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التغيرات الهستولوجية فى انسجة كبد الفأر النرويجى المعامل بالمبيد الحشرى الميثوميل

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معهد بحوث وقاية النباتات–مركز البحوث الزراعية . الدقى–الجيزة–مصر

الملخص العربى

اجرى هذا البحث بهدف دراسة تاثير ١/٤ الجرعة النصف مميتة(٥و٨ مليجرام/كجم من وزن الجسم)من المبيد الكاربامیتى (الميثوميل) وذلك بمعاملة الفآر النرويجى طريق لمدة شهر ودراسة التاثير على وزن وكبد الحيوان بعد اسبوع ، اسبوعين ، ثلاثة اسابيع ثم أربعة أسابيع من بداية المعاملة.

وقد اوضحت الدراسة وجود تناقص معنوى فى وزن الجسم بينما كان هناك زيادة معنوية فى وزن الكبد.

اما بالنسبة للتغيرات الهستولوجية فى الكبد كان هناك تأثير كبير من حيث اتساع وتهتك فى جدر الاوعية الدموية فى الكبد واحتقان مع ارتشاح ليمفاوى وتحور فى خلايا الكبد.

HISTOLOGICAL CHANGES IN LIVER OF MALE ALBINO RAT *RATTUS NORVEGICUS* TREATED ORALLY WITH CARBAMATE INSECTICIDE METHOMYL

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ABSTRACT: ***The histological changes in the liver of albino rat males were examined to show the effect of ¼ LD_{50} of methomyl administered orally daily for a month. The liver sections were prepared and examined after 1,2,3 and 4 weaks post-treatment.***

In general, there was a significant decrease in rat body weight, while a significant increase in liver weight was observed after the all the intervals post-treatment.

There was adilation in the central and portal vein and karyopyknosis of hepatic cells nuclei. Also, There were portal area fibrosis with dilation of central portal vein with lymphocytic, congestion and necrosis.

Key words: ***insecticide, methomyl, male rat, R. norvegicus: Body & liver weight, histological effects.***

INTRODUCTION

Methomyl[s-methyl N-(methyl amino)carbonyl]oxy systemic.

Is acarbooate systemic insecticide and acaricide with contact and stomoach action. It is widely used against a broad range of insects and mites on a variety of fruits, vegetables and field crops and also used indoor to control houseflies,(insecticide manual).

Carbamates are widely used in industry, agriculture and public health purposes. They were detected in well water and certain plants (Abdel-Rahman *et al*, 1985). Insecticides, even in very low concentrations, have been reported to interfere with basal metabolism (Sanders *et al,* 1974; Vigro and Bell ward, 1975 and Write *et al*, 1977).

The application of these Pesticides in soils will Potentially lead to changes in the population of soil invertebrates either directly or indirectly (Edwards and Thompson, 1973). The objective of the present study is to clarify the histological abnormalities that had occurred in liver of the albino rat treated with ¼ LD_{50} insecticide Methomyl oral administration.

MATERIALS AND METHODS

Test material:-

Methomyl (90% water soluble powder) was provided from Dupont Company as lannate insecticide and the chemical name is S-methyl N-(methyl carbamoyloxy) thioacetimidate(jupnc) LD_{50} Acute oral for rat 34 mg/kg body weight of Male albino rat (pesticide manual) (twelfth Edition).

Experimental animals:-

Sexually mature male albino rat (120-160 g b.w.) were obtained from Helwan Breeding station, Cairo. The animals were kept in the laboratory under c onstant temperature (24 +_20C) geven standard diet and water ad libitum, being kept in air conditional room with a 12 hour light/12 hour dark cycle. After two weeks of acclimatization they were divided into two groups. The first one administered the sovent only. Was servede as controls and the second one was daily oral, administered ¼ LD_{50} (8.5 mg/kg b.w) for one month. Five animals from each the control and the treated animals were weighed and sacrificed at intervals of 1, 2, 3 and 4 weeks post- treatment. Their livers were isolated, weighed, fixed in Bouin's fluid and emboded in paraffin was sectioned, stained with haematoxylin and eosin and examined under microscope according to Conn and Darrow (1960). Statistical analysis was done according to snedecor and Cochran (1967).

