Research Paper :

Influence of different hosts on induction of midgut glutathione S-transferase in *Helicoverpa armigera* (Hubner)

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SUMMARY

Effect of different hosts *viz.*, cotton, pigeonpea and chickpea of *H.armigera* on the induction of gut detoxifying enzymes and its effect on insecticide metabolism was studied in the present investigation. Glutathione S-transferase was found to be induced in higher amount in the gut of *Helicoverpa armigera* when reared on chickpea as compared to the other studied hosts. Midgut proteins were also found to be influenced by these hosts. Toxicity levels of different insecticides were studied against *H.armigera* reared on different hosts. The variability in toxicity was observed among strains *i.e.H.armigera* reared on different hosts. Strain reared on chickpea showed tolerance against indoxacarb, spinosad and emamectin benzoate, whereas, strain reared on pigeonpea showed higher LC_{50} for lambdacyhalothrin. Cotton fed larvae was found to be comparatively susceptible. Different hosts were found to induce GST and protein in mid gut, which intern reflect in terms of tolerance against insecticides.

Key words : Detoxifying enzymes, Glutathione S-transferase *Helicoverpa armigera*, Induction, Protein, Toxicity

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Helicoverpa armigera (Hubner) (Lepidoptera: Noctuidae), is well known as cotton bollworm, gram caterpillar, pod borer or American bollworm. It is highly polyphagous pest with broad spectrum of host families including important agricultural crops such as cotton, maize, chickpea, pigeonpea, sorghum, sunflower, soybean, groundnut etc, (Fitt,1989).

Insect feeding exhibits a host-range that is manifested by the different plants on which they usually are found. When the host plant changes, insect changes its metabolism to adopt the same, so as to allow it to metabolize the new primary and secondary compounds of new plants. Host plants induce the biochemical constituents in insect through feeding on them also affect the susceptibility of pest to particular insecticides. These hosts plants induced detoxifying enzymes are responsible for detoxification of xenobiotics and chemical insecticides (Yu, 1982). The detoxifying enzymes of insect include mostly Glutathione S-transferase (GST) responsible for insecticide resistance (Yang *et al.*, 2001). Plant species differ in the degree to which they stimulate the biochemical defense of insects. Therefore, research on insect host plant interactions may yield information of considerable value in the development of insect pest management programmes, where insecticides are an integral part of the programme (Berry *et al.*, 1980). Host plants found to affect the expression of resistance to chemicals in lepidopteran pest like *Platynota idaeusalis* tufted apple bud moth larval populations (Dominguez Gilly and McPheron, 2000).

The present investigation was carried out to know the induced mid gut GST and protein in midgut of *H.armigera* feeding on different hosts and its effect on the toxicity of new insecticide molecules.

MATERIALS AND METHODS

H.armigera was collected from field and reared in laboratory for homogenization on artificial diet (Armes *et al.*, 1992). There after larvae were reared for one generation on different hosts like cotton, pigeonpea and chickpea along with artificial diet. Commercially available formulations of indoxacarb, spinosad, emamectine benzoate, and lamdacyhalothrin were used in the present study for log dose probit (LDP) assay against 3rd or early 4th instar of *H.armigera*.

All chemicals used for enzyme and protein assay were purchased from Himedia Laboratories Ltd., Mumbai, India.

Laboratory rearing of *H.armigera:*

Field collected *H.armigera* was reared on artificial diet for 3-4 generations to develop homogenized population and escape field