

THE EFFECT OF MALATHION ON THE SOME HEMATOLOGICAL PARAMETERS OF ALBINO MICE

Hind A.Jalel

Department of Physiology, College of veterinary medicine, University of
Basrah, Basrah, Iraq.

(Received 25 March 2012, Accepted 11 June 2012)

Keywords; malathion, lymphocytes, insecticides

ABSTRACT

The present study designed for determining the effect of malathion on some blood parameters on male and female albino mice. The study was done on 42 mice divided in three groups, 14 mice per group 7 per sex in each group. During two months, with (250mg/kg, 500mg/kg) malathion doses there were clinical disorders such as salivation, quaking, and diarrhea were observed in addition to significant decreases ($p < 0.05$) in R.B.C. count, Hb. g/dl, P.C.V%. While lymphocytes will recorded significantly ($p < 0.05$) increase and there were significant decreases in general weight during the period of treated mice in compared with control group.

INTRODUCTION

Pesticides can be define as any substance or mixture of substances intended for preventing destroying repelling or mutagening pests can be insects, rodents, weeds, and host of other unwanted organisms [1], cholinesterase inhibiting (anti_ChE) pesticides including organophosphate (op) and carbamate insecticides, have been the most widely used class of insecticides world for over 30 years, which has resulted in much concern over their possible effects on humans and wild life species and their ecosystem [2_3]. Pesticides always not selective for their intended target species and adverse health effects can occur in non target species including humans. In the general population and in occupationally exposed workers primary concern related to possible association between pesticide exposure and increased risk of cancer [4,5,6]. Yet from a global perspective the major problem with pesticides remains that of acute human poisoning the world health organization (who) estimated that there are around three million hospital admissions for pesticide poisoning each year, that result in [7] around 220,000 death. German work during world war 2 produce the organic phosphates, among them tepp and parathion. publication of this work in 1947 led to the commercial development in the united states of additional compounds including methyl parathion, malathion, Eon, systox.....ect. [8] malathion is o,odimethyl dithiophosphat of diethyl markup to succinct is a colorless to amber liquid with a skunk or garlic_ like odor [9] malathion is a broad_ spectrum insecticide used to control a variety of outdoor insect in both agricultural and residential setting malathion is registered for use or food, feed and or Mameet of crops and in mosquito, boll weevil and fruit fly eradication programs [10] malathion is also an ingredient in shampoos regulated administration (FDA) control head lice [2].

MATERIALS AND METHODS

42 albino mice were studied along the period of two months ,and divided for three groups control (injected with N.S.),and two treated groups ;the first one injected I.P with malathion 250mg/kg/day ,and the second group was injected with 500mg/kg/day malathion for both sexes. All mice were kept on standard food in the animal house .Blood samples were collected from the treated animals from its hearts by using sterile needle and stored in clean containers with anticoagulant ETDA . Weight of animals were weekly detected during the study period. Blood parameters were studies such us R.B.C count, Hb, P.C.V%, W.B.Cs, and the data were statistically analyzed by using SPss12 program[11].

RESULTS

There are a wide range of blood parameters and weight between the control and malathion treated albino mice as shown in the following tables:

Table (1) showed significant decreases ($p<0.05$) in blood parameters of malathion treated male mice, while table (2) refers to count of white blood cells and differential W.B.C. to control and malathion treated male mice, the data showed decreases in Neutrophils & Monocytes ,while recorded increases in lymphocytes & there were no significant changes in Eosinophils , Basophiles and W.B.C count during treated period. Table(3) showed the effect of malathion on general weight of treated mice in compared to the control group and recorded a significant decrease ($p<0.05$) with dose (250mg/kg) male treated mice in sixth week while in the dose (500mg/kg) treated male mice the decrease began in the fourth week.

Female treated mice also showed decreases of most values when compared with control group (table4).While the data of (table5) resembles that of table(2) which deals with male treated mice .The data obtained from table(6) showed the decreases in the treated female weight at seventh week when treated with (250mg),while the decreases appear at sixth week in female treated with (500mg) malathion .In generally the weight of treated male mice effected with malathion more than treated females.

