



Study The Effect of Bio-Concentration Factor of Malathion and Dichlorvos Pesticides on The Ovaries of Common Carp (*Cyprinus Carpio*) L. and Gold Fish (*Carassius Auratus*) L.

KEYWORDS

Bioconcentration factors , Dichlorovos , Carp , Sublethal , malathion

Saphia Ali Aitte

Southern Technical University, Health and Medical Technical College , community health Department ,Basra -Iraq

ABSTRACT *The aim of the current study to measure the vital concentration factor BCF in the tissues of the ovaries of two types of freshwater fish carp common carp golden fish under the effect of different concentrations of Exterminators malathion and Dichlorvos were (0.24,0.27. 0.29) ppm for a period of exposure 10 days and concentrations under lethal (0.04, 0.06, 0.08) ppm for a period of exposure amounted to 15 days has this study depended on the effect of pesticides on tissue ovaries of these two fish due to their high lipid content possible to focus these pesticides with ease from the aqueous medium has the current study, the highest recorded value of the coefficient of effect BCF where the recorded values of coefficient focus higher value through the accumulation of the pesticide malathion in the tissues of the ovaries carps usual amounted to(18.5) with (0.87) correlation during the period of 10 days of exposure and the lowest rate of accumulation of pesticide Dichlorvos in the tissues of the ovaries of golden fish was %12.25 correlation factor of (0.60), as bio-concentration factor showed a rise during the period 15 days exposure to both insecticides where malathion record value of (%178.75) and the correlation coefficient (0.95) in the accumulation of tissue fish common carp ovaries in what was the amount of bio-accumulation of Dichlorvos pesticide (%76.5) in the tissues of the ovaries of gold fish when correlation coefficient (0.84)*

Introduction

The pollution of the grave dangers facing the environment in all individuals of the environment wild air and water system so it is a danger of harmful waste and other agricultural chemical major groups resulting from the spread of many of the industries near the banks of rivers where industrial pollution is also caused by toxic heavy metals and waste resulting pollution issued by cadmium, lead, zinc, mercury, vanadium factories [1], as well as oil refineries and electrical contaminants, thermal and radiation as the agricultural pollutants that come from farms and agricultural residues and agricultural crops and the use of chemical fertilizers and pesticides, which are considered an integral part of agricultural technology and the increase in population requires an increase in agricultural production So employ pesticides to revive the plant through the control of agricultural pests, and the fight against the bushes and disease fungi and parasites that infect the plant but on the other hand, they cause a lot of damage to untarged organisms suffered beings, as well as pesticides and other chemicals has led to an acceleration in the high proportion of water pollution and that these contaminants are working to reduce the proportion of dissolved oxygen in the water becomes the aquatic environment unfit for living more aquatic organisms such as fish thus less efficient the system becomes stagnant water valid for increase harm insects which transmit diseases and more substances used in the fight against the bushes or agricultural pests they pollute the environment stream rivers through irrigation water for orchards and fields that have been sprayed with advance [4,3,2]

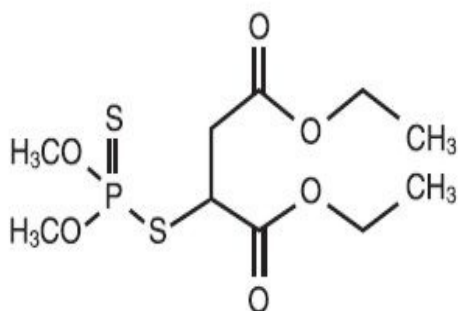
Classification of pesticides to the organophosphate which is characterized by its ability to bio-disintegration and lack of survival in the environment in comparing with Organochlorine pesticides which are of activity effect and toxicity and wide for other aquatic organisms, so occupied pesticides organophosphorus replace organochlorine despite the change in the aquatic environment and many of which are toxic and accumulated in fish and birds and inverte-