RESULTS AND DISCUSSION

The effect of ¼ LD_{50} of methomyl treatment (daily for a month) of on body and liver weight of albino rat *Rattus norvegicus* are recorded in Table (1) the body weight was decreased significantly with control through tested periods. Liver weight comparing increased when compared with control through all intervals of the experiment. The present result are in agreement with those of EL-Mahrouky, (2002), Khidr (2002), EL- Mahrouky, *et al*. (2003), Ramzy (2005) and Asran *et al* (2007).

Regarding the histological effects of ¼ LD_{50} methomyl insecticide on liver of *Rattus norvegicus* before and after treat ment were illustrated in Figs (1, 2, 3, 4 and 5). There were dilation in the central and portal vein (Fig. 2) at one week. Karyopyknosis of nuclei of hepatic cells and dilation of control and portal vein (Fig. 3) at two weeks, the portal area fibrosis with dilation of central and portal vein with lymphocytic infiltration and necrosis (Fig. 4) at three week and congestion with necrosis and. dilation of central and portal vein (Fig. 5) at fourth week post- treatment. These findings are inagreement with Hamed (1979). Who confirmed our data mentioning that organophosphorus compounds induced dilation and engorgation in central veins of rats, sinusoids and portal veins in addition to lymphocytes and macrophages infiltration and fibroplastic proliferation in portal area associated with necrobiotic changes in the hepatocytes. Asran *et al* (2007)

who found toxic effects in rat after treatment with Butachlor (herbicide) represented by increased liver organ weight, concurrently, histological changes observed at 1, 2, 3, and 4 weeks after ¼ LD50 herbicide Butachlor administration, the inflammatory cells infilitration, küpffer cells proliferation and hemosiderin pigments in between the degenerated hepatocytes. In addition dilation in the central veins, portal veins and sinusoids were observed.

Table (1): Effect of ¼ LD_{50} methomyl orally administrated daily for a month on body and Liver weight of male albino rat.

Parameter Weight of (grams)	Control Mean ± S.E	Weeks Post-Treatment (mean± S.E)			
		One	Two	Three	Four
Body (gm)	159.4±1.6	143.8±1.9**	144.2±1.8**	146.8±3.0*	126.0±2.1**
Liver (gms)	4.1±0.04	5.4±0.01***	5.6±0.04***	5.7±0.02	5.8±0.02**

Data are expressed as mean as mean ± S.E of 5 rats
*** Significant at P > 0.05**
**** Significant at P > 0.01**
***** Significant at P > 0.001**

Fig. (1): Liver of rat in the control Showing the normal histologival structure as notice in the central vein, portal vein, hepatocytes in the hepatic Lobules and portal area (H.Ex40).

Fig. (2): Liver of rat first week of treatment showing dilation in the central and portal vein (H.Ex40).

Fig. (3): Liver of second week post treatment showing karyopyknosis of hepatic cells and dilation of ventral and portal vein. (H.Ex40).

Fig. (4): Liver of third week post-treatment showing the portal area fibrosis with dilation central and portal vein with Lymphocytic infiltration and necrosis (H.Ex40).

Fig. (5): Liver of rat fourth week post-treatment showing congestion with necrosis dilation of central and portal vein .

It is well known that the liver is the first target organ in toxicological prospects regarding its role in detoxification biotrans formation and excretion of xenobiotic.

After enteric uptake of injrions materials, it the first organ to be exposed to such hazards via the portal circulation (Katzung, 1990). Also ,the leucocytic infiltration were considered as a prominent response of the body tissue facuing any injurious impacts (Abd El-Rahaman and Zaki (1992). Also, histologic examination of liver of the mice treated with carbosulfan for 10,20 and 30 days revealed the dilation of central vein and sinusoids between hypertrophied hepatocytes. Vacuolization and hyalinization of hepatocytes with loss of radial arrangement. Treatment with carbosulfan for 20 days in female and male mice resulted in a significant decrease in protein ands liver glycogen contents in female mice. Whereas in male, the glycogen was not changed significantly in the liver. (Ksheera sagar and Kaliwal (2006).

Jyotsna *et al* (2008), reported that methomyl influences mixed function oxidases and creates abnormality of liver functions in rats. This effect depends on the dose and duration of methomy.

From our present results and of others we can concluded that the liver was affected (its structure and weight) as a result of methomyl treatment. The liver weight increase is due to many reasons after methomyl treatment and so, it is necessary to examine different doses and the biochemical changes in liver as well as the histological ones must be studied together. Also, liver recovery must be reported with acute and chronic treatments.

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