiveness is 99 percent, and we can see the results in about a day since the isolation of the mosquito DNA," she said.

There will be high accuracy and quick detection methods and analysis observation of the results as a solid background for choosing the development of this method in the detection of resistance to Dengue vectors to insecticides in Indonesia. Penny conveyed that the kit with the original formulation and labeled probe can be used by surveillance agencies, policymakers, and health workers to determine the accuracy of the application of insecticide rotation in eradicating the *Aedes Aegypti* mosquito. In the future, hopefully, the kit will help control efforts for various diseases that are mediated by the *Aedes Aegypti* mosquito, such as Dengue, Zika, West Nile, and Chikungunya.

Author: Ika

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