brates' [7,6,5] also made using pesticides organophosphorus in the world is to reduce of using the pesticides organochlorine that have environmental pollutants resistance to the environment because they continue to stay for a long time where and able to accumulate in the fatty tissue as muscles , ovaries and then travels through the food chain and are considered toxic pesticides have the ability to infect the harmful of fishes , in addition other organisms through exposure to dose or concentrations and with exposure time and persistence in the environment so pesticides used for the cultivation acts as pollutants for fresh water bodies and affect the organisms untargeted also noted [8] that the pesticides are active materials chemically and biologically to greatest for pest control and have a broad spectrum often that some pesticides have the ability to retail in the water [9] as far as into beyond pests and organisms through the skin and through the feeding , breathing and many of the studies dealt with the accumulation of pesticides in the aquatic environment and move through the food chain and in metabolism operation , so bioaccumulation of pesticides or any of the other pollutants resulting from the effectiveness of their solubility in water and because of its impact on the ubiquitous in the aquatic environment animals . Featuring pesticide susceptibility to stay for a long period of time in the tissues of living has clear implications sick on the animal itself is reflected negatively on survival in the environment [10] For that pesticides affect the toxicity to fish is through the case of the chemical at a sufficient concentration on the surface of gills and skin or may accumulate this article in living organisms concentration enough to the events of toxic responses in the internal tissues such as the liver, kidney, ovaries [11]. And dealt with a lot of studies have passed these symptoms to humans through the food chain [12] and dealt with many of the studies are many definitions about the meaning of bio-accumulation has indicated [13] on the concept of bio-accumulation term that describes that process by the removal of material chemical by the organism either directly from exposure to contaminated means or through the consumption of foods that contain

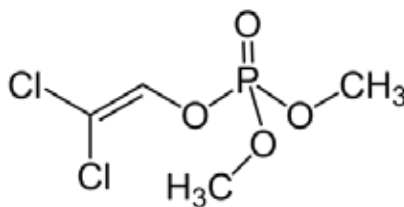
these the chemical also stressed the International Federation of research in chemistry and applied to a gradual increase in the amount of a substance in an organism or part of an organism which occurs due to the rate of consumption exceeds the ability of the organism to remove toxic material from the body, has shown a lot of studies on the bio-concentration factor which is expressed as an effective factor in controlling the concentrations of contaminants from the aquatic environment and the body of water the animal is added to this factor an active role in the extent of accumulation found in the tissues of the organism [14] as expressed him as a measure of tendency to substance in to accumulate in the tissues of fish as an indicator vital for the pollution in the environment or in the tissues of other neighborhoods, has been studied pollution size and accumulation of pesticides in fish by many researchers to the occurrence of necrosis in the liver of the fish under the influence of malathion [15] about his study of changes microstructures observed in the ovaries and the eggs are in advanced stages of growth in fish *Channa punctatus* through exposure to the 15-day period for the pesticide malathion in addition to other studies about the events of on biochemical it has been found [16] Fish during *Puntiu Ticto* exposure to concentrations of pesticide Dimethoate to lower cholesterol content and clogging generate steroids adequate system and a decrease in ovarian protein values and decrease the liver's ability on cholesterol storage pointed both [18,17] Change in blood values of Fish cat fish through exposure to different concentrations of the pesticide diazinon also formed histological studies of the extent of the accumulation of pesticides ample o explain the negative effects on the fisheries impacts where he found all (19) changes in muscle tissue, kidney and gills increase exposure to the substance for long-term period, and there is many studies on the toxicity of known and some industrial pollutants on fish pesticides which included several topics such as behavior and genetic mutations in all the fish and the various stages of its members [21,20]

