تغذية الكلاب على أسماك تعرضت لتركيزات ميتة وتحت الميتة لمادة الديكوات

ف ٠ ع ٠ شعبان ، ع ٠ شعبان ، ط٠ب ع ٠ شحاتة

غذيت مجموعتان من الكلاب ، كل مجموعة تتكون من خمسة كلاب لفترة ثلاثة أيام على أسماك القرموط النيلى التى سبق تعرضها لجرعات ميتة أو تحت الميتة من قاتل الأعشاب دياكوات ولوحظت الأعراض الاكلينيكية خلال عشرة أيام وتم قياس نشاط الأنزيمات فى البلازما بعد أربع وعشرون ، اثنين وسبعون ، مائة وعشرون ساعة من التغذية ٠ كنتيجة لهذه التجربة لم تظهر أعراض اكلينيكية بينما كانت هناك زيادة فى نشاط أنزيمات الترانسا امينار فى المصل ولم يلاحظ أى تغيير فى نشاط أنزيم المصل اللبنى التخموى ٠

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FEEDING OF MONGREL DOGS ON FISH PREVIOUSLY EXPOSED TO LETHAL AND SUBLETHAL CONCENTRATIONS OF DIQUAT

(With 3 Tables and 1 Figures)

By

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SUMMARY

Two groups of mongrel dogs (5 animals each) were fed for three days on Clarais Lazera Nile fish previously exposed to sublethal or lethal doses of the aquatic weed killer herbicide Diquat. Clinical symptoms were observed for 10 days and SGOT, SGPT and LDH serum enzymes activities were measured after 24, 72 and 120 hours post feeding. Results revealed no clinical signs, while SGOT and SGPT activities were significantly raised. No alteration in LDH activity was recorded.

INTRODUCTION

The list of pollutants of potential hazards to animal and human life has increased rapidly during the last years. These substance enter our environment through various ways including surface water. Man can get toxicated by this pollutants through ingestion of fish expeosed to such substances. It is known that these toxic substance disturb functions of vital organs of the victim especially the liver. This disturbance can be diagnosed by several methods.

Determination of SGOT, SGPT and lactic dehydrogenase help much in such diagnosis. Toxic hepatitis due to chloropomazine (SHAY and SLIPLET 1957) and ethyl alcohol (BANY, 1958) were found to be associated with hypertransaminases.

Elevations in serum transaminases may occur in cases of subclinical liver dysfunction. Observation during the course of an epidemic acute infectious hepatitis indicated that elevation in serum transaminases sensitively reflect subclinical hepatitis than do conventional liver function tests(WROBLEWEKI et al., 1957).

The aim of the present study is to clearify the effect of feeding dogs on fish previously toxicated with sublethal and lethal doses of herbicide produced under the trade name Diquat in the market. This study upon serum transaminases level may help in the detection of the possible damage in hepatic cells.

MATERIAL AND METHODS

Determination of LcD_{50}:

Diquat was obtained from ICI, Cairo Assistance Office as formulated compound containing 2 lbs.active ingredient/gallon. The solution is misible with water. The desired concentrations for experimental purposes were prepared by adding a measured quantity of formulated Reglan to known quantity of water in experimental aquaria to reach the desired concentration.

Egyptian channel cat fish (Clarais lazera)weight from 65-90 gm. each, with an average length of 20 cm; was used during our toxicological studies. The fish was obtained from River Nile and acclimated to laboratory conditions at least two weeks before experimental testing. Teteramine fish feed(Tetra, Dr. Baensch, Malle, West Germany) was twice daily ad libidum and withold three days prior to introduction to bioessay to empty the gut(According to United State Department of Interior fish and wildlife Service Report, 1964).

The Lc_{50} was determined by Litchfield and Wilcoxan method (1964).

For Lc_{50} determination, preliminary trials were carried out on eleven groups (8 fish each). Fish were subjected to different concentrations begining with 5 ppm to 100 ppm except control. For test proper 48 Clarais lazera fish were divided into 6 groups (Each contain 8 fish), each group subjected to different concentrations ranging from 10-90ppm except control.

The aquaria were 12, all glass basin with 40 litre capacity each. The test medium of water was about 25°C temperature and pH 6.9.

Ten mongrel dogs aging 2.3 years with an average body weight of 15-20 kgs.were used.Animals were classified into two groups (five animals each), they were fed clarais lazera Nile fish previously exposed to lethal (first group) or sublethal (second group) doses of formulated Diquat. The lethal (75 p.p.m.) and sublethal (20 p.p.m.) doses of Diquat to fish were previously determined Blood samples were obtained from experimental dogs from the recurrent tarsal vein, prefeeding (autocontrol) and after 24, 72 and 120 hours postfeeding. The animals were put under clinical observation for one week. The serum LDH and GOT activities were determined by BERGMEYER method (1975). The SGPT activity was determined by BERGMEYER and BERNT METHOD (1974). In both methods test kits were used (Boeheringer Mannheim Gmbh Diagnostica, West Germany).

