Summary
SUMMARY

*A. stephensi* is a principal urban vector of malarial disease, endemic in all parts of India. Different approaches have been made to control the mosquito population and to eradicate such vector borne diseases. It is hope that integrated pest management combining the botanicals with microbial control agents which are highly effective, safe and ecologically acceptable will give wide spread relief from some of the most serious diseases. In view of these facts, the combined effect of *G. pentaphylla*, *A. amara* and *O. basilicum* with Bti for the control of malarial vector, *A. stephensi* were studied.

The results of the present study are summarized as follows:

1. Larvicidal and pupicidal bioassay has been conducted and combined effect of GPLE, OBLE, AALE and *B. thuringiensis* subsp. *israelensis* (Bti) on malarial vector *A. stephensi*. After treatment of Bti showed higher mortality than the GPLE, OBLE and AALE. Since the Bt toxins are activated by midgut proteases and the activated toxins interact with larval midgut epithelium causing a disruption in membrane integrity and ultimately leading to insect death. Mortality of larval instar being comparatively higher after the treatment of GPLE than OBLE and AALE suggests the multiple effect of various active compounds (alkaloids and flavonoids) in GPLE, (Saponins and tannins) in AALE and (Eugenol, methylchavicol, Linalool) present in the OBLE.
2. After the lower dose treatment of GPLE, OBLE, AALE and Bti significant growth and development effect was evident. The larval and pupal duration was comparatively extended after the treatment of GPLE, OBLE and AALE than the Bti. Extension of larval and pupal duration was higher in the GPLE treatment than OBLE. AALE. Depending on the dose of plant extracts (GPLE, OBLE, AALE) suggests delay in moulting, resulting in prolonged developmental period the insects due to anti-prothoraciotrophic effect and it leads to retardant growth and development of mosquito larval and pupae. Growth regulatory effect was mainly due to the hormonal disturbance of plant phytochemicals at the corpus allatum (or) the interference at neurosecretory centre of the mosquitoes.

3. After the treatment of GPLE, OBLE, AALE and Bti has markedly affected the fecundity of the *A. stephensi*. The treated eggs did not hatched properly and the percentage of hatchability and adult emergence was also diminished. The fecundity was highly affected by the GPLE than OBLE and AALE. Since the botanicals directly affected the ecdysteriods as well as juvenile hormone. Decrease in the fecundity and hatchability also suggest the botanicals also had effect on the female specific protein vitellogenin.

4. The skin repellency and smoke toxicity effect were also studied by using *G. pentaphylla, A. amara* and *O. basilicum* on adult mosquitoes. High smoke toxicity effect was evident after the treatment of plant coil *A. amara* than *G. pentaphylla* and *O. basilicum*. After exposure on the exposed parts of arms of human volunteers, OBLE treatment showed high repellent effect
than GBLE and AALE. The high repellent activity of OBLE was mainly suggest that *O. basilicum* has number of volatile compounds indirectly that may affect the chemoreceptive mechanism of adult mosquito.

5. The combined effect of GPLE, OBLE and AALE with *B. thruringiensis* subsp. *israelensis* had high significant effect on various larval instars and pupae of *A. stephensi*. Since, the phytochemicals present in the GPLE, OBLE and AALE with Bt toxins has much effect on the gut of the insect further increased mortality. Combined effect of plant extract with Bti not only affected the larva, but also inhibited the growth of pupa and the treated insects did not emerge from the pupa as adult.

6. Field trails were conducted to test the combined effect of GPLE, OBLE and AALE with Bti at three different breeding habitats of *A. stephensi*. Mortality was recorded at post 1st day to 4th day. In all the breeding habits the treatment of GPLE with Bti combination was showed higher larval mortality than the other combination of plant extract with Bti (OBLE + Bti and AALE + Bti). The percentage of larval reduction was varied between breeding habitats and breeding sites. This variation may be due to the impact of environmental pollution and size of the breeding habitats.