Materials and Methods

Samples were collected from carp normal fish, gold fish from the Shatt al-Arab in the vine on northern province of Basra weighing 10 ± 2 g and 12 ± 3 cm and were transported to the laboratory for the purpose of adapted appropriate to the circumstances laboratory for a period of 7 days before subjected to experiences laboratory where it was put fish in ponds plastic 100-liter for every 10 fish were divided Fish to 4 sets for each type of time periods Each set contains 30 fish , and attended the concentrations of pesticides depending on the mitigation equation ($C1V1 = C2V2$) and the percentage of the active ingredient installed on a container of pesticides and chemical composition as follows of the material Effective pesticide malathion 50%



O, O-Die methyl phosphorthioate Diethyl mercapto succinate - S- ester effective pesticide Dichlorvos to 48% of the material Dichlorvos or 2,2-dichlorovinyl dimethyl phosphate DDVP]



method of measuring bio-concentration factor (BCF:

to measure the vital concentration of phosphorous pesticides and insecticides coefficient that calculates the bio-concentration factor in the tissues of the ovaries of the fish under study using the method (23.22) By used spectrofluorometer device, Was calculated accumulation rates and standard deviation then compared these values of variance using the full design random analysis (CRD) as a moral differences recorded between the averages below the level likely would ((0.05 by statistical program SPSS)) For the purpose of comparison between the accumulation rates and the focus has been the correlation coefficient calculation (r) .

Results

Tables listed below difference in the values of the dynamic focus BCF concentrations of pesticide organ phosphorus Dichlorvos and malathion accumulated in the tissues of the ovaries fishes carp usual golden fish for a period of time the amount of 10-15 days from exposure to concentrations amounting coefficient (0.24,0.27, 0.29) ppm for the time period 10 The concentration on the period was 15 days (0.04,0.06,0.08) ppm observed from the results that there is an increase in the accumulation pesticide in the tissues of fish ovaries and estimated an increase by a factor of FCB focus for each of the pesticides under study rate, and the effect of these concentrations led to a significant increase ($p < 0.05$) rates BCF values for tissue ovaries exposed to concentrations of the pesticide malathion more than in the tissues of the ovaries exposed to the same concentrations of pesticide my parents dichlorvos, so log bio-concentration factor highest value when (0.29) ppm was (18.5%) compared to with the same pesticide Dichlorvos concentration (%) (16.75), as noted he was also in concentrations of low-lying (0.24) ppm record pesticide malathion the highest value in the BCF for tissue ovaries of common carp course of (15.5%) compared with (%) (14.37) in pesticide dichlorvos accumulated in the tissues of the ovaries exposed to the same period in the table. (1,2)

Table -1- show the %of BCF carp fish ovary after exposed to sublethal concentration of pesticide malathion during 10 days

Type of fish	Concentration	SD± Mean	BCF%	Col-oration factor(R)
Common carp	0.24	37.3±0.46	15.5	0.72
	0.27	44.7±0.58	16.5	0.77
	0.29	53.7±1.62	18.5	0.89

Table -2- show the %of BCF carp fish ovary after exposed to sublethal concentration of pesticide dichlorovos during 10 days

Type of fish	Concentration	SD± Mean	BCF%	Col-oration factor(R)
Common carp	0.24	34.5±0.43	14.37	0.70
	0.27	43.8±0.67	16.22	0.74
	0.29	51.2± 0,84	16.75	0.83

The golden fish during exposure to similar pesticides mentioned concentrations of the current study has pointed to the difference in values vital factor in the ovaries of golden fish with gradual increase focus pesticide malathion has recorded more valuable to concentrations vital factor in the tissues of the ovaries was of (15.93%) to focus (0.29) ppm comparison with the same concentration of the pesticide dichlorvos was the amount of BCF (14.13%) when the ovaries of golden fish. It was found that there is a higher moral significance value ($p < 0.05$) for both insecticides and this confirms that the BCF for Mead malathion more accumulation of pesticide Dichlorvos as shown in table(3,4)

Table -3- show the %of BCF of *Carrasiuss auratus* fish ovary after exposed to sublethal concentration of pesticide malathion during 10 days

