RESULTS AND DISCUSSION

The present investigation is find out the efficacy of crude saponin extract from leaves of *Moringa oleifera* against eggs, larvae, pupae and adult of *Anopheles stephensi* and its larvicidal efficacy compare with pure saponin with varying concentration of crude extract and pure saponin for exposing of 24 hrs.

The results are of our work as susceptibility of crude saponin extract from leaves of *Moringa oleifera* against eggs of *Anopheles stephensi* is LC$_{50}$ was 173.46 ppm, LC$_{90}$ was 342.31 ppm and LC$_{99}$ was 597.84 ppm.

Susceptibility of crude saponin extract from leaves of *Moringa oleifera* against pupae of *Anopheles stephensi* is LC$_{50}$ was 713.02 ppm, LC$_{90}$ is 789.77 ppm and LC$_{99}$ is 858.85 ppm.

Larvicidal mortality of crude saponin extract from leaves of *Moringa oleifera* against *Anopheles stephensi*, LC$_{50}$ for first instar is 387.90 ppm and third instar, fourth instar are 512.97 ppm and 562.99 ppm respectively. LC$_{90}$ for first instar, third instar and fourth instar are 465.37 ppm, 590.04 ppm, and 639.95 ppm respectively and LC$_{99}$ for first instar, third instar and fourth instar are 540.34 ppm, 661.84 ppm, and 710.88 ppm respectively. Larvicidal mortality for second instar is 100% at 575 ppm.

Larvicidal mortality of pure saponin against *Anopheles stephensi*, LC$_{50}$ for first instar was 112.09 ppm, and second instar, and fourth instar are 186.16 ppm and 312.84 ppm respectively. LC$_{90}$ for first instar, second instar, and fourth instar were 194.29 ppm, 309.12 ppm and 390.71 ppm respectively, LC$_{99}$ for first instar, second instar and fourth instar are 305.08 ppm, 468.58 ppm and 468.86 ppm respectively. Larvicidal mortality for third instar was 100% at 350 ppm.

Susceptibility of crude saponin extract from leaves of *Moringa oleifera* against adult mosquito of *Anopheles stephensi* LC$_{50}$ was 0.665 µl/cm$^2$, LC$_{90}$ was 0.943 µl/cm$^2$ and LC$_{99}$ was 1.257 µl/cm$^2$.

Susceptibility of pure saponin against adult mosquito of *Anopheles stephensi* LC$_{50}$ was 0.302 µl/cm$^2$, LC$_{90}$ was 0.607 µl/cm$^2$ and LC$_{99}$ was 1.076 µl/cm$^2$. 
Earlier work of Ferreira et.al. demonstrated that they have worked on larvicidal activity of the water extract of Moringa oleifera seeds against third larvae of Aedes aegypti. In their study they reported 50% mortality at 1260ppm. Likewise Deore and Khadabadi (2009) worked on larvicidal activity of saponin fractions of Chlorophytum borivilianum santapau and Fernandes on third instar larvae of Anopheles stephensi, Aedes aegypti and Culex quinquifascitus, the LC₅₀ of methanol extract, crude methanol extract pure saponin fraction respectively was 8066.67 ppm, 5300 ppm and 400 ppm. In our study of efficacy of crude saponin extract against third instar larvae of Anopheles stephensi LC₅₀ is 512.98 ppm in 24 h.

Earlier work of Bagavan et.al. (2008) on larvicidal activity of saponin from Achyranthes aspera against fourth instar larvae of Aedes aegypti and Culex quinquifascitus and results were LC₅₀ at 18.20 ppm and 96.33 ppm respectively. In the present investigation LC₅₀ for fourth instar larva of Anopheles stephensi at 562.99 ppm so there work was better than our study.

Elango et.al. (2011) reported that they worked on efficacy of indigenous plant extracts on the malaria vector Anopheles subpictus, the egg mortality was 100% at 998.85 ppm but in my work LC₉₉ was 597.84 ppm.

Govindrajan et.al (2011) they worked on Mosquito adulticidal and repellent activities of botanical extracts against malaria vector, Anopheles stephensi. The LC₅₀ and LC₉₀ values of E.alba and A. paniculata against adults of An. stephensi were 150.36, 130.19 ppm and 285.22, 244.16 ppm, respectively. In my investigation LC₅₀ and LC₉₀ were and 0.665 and 0.943 µl/cm² respectively.

Due to present study the pure saponin is more efficient than crude saponin extract from leaves of Moringa oleifera against all four instars of Anopheles stephensi. So saponin compound is effective against all four instars larvae of Anopheles stephensi.