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Effect of Penfluron on Total Haemocyte Count of *Chrysocoris purpureus*

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Abstract: Laboratory experiments were conducted to study the effect of Penfluron on Total Haemocyte Count of *Chrysocoris purpureus* . Penfluron is known to have chitin inhibiting activity. T.H.C in the treated insects increases up to 48 hours and then declines up to 96 hours. Penfluron seems to cause a great reduction in haemocytes in both sexes at 72 hours and 96 hours after treatment.

Key words: *Chrysocoris purpureus* · Penfluron · Chitin inhibitor · Total haemocyte count

INTRODUCTION

The insect haematological studies are very important in studying insect physiology. The haemocytes perform various physiological functions in the body of insect. They direct nutrients to various tissues and store them also. They perform phagocytosis, encapsulation of foreign bodies in the insect body cavity, coagulation to prevent loss of blood, nodule formation andtransport of food materials and may be hormones and detoxification of metabolites and biological active materials [1-5]. As a new trend workers are now trying to use the haemolymph as a medium for controlling insect pest because the changes occurring in the haemolymph are expected to get transferred to other portions of the body. Any change in Total Haemocytes Counts (T.H.C.) of particular insect directly or indirectly affects the insect adversely. Much work has been done since past on the effect of chemicals *viz*. apholate [6], poisons and varied physical factors [7] and marble slurry [8] on haemocytes. Chandel and Gupta [9] reported that topical application of chitin synthesis inhibitors diflubenzuron (DF) and penfluron (PF) to larvae and pupae of *Apis mellifera* and *Apis cerana indica* revealed that these growth regulators were more or less equally toxic to both species and freshly formed pupae were most sensitive followed by fourth and third instar larvae. Larval mortality occurred either within the instar or at the time of ecdysis and from surviving individuals developed the normal adults. In the present work the effect of Penfluron on T.H.C. has been studied. Penfluron is known to have chitin inhibiting activity. It inhibits the formation of chitin and thus makes the insect defenceless and liable to death since dominance of class Insecta is mainly due to the presence of cuticle as well as, because the major contribution of cuticle is chitin and its inhibition evidently renders the insect helpless.

MATERIALS AND METHODS

Bugs *(Chrysocoris purpureus)* were reared in laboratory at 28± 2°C and a photoperiod of 18 to 20 hours day length. The insects were treated with 2 ìl of Penfluron solution applied topically on the ventral side. Penfluron was prepared by dissolving 0.001 gms in 10 cc of acetone. Treated insects were taken at 24, 48, 72 and 96 hr. The methods of haemolymph collection, staining and counting of cells were similar to those applied earlier [10].

RESULTS AND DISCUSSION:

Effect on T.H.C: In the case of control males the T.H.C. was 4,220± 160 cells/mm³ and in females it was 6,640± 440 cells/mm³ . The T.H.C. was always higher in females as compared to males. In normal males, the haemocyte count per cu mm was more or less steady during the course of experiments, though it showed a slight decrease initially. However, in the normal females there was a gradual decline in the haemocyte count. The studies revealed that both sexes showed an initial increase in the T.H.C. up to 24 hours of treatment, reaching up to 6620 ± 320 cells/mm³ in males and 8900±880 cells/mm³ in females and9500±150 cells/mm³ in males and 12700±500 cells/mm³ in females after 48hours of Penfluron treatment (Table 1, Fig. 1 and 2). However, after 72 hours and 96 hours of treatment

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Table 1 : Effect of Penfluron on Total Haemocyte Count (Cells/mm³) in Adult *Chrysocoris purpureus*

			Total Haemocyte count (Cells/mm³)	
Stage of the insect	Treatement	Time period after treatment in hrs	Male	Female
Fully mature adult	Control	-	4220±160	6640±440
Fully mature adult	Application of Penfluron(0.2μl)	24	6620±320	8900±880
		48	9500±150	12700±500
		72	2100± 300	3900±400
		96	900±200	1800±600

@ Average of 20 insects.

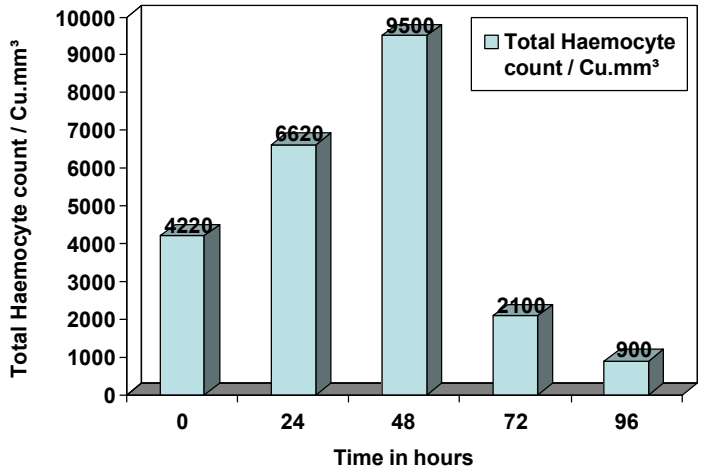

Fig. 1: Changes in T.H.C. of control and Penfluron treated Males of *Chrysocoris purpureus*

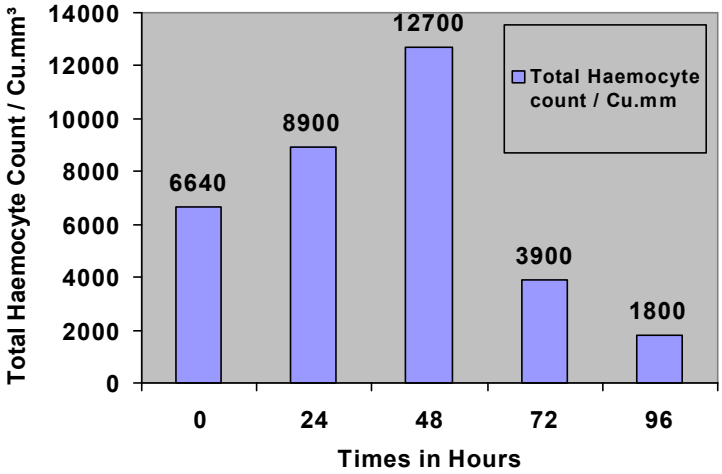

Fig. 2: Changes in T.H.C. of control and Penfluron treated females of *Chrysocoris purpureus*

the T.H.C. showed sharp decline. In males, it declined to 2100±300 cells/mm³ and in females 3900±400 cells/mm³ after 72 hrs, of treatment. After 96 hrs. of treatment, the T.H.C. further declined to 900±200 cells/mm³ and 1800±600 cells/mm³ in male and female insects respectively. Thus, we find that there is an initial significant increase ($P < 0.05$) in the T.H.C. up to 48 hours andthen a significant decrease ($P < 0.01$) in T.H.C.up to 96 hours in both the sexes after treatment with Penfluron. It is interesting to note that the T.H.C in males was lower than that of the female bugs andit remained so even after the treatment. Similar results were observed by Bhalerao [11] in *D. koenigii* after microwave exposure and Karnvat [12] after exposure of *D. koenigii* to *T. arjuna* bark extract.

Penfluron which has a chitin inhibiting activity probably functions like toxins [13] Penfluron inhibiting the formation of chitin in insects might utilize the haemocytes from haemolymph thus causing decline in T.H.C.

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