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Bio-Potency of a 21 Kda Kunitz-Type Trypsin Inhibitor from Tamarindus Indica Seeds on the Developmental Physiology of H. Armigera

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The development of resistance to inhibitors in insects in the near future has necessitated the search for newer and more effective biological means of controlling insects. Inhibitors from diverse sources are being explored for understanding their inhibitory potential. Among several alternatives, protease inhibitors represent an attractive class of biopesticides with several important features. Such protease inhibitors are environmentally friendly and can work as defence molecules against plant pests and pathogens.

A trypsin inhibitor purified from the seeds of *Tamarindus indica* by Sephadex G-75, DEAE-Sepharose and Trypsin-Sepharose CL-4B columns was studied for its antifeedant, larvicidal, pupicidal and growth inhibitory activities against *Helicoverpa armigera* larvae. *Tamarindus* trypsin inhibitor (TTI) exhibited inhibitory activity towards total gut proteolytic enzymes of *H. armigera* (~87%) and bovine trypsin (~84%). Lethal doses which caused mortality and weight reduction by 50% were 1% w/w and 0.50% w/w, respectively. IC_{50} of TTI against trypsin-like *Helicoverpa* midgut proteases and bovine trypsin was ~2.10 µg/ml and 1.68 µg/ml respectively. In larval feeding studies the 21 kDa Kunitz-type protein was found to retard growth and development, prolonged the larval-pupal development durations along with adversely affecting the fertility and fecundity of *H. armigera*. In artificial diet at 0.5% w/w TTI, the efficiency of conversion of ingested food as well as of digested food, relative growth rate, growth index declined whereas approximate digestibility, metabolic cost, relative consumption rate, consumption index and total developmental period enhanced for *H. armigera* larvae.

In conclusion, the action of TTI on the development of *H. armigera* larvae shows that TTI influences larval various developmental and nutritional parameters of *H. armigera* larvae, suggesting that this protein with toxic potential has substantial prospect as bioinsecticidal agent in insect pest management.

Biography:

Dr. Farrukh Jamal has Ph.D. in Biochemistry from Dr. Ram Manohar Lohia Avadh University, Faizabad in collaboration with Central Drug Research Institute, Lucknow India. He has experience in the area of reproductive biochemistry, plant proteins & enzymes in waste water treatment & insect pest management of agriculturally important food crops. Presently his focus is on addressing the growing public concern over the toxicity and carcinogenicity of synthetic and recalcitrant dyes. He has contributed some interesting findings on novel defense proteins/ proteinacious protease inhibitors present in plants and their effectiveness on insect pests for applications in integrated pest management. He has several projects, publications in impacted journals and books. Besides this he is engaged in various academic and administrative activities of the university.