Table(1): Effects of malathion on RBC parameters in treated male mice (mean \pm S.D.)

	R.B.C*10	Hb g/dl	P.C.V.%	M.C.V.	M.C.H	M.C.H.C%
control	5.2±0.6	14.02±0.3	40.03±1.03	78.4±1.2	27.4±1.2	35.02±0.5
250mg	4.5±0.9	13.12±0.5	37.1±0.6	82.4±0.9	30.6±1.2	35.36±0.4
500mg	2.9±0.4*	9.3*±0.6	30.2*±0.9	104.1*±1.9	32.6±0.5	40.7±0.9

*= sig. diff.(P<0.05)

Table(2) : Effects of malathion on W.B.Cs. and W.B.C. d in treated male mice (mean±S.D.)

	WBC *10 ³	Netro%	Baso%	Eosin%	Lymph%	Mono%	L.S
control	3.53±1.2	45±0.4	2.2±0.1	2.9±0.5	35±0.3	3.2±0.4	0.7
250mg/kg	3.0±0.9	40±0.5	2.0±0.2	2.5±0.3	38±0.4	3.1±0.2	0.95
500mg/kg	2.9±0.72	34.2±*1.02	1.9±0.5	2.1±0.7	40*±0.2	2.2±*0.1	1.17

*= sig. diff.(P<0.05)

Table(3): Effects of malathion of treated male mice on weight (mean±S.D.)

weeks	Control/g	250mg/kg	500mg/kg
0w	25.3±0.1	25.4±0.7	26.2±0.1
1w	25.2±0.3	25.2±0.2	25.7±0.3
2w	25.9±0.5	25.0±0.3	25.0±0.4
3w	26.0±0.4	24.7±0.3	24.4±0.5
4w	26.4±0.3	24.1±0.4	22.7±0.3*
5w	26.9±0.6	23.5±0.2	22.0±0.12*
6w	26.8±0.7	22.9±0.5*	21.3±0.22*
7w	27.0±0.5	22.3±0.4*	21.3±0.1*
8w	27.5±0.6	21.3±0.3*	19.2±0.3*

*= sig. diff.(P<0.05)

Table(4): RBC parameters in control and malathion treated female mice(mean±S.D.)

	R.B.C*10	Hb g/dl	P.C.V.%	M.C.V	M.C.H	M.C.H.C%
cont	4.5±0.34	12.02±0.3	36.03±1.3	73.4±1.2	24.4±0.3	33.02±0.5
250mg	4.0±0.3	11.1±0.5	32.1±0.7	71.4±1.3	24 ±0.1	31.36±0.4
500mg	2.8±0.2*	8.3*±0.6	28.2*±0.8	108.1*±0.7	31.5±0.2	28.9±0.4

*= sig. diff.(P<0.05)

Table(5): WBCs and WBC d in control and malathion treated female mice (mean±S.D.)

	3 WBC*10	Netro%	Baso%	Eosin%	Lymph%	Mono%	L.S
control	3.20±0.32	45±0.7	2.5±0.1	1.5±0.5	39±0.2	2.9±0.4	0.86
250mg/kg	3.4±0.2	41+-0.5	2.3±0.2	1.6±0.3	40.3±0.4	2.5±0.1 2	0.97
500mg/kg	3.0±0.12	35.2±*0.2	2.0±0.5	1.3±0.7	47.34*±0.2	1.6*±0. 13	1.34

*= sig. diff.(P<0.05)

Table(6):Effects of malathion on weight in treated female mice (mean±S.D.)

weeks	Control/g	250mg/kg	500mg/kg
0w	24.7±0.3	24.5±0.13	26.2±0.1
1w	25.2±0.1	23.9±0.1	24.7±0.3
2w	25.7±0.12	23.7±0.3	24.0±0.4
3w	26.0±0.2	23.1±0.3	23.4±0.5
4w	26.4±0.22	22.7±0.4	22.0±0.3
5w	26.2±0.3	22.0±0.2	21.5±0.12
6w	26.5±0.23	21.9±0.21	0.3±0.22*
7w	27.0±0.13	21.21±0.14*	19.3±0.21*
8w	28.0±0.4	20.12±0.3*	18.2±0.13*