Type of fish	Concentration	SD± Mean	BCF%	Coloration factor(R)
Gold fish	0.24	31.6± 0.38	13.16	0.67
	0.27	38.5±0.57	14.24	0.74
	0.29	46.3±0.77	15.93	0.82

Table -4- show the %of BCF of *Carrasiuss auratus* fish ovary after exposed to sublethal concentration of pesticide dichlorovos during 10 days

Type of fish	Concentration	SD± Mean	BCF%	Coloration factor(R)
Gold fish	0.24	29.4± 0.32	12.25	0.60
	0.27	33.6± 0.40	12.42	0.71
	0.29	41.0±0,55	14.13	0.77

in addition to the fish carp have the highest values in the bio-concentration factor in the tissues of the ovary cells compared with recorded gold fish for both insecticides and this cumulative values in the tables (1,2,3,4) on the toxicity of the pesticide malathion and its ability to accumulate in the tissues of the ovaries more compared with the amount of pesticide Dichlorvos and the time period of 10 days recorded a positive correlation and different values depending on the degree of bio-accumulation of concentrations of the pesticide where he was the highest correlation coefficient The period of time with a focus was of (0.89) the time period of 10 days when the focus) (0.29) ppm with tissue ovaries fish carp normal exposed to the pesticide malathion and less correlation value was at this time period was of (0.60) during the exposure golden fish into focus (0.24) ppm of the pesticide Dichlorvos During long-term exposure reporting 15 days of exposure to sub lethal concentrations of subsurface recorded concentration of 0.08 ppm of the pesticide malathion more BCF cumulative value of (178.75%) during exposure ovaries compared to carp fish comparison with the same concentration of the pesticide of dichlorvos where he was ((12.25%) as in Fig 1.2

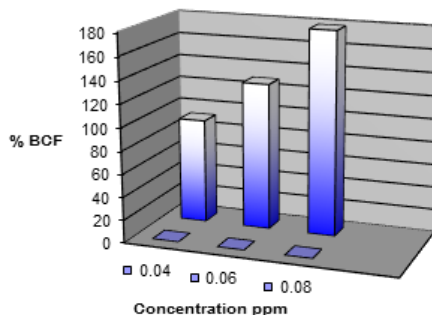


Fig -1-The relationship between concentration and % rate of bio-BCF during common carp fish exposed to concentrations of pesticides to period of 15 days-

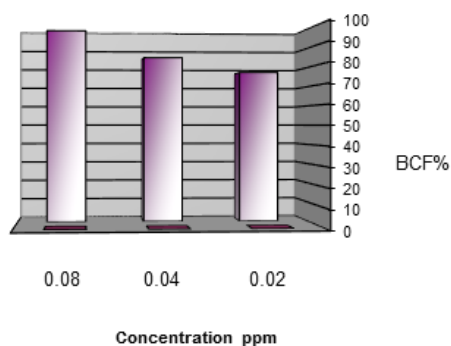


Fig-2-The relationship between concentration and % rate of bio-BCF during gold fish exposed to sub leathal concentrations of malathion pesticides to period of 15 days

and the golden fish when the focus was 0.08 ppm for pesticide malathion may log BCF coefficient of highest value was (98.75%) compared with the amount of pesticide accumulation Dichlorvos in the tissues of the ovaries, where was (76.5%), while pesticide Dichlorvos record lower values when the cumulative concentration was 0.04 ppm ((64.3%) during the exposure ovaries golden fish tissue compared with the same concentrations to fish carp ovaries focus normal prone to pesticide dichlorvos my parents where he was (77.5%). Through the current study confirmed that the period of time her impact to increase the rate of accumulation, especially low-lying to concentrations that accumulate slowly and by high was the highest values for the period 15 days was increased by (%) (178.75) and value for the period 10 days was (%) 14.13) The correlation coefficient values when the time period amounting to 15 days of exposure found the highest value of the coefficient of correlation between the bioaccumulation factor and the time period when the concentration (0.08) ppm was of (0.95) through exposure fish common carp to increase impact the malathion pesticide in the amount scored by focusing correlation coefficient (0.08) ppm reaching (0.88) has been the gold fish to pesticide malathion as in the following table as the low concentration log (0.04) ppm during exposure fish carp to pesticide dichlorvos closely of (0.76) value cored the same the low focus when the ovaries gold fish has been associated with of (0.72) . Fig (3,4)

