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FREE AMINO ACIDS IN SOME TISSUES OF *ORTHETRUM SABINA* (DRURY) (ANISOPTERA: LIBELLULIDAE)

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Free amino acid composition of the foregut, midgut, ovaries, testes, brain and haemolymph of *O. sabina*, detected by two-dimensional chromatograms, is discussed with reference to metabolism.

INTROUCTION

The amino acid constituents of the haemolymph of *Orthetrum sabina* have been studied by VARADARAJ & SUNDARA RAJULU (1977). Here the amino acid composition of the foregut, midgut, ovaries, testes and brain is described.

Adult *O. sabina*, available in plenty throughout the year in and around Erode, Tamil Nadu, India, were used for the experiments. Ethanolic extracts of the tissues of the foregut, midgut, haemolymph, ovaries, testes and brain were used to prepare two-dimensional chromatograms in solvents n-butanol : acetic acid : water (4:1:2) and phenol : water (4:1) and the spotting agent was 0.1% ninhydrin in water-saturated n-butanol.

RESULTS

The results are given in Table I. In the foregut amino acids alanine, arginine, aspartic acid, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, phenylalanine, proline, serine, taurine, threonine, tyrosine and valine were noted; but in the midgut taurine was not found. In the ovaries, testes and brain arginine, lysine and taurine were not detected. In the testes threonine and in the brain isoleucine, leucine and threonine, were also absent.

Table I

Free amino acids in different tissues of *Orthetrum sabina*

Amino acid	Foregut	Midgut	Ovaries	Testes	Brain	Haemolymph
Alanine	+	+	+	+	+	+
Arginine	+	+	—	—	—	+
Aspartic acid	+	+	+	+	+	+
Glutamic acid	+	+	+	+	+	+
Glycine	+	+	+	+	+	+
Histidine	+	+	+	+	+	+
Isoleucine	+	+	+	+	—	+
Leucine	+	+	+	+	—	+
Lysine	+	+	—	—	—	+
Phenylalanine	+	+	+	+	+	+
Proline	+	+	+	+	+	+
Serine	+	+	+	+	+	+
Taurine	+	—	—	—	—	—
Threonine	+	+	+	—	—	+
Tyrosine	+	+	+	+	+	+
Valine	+	+	+	+	+	+

+ = Present; — = Absent

DISCUSSION

Orthetrum sabina feeds on insects like mosquito. As the food reaches the foregut, it undergoes digestive changes in the foregut. The foregut shows the presence of a maximum variety of amino acids. These amino acids either are present in food in the free form or they are formed by hydrolysis of food proteins. Taurine is seen only in the foregut and in no other tissue, not even in the haemolymph, because for taurine no metabolic role has been assigned and it has no function in insects (GILMOUR, 1965). Therefore, it is not easy to say what becomes of taurine in the foregut tissue. Probably this amino acid after diffusion in the haemolymph is used up in the synthesis of haemolymph proteins. PROSSER & BROWN (1965) are of the opinion that the specific new proteins are formed from the amino acids absorbed in the free form as well as from the amino acids liberated by the degradation of already existing proteins.

The haemolymph percolates into various tissues and hence it is the main source for the supply of amino acids to them (PATTON, 1963). When the haemolymph amino acids diffuse into the ovaries, arginine and lysine of the haemolymph are used up in the formation of yolk and other proteins in the eggs. This is similar to the results obtained for *Gryllotalpa africana* by RAKSHPAL (1973). Arginine and lysine, along with threonine, are used up

in the testes in spermatogenesis or they are catalyzed by transaminase, decarboxylases or deaminases (SINGH, 1965).

In the brain the lowest number of amino acids were detected. Different kinds of activities go on continuously in the brain for which a lot of energy is required and it is very probable that to provide this energy there may be catalysis of some of the amino acids.

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REFERENCES

GILMOUR, D., 1965. *The metabolism of insects.* Oliver & Boyd, Edinburgh-London.

PATTON, R.L., 1963. *Introductory insect physiology.* Saunders, Philadelphia-London.

PROSSER, C.L. & F.A. BROWN, 1965. *Comparative animal physiology.* Saunders, Philadelphia-London.

RAKSHPAL, R., 1973. Free amino acids in some tissues of Gryllotalpa africana Beauvois (Orthoptera: Insecta). *Curr. Sci.* 42: 241-242.

SINGH, A., 1965. The effect of diet on the hemolymph amino acid constituents of the larvae and pupae of Sarcophaga ruficornis (Fabricius): Diptera. *Experientia* 21: 340-341.

VARADARAJ, G. & G. SUNDARA RAJULU, 1977. Changes in the free amino acid concentrations of the haemolymph during development in Orthetrum sabina (Drury) (Anisoptera: Libellulidae). *Odonatologica* 6: 253-258.