Thiruvalluvar University, India and Teesside University, UK

Research collaboration with India

20 October 2017 @TeesUniNews **Research**

Malaria management is a big challenge due to the presence of insecticide-resistant strains as well as the development of Plasmodium species highly resistant to major anti-malarial drugs.

A collaborative study between Teesside University academic **Dr Pattanathu Rahman** and Thiruvalluvar University in India is focusing on the application of biosurfactants produced by bacteria from Indian soil for insecticidal applications against malaria mosquitoes.

The work was initiated by **Professor Kadarkarai Murugan**, an entomologist and Vice-Chancellor of Thiruvalluvar University and collaborated with environmental microbiologist **Dr Rajasekar Aruliah**, an Assistant Professor and Ramalingaswmi Fellow of Thiruvalluvar University.

Treatments with bacterial surfactants led to various physiological changes including longer pupal duration, shorter adult ovipositional period, and reduced longevity and fecundity.

Overall, the toxic activity of these biosurfactants on mosquito larvae as well as their major impact on adult longevity and fecundity, allows their further consideration for the development of insecticides in the fight against malaria mosquitoes.

The details of the work were published in the Environmental Science and Pollution Research journal.

In the News

Mosquito control using natural bio-processes
Tamil Daily Newspaper, India, 04/11/2017
Dr Pattanathu Rahman is involved in a global challenge research to control mosquitos.

Biosurfactants produced by Bacillus subtilis A1 and Pseudomonas stutzeri NA3 reduce longevity and fecundity of Anopheles stephensi and show high toxicity against young instars

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Abstract:

Anopheles stephensi acts as vector of Plasmodium parasites, which are responsible for malaria in tropical and subtropical areas worldwide. Currently, malaria management is a big challenge due to the presence of insecticide-resistant strains as well as to the development of Plasmodium species highly resistant to major antimalarial drugs. Therefore, the present study focused on biosurfactant produced by two bacteria Bacillus subtilis A1 and Pseudomonas stutzeri NA3, evaluating them for insecticidal applications against malaria mosquitoes. The produced biosurfactants were characterized using FT-IR spectroscopy and gas chromatography-mass spectrometry (GC-MS), which confirmed that biosurfactants had a lipopeptidic nature. Both biosurfactants were tested against larvae and pupae of A. stephensi. LC50 values were 3.58 (larva I), 4.92 (II), 5.73 (III), 7.10 (IV), and 7.99 (pupae) and 2.61 (I), 3.68 (II), 4.48 (III), 5.55 (IV), and 6.99 (pupa) for biosurfactants produced by B. subtilis A1 and P. stutzeri NA3, respectively. Treatments with bacterial surfactants led to various physiological changes including longer pupal duration, shorter adult oviposition period, and reduced longevity and fecundity. To the best of our knowledge, there are really limited reports on the mosquitocidal and physiological effects due to biosurfactant produced by bacterial strains. Overall, the toxic activity of these biosurfactant on all young instars of A. stephensi, as well as their major impact on adult longevity and fecundity, allows their further consideration for the development of insecticides in the fight against malaria mosquitoes.

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