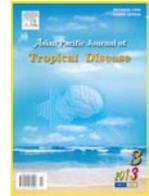




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Efficacy of phytosterol as mosquito larvicide

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To the editors,

Mosquitoes are the most important vectors in terms of global public health. They transmit most of the life-threatening diseases like malaria, yellow fever, dengue fever, chikungunya fever, filariasis, encephalitis, West Nile virus *etc.*, mostly in tropical and subtropical countries of the world.

Emergence of insecticide resistance and the necessity of preservation of natural health of ecosystem recommended the use of biological products in vector control operations. They are biodegradable, target specific, eco-friendly and there are no evidences of resistance development.

Phytosterols are steroid compounds similar to cholesterol that are found in plants. Exploiting nutritional requirements, such as cholesterol, offers a novel, target-specific and environmentally friendly approach are important for mosquito control. Cholesterol is used in cell membranes and is a precursor of molting hormone. In mosquitoes, it is vital for growth, development and egg production. Mosquitoes can't produce cholesterol in their body and generate cholesterol by metabolizing ingested plant sterols in their guts. Mosquitoes take the sterol from the plant decays during their larval stage in the form of phytosterol, which is then converted to cholesterol. This conversion occurs by a sterol carrier protein (SCP).

Phytosterols can be used in vector control operations in following ways.

a) Some noxious phytosterols produce larval mortality after their consumption. For instance, the steroid β -sitosterol, isolated from leaves of *Abutilon indicum* (Linn.) Sweet exhibited toxicity to larval forms of *Aedes aegypti* (*Ae. aegypti*) ($LC_{50}=11.5$ mg/L), *Culex quinquefasciatus* ($LC_{50}=26.7$ mg/L) and *Anopheles stephensi* ($LC_{50}=3.58$ mg/L)[1]. A phytosteroid, isolated from the leaves of *Cestrum diurnum* was previously reported for its toxic activity against *Culex quinquefasciatus*[2]. Another steroid, β -sitosterol-3-O- β -D-glucoside also exhibited potent mosquitocidal activity

against adult *Ae. aegypti*[3].

b) Mosquito populations can also be controlled by plant-based inhibitors, which inhibit SCP activity. Due to the inhibition of SCP, mosquitoes can't produce cholesterol from plant sterols and results in developmental deformities lead to larval death. Ee *et al.*, isolated mangostin, an inhibitor of SCP, which was toxic against *Ae. aegypti*[4].

Today, the environmental safety is considered to be of paramount importance. Application of phytosterol as dietary supplement or SCP inhibitor may serve as relatively safe, inexpensive, and are readily available option in mosquito control programme.

Conflict of interest statement

We declare that we have no conflict of interest.

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