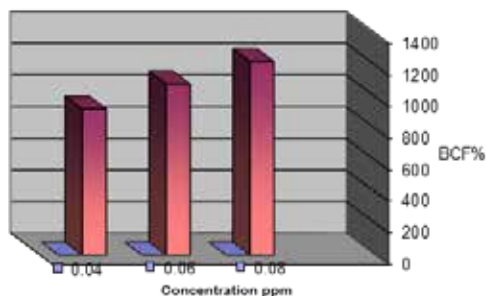


Fig-3-The relationship between concentration and % rate of bio-BCF during common carp exposed to sub lethal concentrations of dichlorovose pesticides to period of 15 days

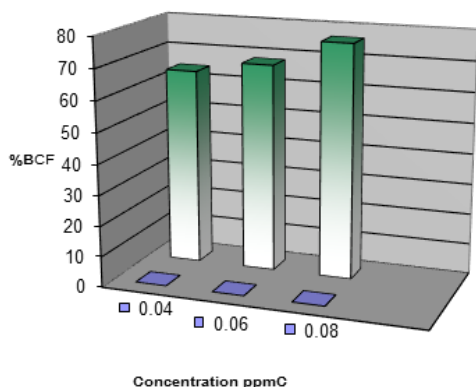


Fig-4-The relationship between concentration and % rate of bio-BCF during gold fish exposed to sub lethal concentrations of dichlorovose pesticides to period of 15 days

and compared the relationship between per fish correlation coefficient with both insecticides were tissue ovaries fish carp normal more closely in the bio-accumulation with the pesticide malathion pesticide dichlorvos , and this significance coloration moral link to both periods 10-15 days for the amount of bioaccumulation in the tissues of the ovaries of common carp fish and gold fish .

Discussion

The reason for the high accumulation in the aquatic environment due to the nature of chemical pesticides which distinction susceptibility to soluble in fat than in water so environmental damage through pesticides resulting from interaction with compounds vital is engaged causes in breach of the nature balance along with the other environmental risks to animals and plants alike as the accumulated chemical compounds in the aquatic use its bio-concentration factor convention BCF and is subject to the vital concentration of pesticides in the food chain of molecules relevant coefficient by metabolic transformation of materials and chemical several under different environmental factors and the factors influencing the bioaccumulation the characteristics depending on where stability chemical compound and the degree of solvent in fat and efficient partion , The other factor is the taking and uptaking rate into biological system (27,26,25,24) that the absorption of the chemical through food and water by the external membranes of living organisms is the most important of the Bioaccumulation process , but is especially important where these materials tend to be concentrated mainly in

