Research Paper :

Influence of different hosts on induction of midgut carboxylesterase and cytochrome p-450 in *Helicoverpa armigera* (Hubner) and the effect on insecticide metabolism

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SUMMARY

Effect of different hosts *viz.* cotton, pigeonpea and chickpea of *H.armigera* on the induction of carboxylesterase and cytochrome p-450 enzymes were studied in the present investigation. Pigeonpea was found to be good inducer of CarE. Less induction of CarE activity was observed in larvae reared on cotton. Different isozymes were observed which showed significant difference in expression on PAGE. Pigeonpea strain showed maximum number of bands with dark intensity, followed by chickpea strain than by cotton strain. Microplate assay results showed higher expression of p-450 in pigeonpea strain with than chickpea strain. Less activity was shown by the cotton strain. Toxicity of different insecticides was tested against *H.armigera* reared on different hosts. The variability in toxicity was observed, and the 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 were found to be comparatively susceptible.

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Helicoverpa armigera (Hubner) (Lepidoptera: Noctuidae), is well known as cotton bollworm, gram caterpillar, pod borer or American bollworm. Highly polyphagous pest, *H.armigera* has great host-range from agronomical to horticultural crops with economic damage to a greater extent. It has been estimated that out of $ 480 million spent on insecticides in agriculture in India, nearly 50 per cent is used for cotton and out of that 75 per cent of this material is targeted against *H. armigera* (Kranthi *et al.*, 2001).

Indiscriminate use of chemicals against this pest led to emergence of serious problems of insecticide resistance to most of the common classes of insecticides. There are approximately 2000 active pesticide ingredients in use, most of which have been relied upon for many years. However, they act on about 25 physiological target sites. Highly efficacious insecticides with novel mode of action are becoming increasingly important in agriculture and currently essential for the resistance management in *H. armigera.* The latest generations of insecticides includes indoxacarb, emamectin benzoate, lambdacyhalothrin and spinosad and are found effective against lepidopteran pest like *H. armigera.*

Host plant can modify the susceptibility of herbivorous arthopods to pesticides (Yu,1986, Brattsten,1988). 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 may affect the expression of resistance to chemicals in lepidopteran pest like *Platynota idaeusalis,* tufted apple bud moth larval populations (Dominguez Gilly and McPheron, 2000). Host plant induces many biochemical components like enzymes, proteins in insect to detoxify chemicals,