

SUMMARY AND CONCLUSIONS :

The available literature on the neem tree A. indica suggests that its products especially the seeds and oils have been utilised in biological studies from different angles. Efforts have also been made to utilize the neem as a insecticidal agent. However, the available literature on the neem indicates that there are hardly any reports regarding the insecticidal effect of the neem on the important chemical moieties like mucosubstances. Though, there exists an abundant information with reference to the application of various insecticides among the insects, most studies are dealt with the synthetic organic insecticides. No doubt, these chemicals have proved to be most efficient in controlling the target pests but there are many disadvantages too, since they cause intrinsic toxicity not only to the target pests but also bring hazardous effects in other useful animals. Therefore, a different approach would be hunt for the bioactive principle from naturally occurring source like neem trees. Keeping this approach in mind the present investigation was undertaken to utilise the neem as a insecticidal agent and to see its effect on the distributional pattern of mucosubstances from the different region of the gut of the two insects. Insects selected for the present work are important from the socio-economic point of view, ^{one} being the pest of common household commodities and the another being of agricultural crops. The mucosubstances from the different regions of the alimentary tract were demonstrated by employing well known techniques and some interesting histochemical reactivities were evident at various histological sites, the salient features of which are as follows :

1) Among the different regions of the foregut the cuticular intima possessed the cuticular hairs in the oesophagus of P.americana which were found to be absent in the oesophagus of S.gregaria. Instead, it was comparatively thick in this insect.

2) The cuticular intima did not exhibit any reactivity to the techniques employed so far, thus indicating the absence of mucosubstances in it.

3) The epithelial layer consisted of flat cell with indistinct boundaries in both the insects. Both the intima and the epithelium were thrown into longitudinal folds which were rather prominent in the foregut of S.gragaria.

4) The histochemical reactivities indicated the presence of neutral and acidic mucosubstances in the epithelia of both the insects. Both sulfated and unsulfated mucosubstances ~~were~~ were evident.

5) The muscular layer indicated the presence of glycogen in it

6) The intense reactivities were evident at different sites of the gizzard of P.americana. The connective tissue encircling the muscle fibres indicated the presence of sulfomucins and other acidic mucosubstances.

7) The midgut of both the insects showed the presence of distinct peritorophic membranes.

8) The peritrophic membrane showed positive periodate and alcianophilic reactions, thus indicating the presence of neutral as well as acidic mucosubstances.

9) The preliminary histochemical reactions indicated the presence of neutral, sulfated and unsulfated mucosubstances in the epithelium, glycogen in the muscular layer of the mesenteron of both the insects.

10) The hepatic caeca of both insects also possessed different mucosubstances.

11) Among the three regions of the hindgut the cuticular intima was thin and flexible as compared to that of the foregut and it indicated some positive reactivities for various histochemical techniques.

12) Various histological sites of the hindgut indicated the presence of different mucosubstances like those of the foregut and the hindgut. The histochemical reactivities were prominent especially in the region of the rectal pads.

13) The results obtained so far on the mucosubstances of insects studied presently were compared with the available literature and were discussed from the view point of their functional involvement.

14) Histochemical reactivities indicated alterations in the staining reactions of mucosubstances at different sites after the treatment with neem oil.

15) Neutral and acidic mucosubstances from the different tissues as well as glycogen from the muscular layer were found to be reduced or rather exhibited comparatively poor reactivity in different regions of the foregut and midgut of both the insects.

16) The hindgut mucosubstances, particularly of the epithelial tissue did not show much alterations in their staining reactivity after exposure to the neem oil.

17) A slight histological disturbances were noticed in the epithelium of the mesenteron of both the insects.

18) In general, the neem oil exhibited a toxic effect on the distribution of mucosubstances at different sites of the gut. However, a clearcut physiological significance of such alterations is not clear.

From the result obtained during the present investigation, it can be concluded that the tree products like neem oil present a distinct evidence of pest control potential for developing safe biological insecticides that can be used in programmes of Intergrated Pest Management, or biological control of pests with minimal use of pesticides. The present investigation, though a preliminary work with limited scope, provides an excellent subject matter for further studies, especially from the morphogenetic and phylogenetic point of view. For better understanding of the mucosubstances in insects their biochemical analyses like fractionation, characterization etc. is essential which constitutes a part of the future work.