*= sig. diff.(P<0.05)

DISCUSSION

The increasing use of pesticide all over the world makes it necessary to reveal the toxic risk in populations of non target organisms. The exposure of animals to pesticides in different environments may not cause immediate death but certainly would bring about different abnormalities in the internal organs of the animals and their off spring [12] ,this study is an attempt to test the effects of exposure to sublethal dose of the commonly used insecticides malathion on albino mice. The results of the present investigation suggested that exposure to sublethal doses of these insecticides caused deleterious effects on hematological parameters of treated animals table(1&4). Chronic treatment by organophosphoras insecticides asserted significant decrease ($p<0.05$) in RBCs, Hb and P.C.V% values into experimental animals and this obtained results agreed with [13,14]. Using malathion insecticides disorder the malathion status and may be affect to the hemapoitic system[15]. And the target organ for distrusting potential by the used insecticides indicating cellular damage , lesions and increase the sensitivity for genetic and environment risk factors ;or because of the effect on iron deficiency [16,17,18,19].

There were highly variables in WBC differential count results in comparison with control group(table2 & 5); this results perhaps occurs because of effects of malathion on gene heredity [20]found in their study on the people who were exposure to highly levels of malathion causing DNA abnormalities. Also [21,22,23] indicated decreases in human immunity, while [24,25] indicated that long exposure to pesticides cause non Hodgkin lymphoma (NHL).Bone marrow failure and a plastic anemia also effected by malathion treatment[17,22,26,27].

Decreases body weight in treated mice comparison with control group $p<0.05$ (table3,6)agreed with[30],this may be as a result of diarrhea to animals or decrease appetite to consumed food or to weak muscle of mouth in malathion treated mice.

تأثير مبيد الملاثيون في صورة الدم للفئران المختبرية البيضاء

هند عبد الجليل

فرع الفلسفة، كلية الطب البيطري، جامعة البصرة، البصرة، العراق.

لخلاصة

صممت الدراسة الحالية لتسليط الضوء على الآثار السلبية لاستخدام المبيدات على الدم إذ استخدم 42 فار مختبري (21) لكل جنس وزعت الحيوانات بالتساوي لثلاث مجموعات الحيوانات المعاملة (حقنت بالخلب) المجموعة الأولى حقنت بالمحلول المتعادل 0.1 مل والمجموعة الثانية حقنت بجرعة 250 ملغم/كغم/يوم والمجموعة الثالثة حقنت بجرعة 500 ملغم/كغم/يوم. لوحظت عدت علامات سريرية كالارتجاج، الإسهال وسيلان اللعاب. كما أظهرت النتائج تغيرات واسعة عند $P\leq 0.05$ حيث أظهرت انخفاضاً معنوياً في معدل إنتاج كريات الدم الحمراء ومعدل خضاب الدم وحجم الدم المضغوط إضافة إلى انخفاض كريات الدم المعدلة والوحيدة وارتفاعاً ملحوظاً في الخلايا اللمفاوية. كما أظهرت الدراسة انخفاضاً معنوياً في معدل أوزان الحيوانات المختبرة المعاملة وكلا الجنسين.