Statistical analysis of the data was calculated according to KALTON (1967).

RESULTS AND DISCUSSION

Preliminary trials for Lc_{50} determination of Diquat in Clarais lazera Nile fish showed that mortalities begins at 10 ppm. wile at 70 ppm.100% mortality was recorded (Table 1). The mortality curve showed that the Lc_{50} was 36 ppm. (Fig.1). The test proper indicated that the Lc_{50} of Diquat with 19/20 confidence limits was 36 (13.8-93.6) ppm. (Table 11).

No obvious clinical signs were observed on dogs during the whole period of experiment (110 days). This may be due to the assumption that this toxicant produce the experimental animals to the subclinical phase only. Serum GOT and GPT levels have been used as a senitive test in dogs for liver affection in several diseases (MAHLERBE, 1950, 1960, HOE and HARVEY, 1961) and toxicological cases (SHAY and SLIPLET, 1957; BANG,1958; WALDMAN and BERMAN,1959; ORANDI and JERZQUL,1972).

Obtained results indicated that dogs fed on poisoned fish showed hypertransaminasemia that means hepatic affection from absorption of Diquat or its metabolites; and consequently the escape of these enzymes to the serum from injured liver cells. This result has been previously stated by CORNELIUS et al., (1959) in his work about toxication with hepatotoxic substances. The elevation in GPT was more significant in dogs fed on fish exposed to lethal concentration (75 ppm.than those exposed to sublethal (20 ppm) doses. This fact that GPT is elevated to high significant levels($P \leq 0.01$)could be explained on the fact that dogs showed more GPT activity in normal liver tissue than other domestic animals. No significant alteration in LDH could be detected (Table 3). As a conclusion one can safely see that feeding of dogs on fish previously exposed to sublethal or lethal aquatic weed killer herbicide (Diquat) could seriously affect the general health.

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Table I.

Preliminary trials for Lc_{50} determination of Diquat in Clarais lazera.

Doses ppm	No of fish	Time post exposure (hr.)							
		24		48		72		96	
		L	D	L	D	L	D	L	D
5	8	8	-	8	-	8	-	8	-
10	8	8	-	7	1	6	2	6	2
20	8	8	-	6	2	6	2	6	2
30	8	8	-	7	1	5	3	4	4
40	8	7	1	5	3	5	3	4	4
50	8	5	3	4	4	4	4	4	4
60	8	6	2	2	6	1	7	1	7
70	8	3	5	-	8	-	8	-	8
90	8	3	5	-	8	-	8	-	8
100	8	3	5	-	8	-	8	-	8
Control	8	8	0	8	0	8	0	8	0

Table II: Solution of the dose effect curve of Diquat to Clarais lazera.

Dose ppm	Response	Observed %	Expected %	Observed minus Expected	Contribution to $(Chi)^2$
10	2/8	25	0.1	24.9	0.0000
20	2/8	25	2.0	23.0	0.0020
40	4/8	50	60	10	0.0450
60	7/8	87.5	95	7.5	0.1200
90	8/8	100(99.3)	99.82	0.52	0.0053
				Total	0.1723

$(Chi)^2$ = 1.3792

Degree of freedom = 3

Chi from Table II = 7.82 (1.3792is less than 7.82 therefore the data are not significantly heterogenous).

From previous results, the Lc_{50} value of diquat to clarais lazera Nile fish with 19/20 confidence limits equals to 36 (13.8 - 93.6).

Table III: The effect of feeding mongrel dogs on Clarais lazera Nile fish previously exposed to lethal and sublethal concentrations of Diquat.

Enzyme	Group No.	Number of animals	Time Post feeding (Hours) 0	24	72	120
GOT	I	5	58.8 ± 8.05	114.4 ± 8.210	84.2 ± 7.185	122.6 ± 2.532
	II	5	57.8 ± 9.98	106 ± 3.791	79.2 ± 17.13	120.4 ± 5.337
GPT	I	5	19.2 ± 2.604	86. ± 4.655	71.2 ± 4.659	100. ± 4.896
	II	5	18.6 ± 1.806	59.4 ±30.679	46.6 ± 4.383	68.8 ± 6.665
LDH	I	5	163.2 ± 8.230	155.2 ± 8.005	155.2 ± 8.005	157.2 ± 8.343
	II	5	144 ± 7.713	161 ± 14.49	159.8 ± 1484	155.8 ± 1.064

Significant at P 0.05.

