ALTERATIONS IN THE GLYCOGEN CONTENT OF *CYPRINUS CARPIO* AND *CARASSIUS AURATUS* FISHES AFTER ACUTE [+]EXPOSURE TO MALATHION INSECTICIDE

التغيرات في محتوى كلايكوجين سمكتي الكارب الاعتيادي والسمكه الذهبيه بعد تعريضها الى مبيد الملاثيون الحشري

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Abstract:

***Cyprinus carpio* and *Carassius auratus* fishes were exposed to concentrations of malathion (2, 4, 8 and 20 ppm) for 96 hours. Muscle glycogen in each fish was investigated. The concentration of muscle glycogen was decreased from 0.56, 0.37, 0.25, 0.08 and 0.0125 ppm in *C. carpio* after exposure to 0, 2, 4, 8 and 20 ppm malathion insecticide respectively. The same is found for *C .auratus* in which concentration of muscle glycogen was decrease from 0.46, 0.175, 0.08, 0.04 and 0.02 ppm for the same trend of concentrations of malathion insecticide. *C auratus* fish showed Sharpe decrease in the concentration of muscle glycogen compared to *C carpio.* Significant differences (P<0.01) were observed. Reduction in glycogen is probably due to its rapid breakdown energy requirement of the fish or utilization by anaerobic glycolysis.**

المستخلص:

تم تعريض سمكتي المياه العذبة الكارب الاعتيادي والسمكة الذهبية إلى تركيز (٢ و ٤ و ٨ و ٢٠ جزء بالمليون) من المبيد الحشري الملاثيون لمدة ٩٦ ساعة. تم خلال الدراسة تقدير محتوى الكلايكوجين في كل سمكة. اظهر كلايكوجين العضلات انخفاضا"حسب الترتيب التالي: ٠،٥٦ و ٠،٣٧ و ٠،٢٥ و ٠،٠١٢٥ جزء بالمليون في سمكة الكارب الاعتيادي بعد التعرض لتركيز صفر و ٢ و ٤ و ٨ و ٢٠ جزء بالمليون من المبيد الحشري الملاثيون على التوالي. وقد وجد نفس الترتيب للسمكة الذهبية حيث اظهر الكلايكوجين تناقصا" كما يلي: ٠،٤٦ و ٠،١٧٥ و ٠،٠٨ و ٠،٠٤ و ٠،٠٢ جزء بالمليون بعد التعرض لمبيد الملاثيون بنفس ترتيب التركيز على التوالي. لقد أظهرت السمكة الذهبية انخفاضا" حادا" في تركيز كلايكوجين العضلات مقارنة بالكارب الاعتيادي، حيث وجدت تغييرات معنوية (P<0.01) . يعزى سبب انخفاض تركيز كلايكوجين العضلات إلى التكسير حسب حاجة السمكة للطاقة آو حدوث عملية .glycolysis لاهوائية.

Introduction:

The impact of ecosystem by different chemical pollutants such as pesticides, the poisoning by pesticides from agricultural fields is a serious water pollution problem and its environmental . long term and short term effect may result in the incidence of toxicity of fish and other aquatic life forms . [1]

Pesticides are added to the environment for the purpose of killing undesirable organisms. These pesticides should be highly specific in their toxicity to undesirable target organisms and harmless to non-target desirable animals including fish and other species. [2] [3]

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Malathion(O-O-diethyl S-1,2- dicarbethoxyethyl phosphorodithioate)) is an organophosphorous insecticides it used to kill harm pests to agricultural production , but unfortunately most of pesticides are not highly selective and are toxic to non- target organisms[4] [5] [6]

This problem start to face the countries lead to reflex of the negative effects for the economical level, thus the serious impacts on the aquatic organisms such as fish, which could be exposed to these pollutants, among effects are changes in production, survival and growth. Many environmental studies involved the toxicity of malathion ([7] [8] [9].Alteration in the chemical composition and the biochemical system and metabolism harmful changes by pesticides in acute and chronic effects as well as the accumulation across the food chain in fish body [10][11] [12].

Pesticides are highly toxic to fish, and aquatic plants and invertebrates which are used as food for fish and responsible for decline in the oxygen level dissolved in water.

