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COMPERHENSIVE STUDIES ON EFFECTIVENESS OF CERTAIN ANTICOAGULNTS RODENTICIDES AGAINST HOUSE MOUSE (ALBINO) *Mus musculus L*.

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ABSTRACT

Laboratory studies were carried out to investigate the efficiency of three anticoagulant rodenticides ,Brodifacoum, Chlorophacinon, and Warfarin on both sexes of albino house mouse Mus musculus L. which fed on either mixture of churched maize and wheat or vegetables.

The gained results revealed that the LD30,LD50 ,LD90,values of Brodifacoum were respectively; 0.235 ,0.46 and 2.385 mg/kg bw for males and were o.284 ,0.556 ,and 2.872 mg/kg of b.w. for females of albino house mouse, Mus musculus which have been fed on mixture of churched maize and wheat. These values were respectively ,0.175,0.407and 3.018 mg/kg of b. w. for males which have been fed on vegetables, while they were o.184,0.417 and 3.273 mg/kg of b.w. for females.

The LD30,LD50, and LD90 ,of Chlorophacinone for albino house mouse Mus musculues which were fed on maize and wheat were 7.932, 22.39 and 178.823 mg/kg of b.w. for males but they were 8.155, 22.677 and 26.142 mg/kg b.w. for females ,while in case of vegetables they were 8.401,20.312 and175.111 mg/kg of b.w for males, but they were 8.796 ,21.538 and 215.299 mg/kg b.w.for females respectively.

The LD30, LD50 and LD90 of Warfarine for albino house mouse Mus musculus when fed on vegetables they were e 133.832,380.419 and 4887.439 mg/kg b.w.for males while theywere175.50,407.894 and 5203.665 for females. Meanwhile , when the mice fed on mixture crush maize with wheat they were 133.832, 380.419 ,and4887.439 mg/kg for mages and they were 175.507 ,407.894 and 5203.894 mg/kg of b. w. for females.

In additional; the figures proved that the experimental mice which were fed on mixture of crushed maize and wheat were more tolerant to warfarine compound (LD50 valuse of males 280.419 and females 407.894 mg/kg of b. w.). Meanwhile, they were more susceptible to Brodifacoum (LD50 value of male, 0.407 and female,0.417 mg/kg of b.w.). Also the results cleared that male of the house mouse were more susceptible than female for each of brodifacoum, Chlorophacinon and Warfarine . The animals which have been fed on vegetables took the same trend . At last the mice which were fed on vegetables were more tolerant than which were fed on mixture of crushed wheat and maize.

INTRODUCTION

Rodents cause unlimited losses to farmers, manufactures and processors as well as causing damages to the structure and building fabric .Undoubted by the economic losses due to rodents is enormous particularly in the tropics, but it is impossible to exact monitory values on the damaged caused. The world Health Organization estimates that about 33 million tons of foods destroyed word-wide each year.

The use of toxicants of chemical pesticides had been relatively ineffective, due to shyness, or behavioral resistance, developing as results of the rapid on set of poisoning symptoms before ingestion of a lethal dose had

occurred (Grand,1979) (Ophof and langeveld,1969) and (Wang,1978). Despite the fact that chemical control of rodents has been practiced for more than 2000 years. It was only 35 years ago that the introduction of anticoagulants rodenticides revaluationised the efficacy and safty control of rodents(Dubock 1979) the majority of anticoagulants chemically belong to coumarins group (Hagan *et al* ,1967)

Thus the aims of this work was to investigated Chlorophacinon, Brodifacoum and Warfarin toxicity aganist the albino house mouse *Mus musculus*

MATERIALS AND METHODS

Experimental design;-

1) Anticoagulants used;-

Three anticoagulants were tested during this study ,i.e. Warfarin, Chlorofacinone and brodifacoum which were obitained from Glaxo Wellcome U.K.Besiers, France and I.C.I. companies., respectively.

1-a)Warfarin:-

-Chemical name :-

3-(α-acetonylbenzyl)-4 hydroxy coumarin.

1-b)Chlorophacinon:-

-Chemical name:-

2-[2-(4 chlorophenyl)-2- phenyl acetyl] Indian -1-3-dione.

1-c)Brodifacoume:-

-Chemical name:-

3-[3-(4-bromo(1,1-biphenyl)-4 yl)-1,2-3,4- tetrahyaro-1naphtalenyl]-4-hydroxy-2H-1-benzopyran-2-one.