the part of the lipid organisms may lead to the burden of physiological and this agreement on the ovaries, which are the parts of the reproductive is important where found by (28) in the study on the fat content of these fish estimate found reduced in lipid content during exposure carp fish ovaries and gold fish to concentrations of pesticides malathion and alnokoz ,This confirms that the accumulation pesticides reflected indirectly on the low fat content (29). Therefore the possibility of entering the chemical specification of the body is done through a set of processes lead to spread across membranes in the first place for the respiratory system as well as the size of the organism and increase the time exposure for this pesticides to connect to the body of the animal to concerted it more than in the outer perimeter of where it found , to approach on any chemical substance by the organism directly from the environment so that leads to this substance focuses on body organism which is higher than the environmental concentration (30) linked to absorption of surface space and mass organisms , which is the content of fatty and members of the ovaries best indicator of that in terms of accumulation leads to damage to the object the process of moving to the food chain, which pose a threat to human health and lower susceptibility Fish on ability decrease for releasing new eggs from fishes (31) The ovaries most important physiological part in the fish have high content fat is undoubtedly much cumulative content strong and high concentration coefficient so emphasize by many researchers ((32.33) that the increased accumulation depend on increase lipid who qualifies to chemical pollutant that accumulates in it and this lead to a decrease in fat content after the accumulation of the chemical in it (34)there for the measurement of BCF coefficient has a direct relationship with the lipid content of the ovaries of the fish because he accumulation hydrophilic chemicals often to rely on fatty molecules (35) and indicated (36) that pesticide dichlorovos has a wide range of accumulation in the tissues of fish because of its able in the solvent in the fat content of these tissues . This is consistent the agreement with the current study that the BCF rate in the accumulation of the pesticide in the ovaries of carps usual higher than the value in the ovaries of golden fish and this shows that the fat content in fish carp higher than in the gold fish (37). As many researchers on the impact of subsurface concentrations of lethal pesticide dichlorovos led pointed to inhibition acetylcholine addition to the effects concentrations on chronic mitochondrial energy and this corroboration the current study that the high values of BCF in sub-lethal concentrations fatal is higher than concentrations influenced with exposure time to allow the necessary opportunity for water molecules are linked of chemical pollutants accumulate with fatty molecules, where the difference in rates of BCF in the current study depends on the concentration and time in addition to the User exhibition to contaminated (38) has varied values Dynamic focus between concentration and another and from one pesticide and another and between fish and other thus the amount of BCF (% 18.5) in the ovaries of fish carp regular concentrations of the pesticide malathion for a period (10) day while in concentrations sublethal in 15-day for exposure period rate was (167.5), and also gold fish was average during the 10 days for period in the special dichlorovos concentrations (14.137%), while in concentrations sublethal for a period of 15 the rate (% 98.75) BCF for the pesticide malathion, noted [39] that the accumulation of pesticide dichlorovos where high rates of record when its accumulation in fish *Gymnarchus* also indicated the study carried out by [40] when studying the summation pesticide chlorpyrifos on carps normal that the levels of accumula-

tion depends on a series of concentrations and the length of time and this emphasize [41] it has been found that the increase in the accumulation of the pesticide chlorpyrifos is associated with increased time period In another study found [42] that the bio-concentration factor increases on average by increasing the period of exposure carps normal to pesticide DDT, Aldine also confirmed (43) to bio-concentration factor in the sublethal than in concentration during exposure *Oreochromis niloticus* Fish to herbicide diclofopmethyl. In another study by (44) on the accumulation of Dichlorovos in shrimp and fish he found to be a few accumulation rates compared to the rest of pesticides and chlorenophosphorous , This agreement with this study with the current study .The impact of accumulation dynamic increase rates lead to sabotage physiologic in the tissues of the ovary and eggs, and many researchers have studied the effects of accumulation on the ovaries Fish in turn represent a high greasy content which leads to the accumulation of concentrations of pesticides are high lead to synthetic changes in the tissues of fish and confirmed (45) to move pesticides through breathing oxygen dissolved in water causes damage cumulative in the ovary during his studies on the *hetero fossils* fish and through exposure *panna punctuates* fish to concentrations of sublethal pesticide malathion. this study examined the effects of these concentrations on the tissue ovary were seen degeneration in the eggs and adhesion to each other and increase the intercellular and connective tissues space (46,47) in another study noted (49,48) that pesticides are not to be toxic in the case and lead to the death of the animal but small amounts of concentrations underneath lethal probably lead to changes in behavior, weight loss, loss of ability to avoid predation and its inability to the shift in temperature changes and also confirmed, along with the accumulation in the tissues of animals to what caused this small concentrations when exposure to them for a long period of pesticides lose the ability to produce eggs and hatching and low resistance diseases as the concentrations of sublethal lead to reduced survival and decrease in the fish population .

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