MATERIALS and METHODS:

Adult fishes, *Cyprinu. carpio* average weight 15 gm and which length 12 cm and *C, auratus* average weight 10 gm and average length 9 cm were caught by net and transferred to lab, the fishes were acclimated for one week in plastic aquaria containing tap water under control temperature of 20± 2 ° C. Fish were feed daily with dried algae. Replicates of five fish were exposed to malathion concentrations (2,4, 8 and 20 ppm) were tested for each species with three replicates including control. Fish were killed and cut into pieces, small pieces of muscles were freeze dried and glycogen contents were determined according to [12]

Statistical Analysis of data was carried out with spss Statistical program-One way Anova was used to compare the results.

RESULTS:

The mean glycogen content for the exposed *C. carpio and C. auratus* fishes to 2, 4, 8 and 20 ppm malathion are shown in Figures 1 and 2 after 96 hours of exposure. Significant depletion was observed under $p<0.01$ level. In the muscles of both species, glycogen contents showed marked decrease as the exposure concentration of malathion increased. For *C. carpio* fish after exposed to 2 ppm malathion, muscle glycogen was the low (0.37), whereas exposure to 20 ppm of malathion muscle glycogen contents was 0.04 ppm. For *C. auratus,* the same trend was found in the muscle glycogen contents .

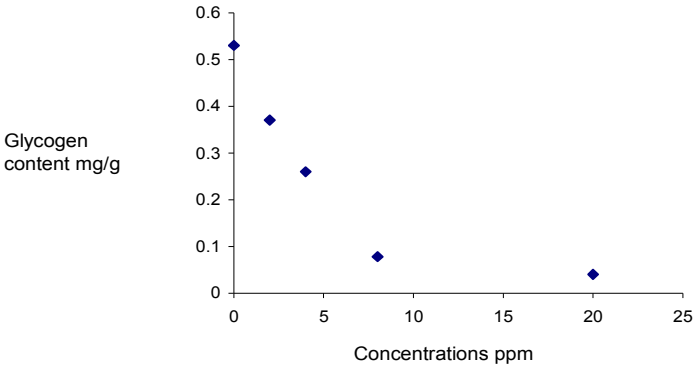

Fig-1- changes in muscle glycogen content of *C.carpio* exposure to malathion of 96hr

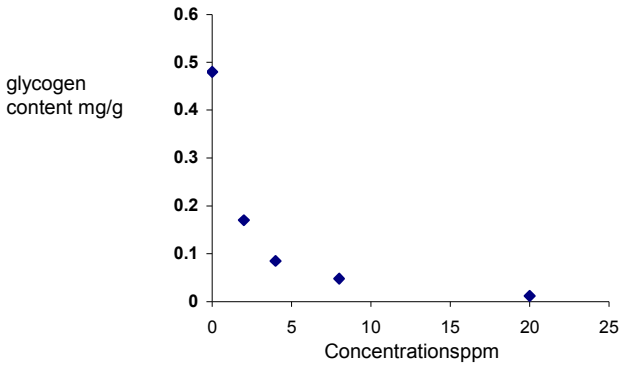

Fig-2-changes in Muscle glycogen content of *C.auratus* exposure to malathion for 96hr

were 0,17 and 0.015 ppm after the exposure to 2 and 20 ppm of malathion respectively, in comparison with 0.58 and 0.461 ppm for muscle glycogen contents in control samples of *C. carpio and C. auratus* fishes respectively.

Discussion:

Data presented in fig 1,2 indicate that the levels of glycogen contents in the muscle of malthion exposed fish were depleted ($p<0.01$) at all content rations after 96hr of exposure .Previous studies have shown due to disturbance of fish[13] [14] [15].and Glycogen is readily depleted as a result of energy production and my be typical stress response confirming the prevalence of hypoxia condition at the tissues level and there were a decrease in glycogen content due to its utilization by anaerobic glycolysis perhaps to meet the energy warranted by the toxic environment stress of acute hypoxia [16] [17] [18]. The depletion were in glycogen content due to utilization by anaerobic glycolysis may be expected to meet the energy requirements of the animal for the increased level of physical activities and enhanced physiological processes of metabolizing and eliminating the toxicant . [19] [20] [21] . and induce marked changes in carbohydrate energy reverse of the fish. [22] [23] [24].
This study showed the decrease in glycogen content combined with increase concentration, which emphasized about the signs of malathion poisoning, and it is in agreement with the findings of [25] [26] in which glycogens is inhibited as the concentrations became high. As a result of the effect it is appeared also that *C. auratus* was more sensitive than *C. carpio* which explained on the bases of rapid glycogenolysis during exposure to organophosphours. [27] .

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