**Abstract**

The plants hoard vital phytochemicals which have unique properties and functions have been used for human ailments and controlling pest is proven from earlier studies. The exploitation of plant phytochemical compounds for application in pest control can serve a potential alternative against synthetic chemicals. In this perspective the research work was attempted to explore the insecticidal properties of medicinal plant *Capparis divaricata* against crop insect *Spodoptera litura* and human vector *Aedes aegypti*. Plant collection, extraction methods, larvicidal and hemocyte analysis were carried out according to standard protocol with slight modifications. The petroleum ether, chloroform and ethyl acetate extracts have been obtained by soaking method. The larvicidal activity on *A. aegypti* of IV instar and III instar larvae of *S. litura* was performed using various concentrations of three extracts. The treated *S. litura* haemocyte analysis was performed and the morphological changes of treated mosquito larvae and *S. litura* haemocytes were observed. The data analysis was done using SPSS 16.0. The larvicidal assay on *A. aegypti* revealed that the ethyl acetate extract and petroleum ether extract showed promising results of above 70% mortality where as chloroform showed mortality above 60%. The larvicidal activities of *S. litura* using these extracts indicate that the larvae have produced 20% mortality for ethyl acetate extract and less than 5% in other two extracts. However the extract has affected the adult development hence less than 40% of the adult was emerged from pupa which was evident from certain changes observed in the hemocyte morphology of *S. litura*. This preliminary work on the plant extract has found to be potential in affecting the insect cuticle of *A. aegypti* larvae and the adult development of *S. litura*. Detailed study of this plant extract is undertaken against similar insect species.