2) Tested animals:-

Albino adult of House mouse Mus musculus L .were brought from Cultureof experimental animals in Helwan, (Egyptian Organization for biological products and vaccine).Mice were individually reared , acclimatized under laboratory conditions. Active and healthy mice of both sexes were chosen for mating to obtain a healthy offspring's. The resultant offspring were fed on standard laboratory ration till maturity stage.The active, health and similar weight as possible of mice males and virgin females were randomly chosen and separated into two groups. The first group was fed on mixture crushed wheat and maize, while the second was fed on vegetables for two weeks . Then mice weighted before and after treatments.

3) Parameters evaluation:-

Determination of various rodentcides, Warfarin, Chlorophacinon, and Brodifac oum active ingredient calculated as mg/kg of body weight were prepared. Five adults of each males and females mice ,caged individually were used for each dose administrated by oral incubation

A paralled control test was conducted using solvent for the rodenticides tested. Mortality percentages were recorded up to 28 days post treatment.

4) Statistical analysis:-

1/10 LD90, LD50 and LD30 values were calculated by probit regression analysis.

RESULTS AND DISCUSSION

Acute oral toxicity determination of certain rodenticides, LD30, LD50 and LD90 for Brodifacoum, chlorofacinone and Warfwrin were detected to the albino house mouse *Mus musculus* on males and females which were fed on either (maize and wheat) or vegetables for two weeks .

1 –a) Brodifacoum toxicity on albino house mouse *Mus musculus:-*

Data recorded in Table (1&2) detected that the LD30, LD50 and LD90 of Brodifacoum in males which were fed on vegetables, were 0.235, 0.616 and 2.385 mg/kg b.w. . for females they were 0.284, 0.556 and 2.872 mg/kg b.w., also, they were 0.175, 0.407 and 3.018 mg/kg in males which were fed on mixture crushed maize and wheat while they were 0.184, 0.417 and 3.273 mg/kg for females respectively.

1-b) Chlorofacinone toxicity on albino house mouse *Mus musculus:*

The tabulated data in Tables (1&2) cleared that the LD30, LD50 and LD90 were 7.932, 22.39 and 178.832 mg/kg b.w. for males which were fed on vegables, but they were 8.155, 22.677 and 294.142mg/kg b.w.for females, while in case mixture of crushed maize and wheat they were 8.401, 20.312 and 175.711 for males but they were 8.796, 21.538 and 215.299 mg/ kg b.w. for females respectively.

1-c) Warfarine toxicity on albino house mouse Mus musculus L. :-

The obitained data in Tables (1&2) cleared that the LD30 ,LD50 and LD90were257.811, 481.56 and 2217.223 mg/kg b. w for males but they were 266.207, 489,575 and 2170.123 mg/kg b.w.for females which were fed on vegetables respectively, while for mixture crushed maize and wheat feeding, they were 133.832,380.419 and 4887.439 mg/kg in males while they were 175.507, 407.894 and5203.665 in females, respectively.

The obtained data in all three rodenticides, the males were more sensitive than females for the two types of foods at LD30, LD50 and LD90.The LD30 and LD50 were higher in case of vegetables feeding than maize and wheat in both sexes. Also, the data revealed that the LD30 and LD50 were higher in case of vegetables feeding than in case of maize and wheat in both sexes in the three tested rodenticides. These results agree with several authors e.i.,Bull,1976 who evaluated the acute oral singal dose LD50value to albino Norway rat *Rattus norvegicus* when treated with warfarin was 186.0 mg/kg .Thonison,1976 found that the LD50was 6.26mg/kg for chlorofacinone, while Marsh et.al., 1980 determined the LD50 of warfarin, it was 180mg/kg on the previous rat. Mathur.and Prakash, 1981 calculated the LD50 at *R.rattus* to brodifacoum were0.73 and 0.65 mg/kg for males and

females respectively.Johnson and scott, 1986 evaluated the LD50 of R.norvegicus ,it was 0.26 mg/kg of body weight for brodifacoum ,and Abou Elkhear, 1993 found that the LD50 value 0f brodifacoum was 0.42 mg/kg for R.rattus. Hagen and Radomski (1953) found the LD50on *Mus musculus* for warfarin was 374.0 mg/kg b.w. while Redfern and Hadler (1976)evaluated the LD50 of WBA 8119 ,it was0.40 mg/kg b.w. on *Mus musculus.* Dabock (1979) found that the LD50 of brodifacoume ranged between 0.021 and 0.o50 mg/kg of body weight on *Mus musculus*.