REFERENCES

- 1-EcobichonDj:2001b.Carbamate insecticides ,in Krieger R (ed):hand book of pesticide toxicology .SanDiego :Academic press,,p.p1087-1106.
- 2-BrownAwA.1978.Ecology of pesticides john wily &sons, new York, NY, USA.
- 3-SmithGJ.1987.Pesticide use and toxicology in relation to wild life organophosphoras and carbamate compounds. us fish wild sever Resource publ 170:1-171
- 4-Alavanja MCR ,Dosemeci M, Samanic C,etal.2004.Pesticides and lung cancer risk in the agricultural health study cohort. Am JE pidemiol160:876-885.
- 5-Pearce N, Mclean D.2005.Agriculturalexposures and non Hodgkin's lymphoma. Scand J work Environ Health 31(suppl1):18-25.
- 6-Jagak,Dharmanic .2005.the epidemiology of pesticide exposure and cancer :A review. R cv Environ Health 20:15-38.
- 7-WHO(world health organization)1990:populic health impact of pesticides used in agriculture .Geneva.
- 8-Revegitation Eligibility decision (RED)for malathion,EPA2006.738-R-06-030,4.s Environmental protection Agency, office of prevention, pesticides and toxic substance, office of pesticide programs, u.s government printing office: Washington ,Dc.
- 9HazardousSubstanceDatabank(HSDB)2008.Malathion,u.s.Department at health ,national library of medicine.
- 10-Roberts,T.R .1998.Metabolic path ways of Agro chemicals- part2:insecticides and fungicides ,the royal society of chemistry: Cambridge uk,p.p360-367.
- 11-Lewis,S.M;Bain,B.J,andBates,I.(e.ds)2007.In;Davies and Lewis practical Hematology, Churchill Livingstone, Edinburgh, united kingdom.10th ed,p.p25-58.
- 12-Hassal ,k.A:1990:The bio chemistry and use of pesticides structure metabolism .mode of action and use in crop protection Vclt publishers In C .Werheim and new York.p.263-361.
- 13-ELZawahry,E.I.2004:Assessment of toxicity on chronic treatment with some pesticides on albino rat .Bull. Egypt. Soc. Physiol .Sci 24(1).

- 14-Narcyan,P.B.S;Sampathraj,e and Vanthakumarr ,G. 1993:Ratoxicity studies with neem oil, world neem conf(Bangalore. India).Astr.p.55.
- 15-Schalm,o.w.;Jain,N.c;andCarrol,E.j. 1975:Veterinary hematology Leo and Febiger,3/E.
- 16-Tos-luty,S.D.obuchowska-przebirowska;Latuszynska,J.;Tokarska,M.;and Haralym,A.2003.Dermal and oral toxicity of malathion in rats. Anu .Agric. Environ. Med., 10:101-106.
- 17-Anuar,A.;Naji,Z.T;El-imamy,I.2011:Protection effects of vitamin E and pollen grain against insecticides rats(*Rattus nor vegicus*)uatmas.pp.195-201.
- 18-Lox,C.D.1983:Effectsof acute pesticide poisoning on blood clotting in the rat .Eco toxical Environ Saf7:451-454.
- 19-EPA2000.Malahion ,Re-registration eligibility decision.u.s Environmental protection Agency pesticides/red/malathion.
- 20-ATSDR2006.Toxicological profile for malathion draft for public comment Atlanta: us department of health and human services:(ATSDR).
- 21-Balaji,M;Sasikala,K.1993:Cytogentic effects of malathion in invitro culture of human peripheral blood .Mutal Res 301:13-17.
- 22-Banarjee,B.d.;keener,D.C.;Ray,A.1996:Immunotoxicity of pesticides perspectives and trends. Indian J Exp.Biol:723-733.
- 23-Rodgers,K.1995.Theimmuno toxicity of pesticides in rodents .Hum. Exp toxicol 14:111-113.
- 24-ATSDR2001 .Toxicological profile from malathion draft for public comment Atlanta: us Department of health and human Services.
- 25-cantor,Kp ;Blair,A.;Brown,L.M;etal.1993.Pesticides and other agricultural risk factors for non-Hodgkin's lymphoma among men in Iowa and Minnesota. cancer Res:53:242.
- 26-Zahm s.h; wisent burger,D.D,Saal,R.c.;etal1993.The role of agricultural pesticide use in the development of non Hodgkin's lymphoma in woman arch. environ health 48(5):353-358.
- 27-Gyton C. and Hall E.2006.Text book of medical physiology 11th ed .Elsevier Inc. pensylvania.USApp.272-276.
- 28-Sananayk,N;Karall,I:1986.Acute poisoning in sirilanka or over view .Ceylon medical Journal .31:61-71.

29-Hayes,M.;VanDerwesh,U.;Zen,N;Gel fand,M.1998.Organophosphate poisoning in Rhodesia. south African medical Journal .53:230-234.

30-Barlas,N.E.1996.Toxicological assessment of bio degraded malathion in albino mice. bull. Environ .cantor.. Toxicol 57:705-712.