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Bacillus thuringiensis* strains native to Saudi Arabia with enhanced larvicidal toxicity against the rift valley fever mosquito vector, *Aedes caspius

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The bacterium *Bacillus thuringiensis* is a safe eco-friendly entomopathogenic bio-control agent widely used to complement chemical control. Hence there is an urgent need for characterizing novel isolates with potent larvicidal activity against mosquito vectors. The present study was initiated to characterize new native *Bacillus thuringiensis* isolates with mosquitocidal activity from various samples from 16 regions across the Saudi Arabia. Various samples were collected from mosquito breeding sites across different regions in the country and screened for *Bacillus thuringiensis* isolation. *Bacillus thuringiensis* isolates were characterized on the basis of colony morphology; shape of spores and parasporal crystals and through comparisons of biochemical profiles. The larvicidal activity (LC50 and LC95) of standardized spore/crystal mixtures of *Bacillus thuringiensis* isolates were tested against larvae of the Rift Valley Fever (RVF) mosquito vector in Saudi Arabia, *Aedes caspius* at 24 hours post-treatment and compared with that of the *Bacillus thuringiensis israelensis* (Bti-H14). A total of 23 (out of 68 native *Bacillus thuringiensis* isolates) were mosquitocidal. Larvicidal strains were similar in terms of colony morphology, hemolytic and motile. Out of the 23 isolates, 9 showed significantly higher activity (LC50 range from 3.90 to 9.5 µg/ml) than the Bti-H14 (LC50 of 13.33 µg/ml) with one strain having as much as 3.4-fold higher activity than the Bti-H14. This is the first report of *Bacillus thuringiensis* strains native to Saudi Arabia with significantly enhanced larvicidal efficacy against the RVF mosquito *Aedes caspius*. These novel *Bacillus thuringiensis* strains may therefore contribute to novel potent biopesticides and help mitigate the risk of *Bacillus thuringiensis* resistance emergence in bio-control programs targeting RVF vector populations.

Biography

Ashraf M Ahmed has completed his PhD from Keele University, UK, in 2002 and has ongoing Research Fellowship at Keele from 2004 to until now, and Fellow of the Royal Society, UK, in 2004. He is a Professor of Medical Entomology at Zoology Department at El-Minia University, Egypt, (currently at King Saud University, Saudi Arabia). His current research interest is "mosquito immunity and biocontrol", aiming at utilizing the immune response of mosquito vectors against mosquito-borne disease agents, and biological agents in the biocontrol measures against mosquito vectors. He has successfully achieved several grants for research projects, and got two currently ongoing grants projected (1.6 million Saudi Riyals each). One grant is for isolating native mosquito *Bacillus thuringiensis* bacteria with enhanced larvicidal activities for use in the battle against mosquito vectors in Saudi Arabia. The other grant is for isolating immune peptides from honey-bees for use as natural antibiotic against the American Foal Broad disease (AFB) that threatens the global Apiary industry. He had successfully monitored undergraduate, postgraduate students and research scholars. His academic output consists of more than 26 papers in reputed journals, membership of several scientific societies, attended several local, national & international conferences and invited for main talks in many international conferences.

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