ABSTRACT

The purpose of this study was to judge the efficacy of crude saponin extract of *Moringa oleifera* leaves against eggs, pupae, larvae and adults of *Anopheles stephensi* and compared with larvicidal activity of pure saponin against larvae and adults of *Anopheles stephensi*. Because mosquitoes act as a vector which causes the vector borne diseases such as malaria, filariasis, dengue and Japanese encephalitis and these diseases are still major public health problem.

Vector control is an essential and effective means for controlling the transmission of these mosquito borne diseases. For its quick action, synthetic insecticides are the first line of defence but the continuous use of synthetic insecticides may led to the development of resistance and undesirable effects on non-target organisms and fostered environmental and human health concern, which initiated a search for alternative control measures. Plants are considered as a rich source of bioactive chemicals and they may be an alternative source of mosquito control agents. The botanical insecticides are generally pest specific, radially biodegradable and usually lack toxicity to higher animals. Many studies on plant extracts against mosquito larvae have been conducted around the world. Extracts and essential oils from plants may be alternative sources of mosquito larval control agents, as they constitute a rich source of bioactive compounds that are biodegradable into nontoxic products and potentially suitable for use in control of mosquito larvae. In fact many researchers have reported on the effectiveness of plant extracts and essential oils against mosquito larvae. Saponins possess clear insecticidal activity: they exert a strong and rapid working-action against a broad range of pest insects that is different from neurotoxicity.

The leaves were extracted with the methanol solvent for 72 h in a Soxhlet apparatus and extract was evaporated to dryness in rotator vacuum evaporator. This extract applied on test organism in suitable concentration after screening. Pure saponin also applied on organism in suitable concentration after screening.
Efficacy of crude saponin extract of *M. oelifera* leaves exhibited against the eggs of *Anopheles stephensi* and the LC$_{50}$, LC$_{90}$ and LC$_{99}$ was 173.46 ppm, 342.31 ppm and 597.84 ppm respectively. Against pupae of *Anopheles stephensi* and the LC$_{50}$, LC$_{90}$ and LC$_{99}$ were 713.02 ppm, 789.77 ppm and 858.85 ppm respectively. Efficacy of crude saponin extract of *M. oelifera* leaves exhibited against first to fourth instar larvae of the *Anopheles stephensi* and the LC$_{50}$, LC$_{90}$ and LC$_{99}$ values were 387.90 ppm, 465.37 ppm, 540.34 ppm for the first instar. 100 % mortality for the second instar at 575 ppm, 512.97 ppm, 590.04 ppm and 661.84 ppm for third instar respectively and 562.99 ppm, 639.95 ppm and 710.88 ppm for the fourth instar larvae. Larvicidal activity of pure saponin exhibited in the first to fourth instar larvae of the *Anopheles stephensi*, and the LC$_{50}$, LC$_{90}$ and LC$_{99}$ values were 112.09 ppm, 194.29 ppm, 305.08 ppm for the first instar, 186.16 ppm, 309.12 ppm, 468.58 ppm for the second instar and 100 % for the third instar at 350 ppm and 312.84 ppm, 390.71 ppm, 468.86 ppm for fourth instar respectively. Efficacy of crude saponin extract of *M. oelifera* leaves exhibited against the adult of *Anopheles stephensi* LC$_{50}$, LC$_{90}$ and LC$_{99}$ values were 0.665 µl/cm$^2$, 0.943 µl/cm$^2$ and 1.257 µl/cm$^2$. Efficacy of pure saponin against the adult of *Anopheles stephensi* LC$_{50}$, LC$_{90}$ and LC$_{99}$ values were 0.302 µl/cm$^2$, 0.607 µl/cm$^2$ and 1.076 µl/cm$^2$.

The present study indicates that the chemical compound saponin is the effective for mosquito control because due to the results of comparison of crude saponin extract of *M. Oelifera* leaves and pure saponin, the pure saponin is more efficient than crude saponin but *M. Oelifera* leaves consists sufficient amount of saponin to control the all stages of *Anopheles stephensi*. The data obtained in the present study suggests that the crude saponin extract of *M. Oelifera* leaves have potent larvicidal activity against the disease causing mosquito vector like *Anopheles stephensi* has been recorded.