Table (1): Effect of three anticoagulant rodenticides at different doses against both sexes of albino *Mus musculus*, fed on vegetables

Rodenticides	Sex	LD30mg/kg	LD50mg/kg	LD90mg/mk
Brodifacoum	Male	0.235	0.46	2.358
	Femal	0.284	0.556	2.872
Chlorophacinone	Male	7.932	22.39	178.822
	Femal	8.155	22.677	264.142
Warfarin	Male	257.811	481.63	2217.223
	femal	266.207	489.575	2170.123

Table (2): Effect of three anticoagulant rodenticides at different doses against both sexes of albino Mus musculus L. fed on mixture crushed maize and wheat

Rodenticides	Sex	LD30mg/kg	LD50 mg/kg	LD90mg/kg
Brodifacoume	Male	0.175	0.407	3.018
	Female	0.184	0.417	3.273
Chlorophainon	Male	8.401	20.312	175.711
	Female	8.796	21.538	215.299
Warfarin	Male	133.832	380.419	4887.439
	Female	175.507	407.894	5203.665

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دراسات مقارنة لتأثير بعض المبيدات المسيلة على فويرة المنازل (السلالة الألبينو)

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أجريت دراسات معملية لدراسة تأثير سمية ثلاثة مبيدات مسيلة للدم وهى البروديفاكوم والكلوروفاسينون والوارفارين على ذكور وإناث فويرة المنازل (السلالة الألبينو) والذى تم تغذيتهم إما على خليط من جريش الذرة والقمح بنسبة ١-٢١ أو على الخضار لمدة أسبوعين قبل المعاملة وعلى نفس التغذية بعد المعاملة.

ويمكن تلخيص النتائج المتحصل عليها فيما يلى:

كانت الجرعات المميتة (ج م) ٥٠ و (ج م) ٩٠ لذكور فويرة المنازل والتى غذيت على خليط من جريش الذرة والقمح المعاملة بالبروديفاكوم هى ٠,٢٣٥ ، ٠,٤٦ ، ٢,٣٨٥ ملليجرام/كجم من وزن الجسم بينما كانت للإناث ٠,٢٨٤ ، ٠,٥٥٦ ، ٢,٨٧٢ ملليجرام/كجم من وزن الجسم.

بالنسبة لمبيد الكلورفاسينون فكانت قيم الجرعات المميتة (ج م) ٥٠ ، (ج م) ٠,٩٠ لذكور وإناث فويرة المنازل التى غذيت على جريش الذرة مع القمح هى ٧,٩٣٢ ، ٢٢,٣٩ ، ١٧٨,٨٢٣ ملليجرام/كجم للذكور وكانت ٨,١٥٥ ، ٢,٦٧٧ ، ٢٦,١٤٢ ملليجرام/كجم من وزن الجسم فى الأناث وفى حالة التغذية على الخضار كانت قيم الجرعات المميتة للذكور هى ٨,٤٠١ ، ٢٠,٣١٢ ، ٠,١٧٥ ملليجرام كانت فى الإناث ٨,٧٩٦ ، ٢١,٥٣٨ ، ٢١٥,٢٢٩ ملليجرام/كجم من وزن الجسم.

أما بالنسبة لمبيد الوارفارين كانت قيم (ج م) ٣٠ ، (ج م) ٥٠٠ ، (ج م) ٩٠ للذكور ١٣٣,٨٢٢ ، ٣٨٠٤١٩ ، ٤٨٨٧,٤٣٩ ملليجرام/كجم بينما كانت للإناث ٨٩٤,٥٠٧ ، ٤٠٧,١٧٥ ، ٢٠٣,٦٦٥ ملليجرام/كجم من وزن الجسم عند تغذيتهم على جريش الذرة مع القمح على التوالى ، وكانت ٦٣,٨١١ ، ٤٨١,٢٥٧ ، ٢٢١٧,٢٢٣ ملليجرام/كجم للذكور بينما كانت ٢٦٦,٢٠٧ ، ٤٨٩,٥٧٥ ، ٢١٧٠,١٢٣ ملليجرام/كجم من وزن الجسم للإناث وذلك عند التغذية على الخضار.

بالإضافة إلى ذلك فقد أثبتت النتائج أن الفويرات التى غذيت على جريش الذرة مع القمح كانت أكثر تحملا للوارفارين (ج م) ٥٠ للذكور ٣٨٠,٤١٩ ملليجرام/كجم و(ج م) ٥٠ للإناث ٤٠٧,٨٩٤ ملليجرام بينما كانت الأفراد أكثر تأثرا للبروديفاكوم (ج م) ٥٠ ٠,٤٠٧ ملليجرام/كجم للذكور وكانت ٠,٤١٧ للإناث فى حالة التغذية على الجريش مع القمح. وقد أوضحت النتائج أيضا أن ذكور فؤيرة المنازل أكثر تأثرا من الإناث لكل من البروديفاكوم الكلورفاسينون ، الوارفارين وقد أظهرت الدراسة أن الفويرات التى غذيت على الخضار كانت أكثر تحملا من نظيرتها التى غذيت على الجريش مع القمح.