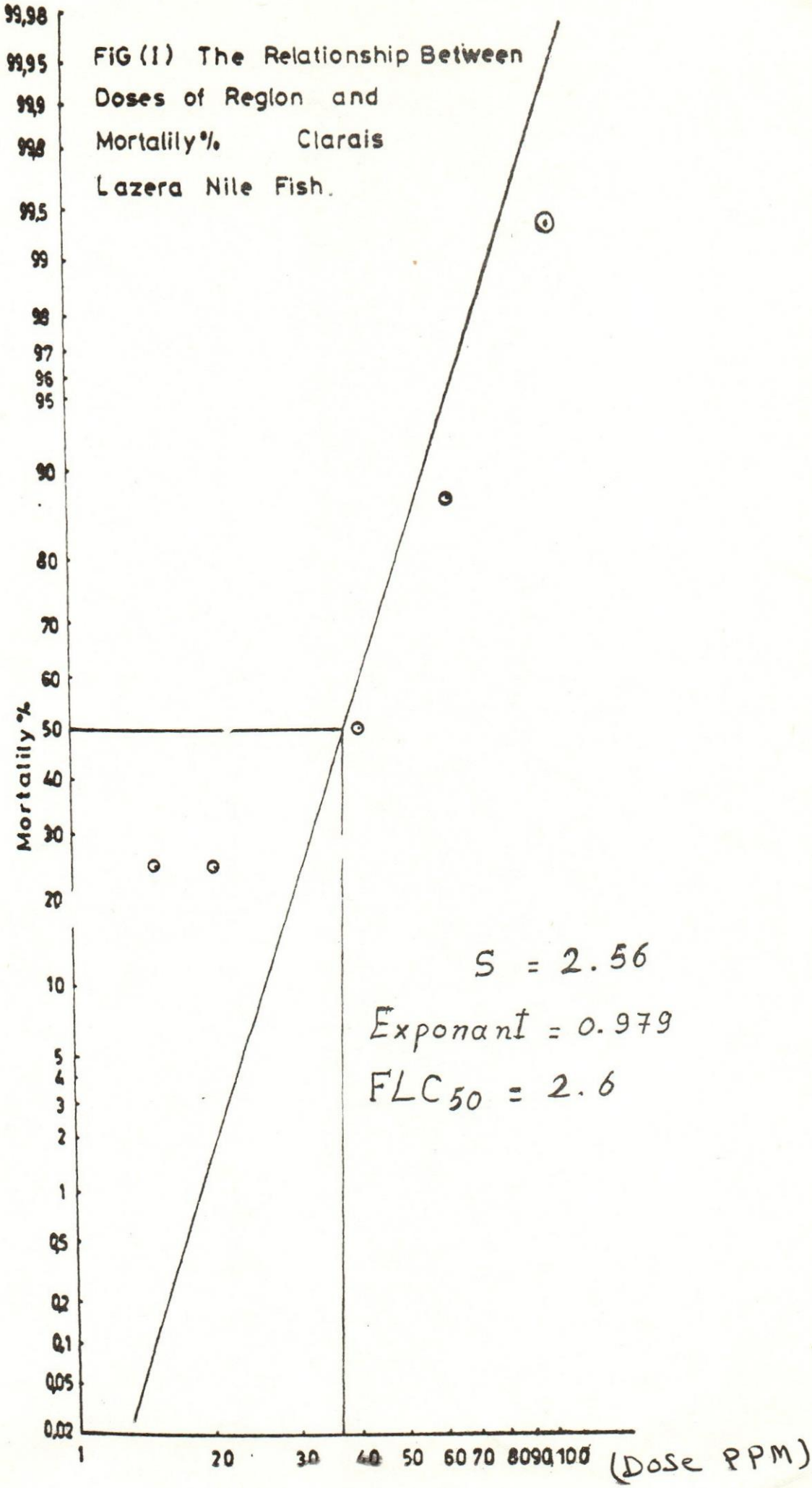
FIG (1) The Relationship Between
Doses of Region and
Mortality % Clarais
Lazera Nile Fish.
Mortality %
99,98
99,95
99,9
99,8
99,5
99
98
97
96
95
90
80
70
60
50
40
30
20
10
5
4
3
2
1
0,5
0,2
0,1
0,05
0,02
1
20
30
40
50
60
70
80
90
100
(Dose PPM)
S = 2.56
Exponant = 0.979
FLC50 = 2.6