ABSTRACT

Dengue viruses infect 390 million people all over the world annually. Dengue is occurring in Pakistan from the last two decades as emergingreemerging disease with many thousands of positive cases and deaths annually all over the country. As there is no registered therapeutic or vaccine intervention available commercially therefore, vector control is the only option for the disease control. Traditionally various chemical insecticides have been used for vector control. However, these chemicals have many harmful effects on environment, no target organisms, biomagnifications and develop resistance in vector mosquitoes. So far, existing traditional control methods are neither sufficient nor environmental friendly to control mosquito vector/diseases therefore; novel tools are urgently required to control vector-borne diseases. *Wolbachia* is an endosymbiotic bacterium that has the potential to suppress the vector population through cytoplasmic incompatibility (CI) and also block the transmission of pathogens or parasites such as dengue, Chikungunya viruses and filarial nematode to humans. The main objective of the current study was the transfection of a novel strain of *Wolbachia* (wAlbB) from *Ae. albopictus* (donor) into the cytoplasm of *Ae. aegypti* (recipient) via embryonic microinjection. For this purpose, wAlbB from locally collected *Ae albopictus* was detected and molecular characterized by PCR using *wsp* gene specific primers. After successful transfection with overall 1.32% *w*AlbB positive survival rate, the stable vertical transmission was achieved at F_7 generations. It was found that *w*AlbB does not affect the general fitness of the host (*Ae. aegypti*) such as fecundity or egg laying capacity. However, this strain has the potential to cause 100% CI (zero egg hatch rate) when wAlbB *Wolbachia*-infected males crossed with uninfected females (1:1) at standard conditions in laboratory. Moreover, complete CI indicated suppression of mosquito population in successive generations and cause population replacement. All other crosses have been shown transfer of *Wolbachia* to the next generation. In Conclusion *w*AlbB has a great potential with complete CI effect to control vector population and alternately control the transmission of disease to human. There is a dire need for future research on mass rearing of wAlbB *Wolbachia* infected males to use this strain as a key candidate for further testing in field trials in the specific dengue endemic areas of Pakistan.