NUVAN (dichlorvos) and Dimecron (Phosphamidon) induced toxicity on *Clarias batrachus*

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ABSTRACT:

Nuvan and Dimecron is an organophosphorus pesticides widely used in agriculture ,animal husbandry,horticulture,food storage and even to control fleas on domestic pets.In the salmon farming industry it is used to control sea lice. Both the pesticides attract an important enzymes in the nervous system of insects and human.People can get sick from breathing too much pesticides vapor in the air.The pesticides can cause more serious nervous system symptoms if exposure continuous. Diffrent methods employed for the determination of acute toxicity of cat fish *Clarias batrachus*.An average 96 hrs LC 50 was found to be 1.66+-0.36 mg/lwith 3.14+-0.025 mg/l as upper and 2.16+-0.24 mg/las lower 95% confidence limits for Nuvan and 5.46+-0.13mg/l with 4.55+-0.11mg/l as upper and 5.04+-14 as lower 95% confidence limit for Dimecron. Different methods used for determination of LC50 value gave almost same results.Behaviour of fishes during experiment also observed showed erratic and jurky movements secreting mucous and increased opercular movements were exhibit by fish.

KEY WORDS: Nuvan, *Clarias batrachus, Dimecron*

Nuvan Dimecro*n Clarias batrachus*

INTERODUCTION

Appreciation of fisheries and aquatic system has been accompanied by increasing concern about the effects of growing human population s and human activity an aquatic life and water quality.Pesticide enter in aquatic ecosystem causes undesirable loss in the form of pathology or mortality of aquatic animals which cause decline of aquatic micro organism,fish and other aquatic species like fishe sprawns,muscles etcThese aquatic animals are main source of natural food chains.Toxicity of the pesticide refers to how poisonous it is.Some pesticides are extremely toxic, whereas others are relatively nontoxic.Exposure refers to the length of time the animals is in contact with the pesticides.A brief exposure to some chemicals may have little effect on fish,where as longer e posture may cause harm.Fish and aquatic animals are exposed to pesticides through dermally, direct absorption through the skin by swimming in pesticide contaminated water. Direct uptake of pesticides through the gills during respiration.Orally by drinking pesticides contaminated water or feeding on pesticides contaminated prey. Dichlorvos an organphosphorus is predominant pesticide used in domestic insect control in developing countries.Acute and prolonged exposure may lead to death ,genotoxic neurological, reproductive, carcinogenic, immunological,hepatic,renal respiratory metabolic dermal and other systemic effects.Dichlorvos has been used in fish farming to eradicate crustacean ectoperasites (Varo *et.al*.2003).It has been in use since the early 1960s and has been the subject of many toxicity studies(Durkin and Follansbee,2004).Dimecron is widely used as a crop proteins in agriculture and as an ectoperasites in poultry and livestock.The abuses of this chemical causes contamination of water ways affecting aquatic fauna(Gopal and Dwivedy1978) The recent trend in pesticide research the use of sub lethal concentrations that do not kill the fish but may impair growth and reproduction (Rand 1985).Therefore present investigation was carried out to the study of acute effect of Dimecron. Acute toxicity tests are especially useful in estimating the effects of toxicants on organisms in short period of time.(Hagen 1959).The toxicity testing started with the work of Doudoroff *et.al(*1951) using fish as experimental model and later several studies were made in detail on this aspect.(Murthy 1986 and Murthy and Kondaiah 1991). Toxic effect of Nuvan and Dimecron

pesticide studied by different workers on various fishes.(Thomas and Murthy 1976 Verma *et.al.*1979 ,1981,Chaudhary *et.al.*1984,Benarji and Rajendranath 1988,1990 1992, Rajendranath and Benarji 1991,Ghosh and Chatterji 1989.Ekpo and Okorie 2004, Bhat and Bhat 2016.

MATERIAL AND METHOD

The cat fish *Clarias batrachus* similar size and weight were selected from local fish market.After giving a bath in 0.1% potassium permanganate solution,the fish were acclimatized to the laboratory condition for a week under normal temperature and photoperiod. For the determination of mortality data with Nuvan and Dimecron a series of range findings tests and definitive tests were performed.The 96 hrs LC50 value were estimated by both the interpolation and computation methods.The methods attempted for the purpose were direct interpolation log interpolation log probit interpolatiomn ,probit unweighted regression and Dragstedt and Behrens method the physico- chemical quality of test medium was monitored according to standards method of APHA *et.al*.1985.

RESULTS

The mortality data obtained for the fish from the definitive tests with of Nuvan and Dimecron are shown in table 1. The physico- chemical characteristics of test medium have been present in Table 2. While the 96 hrs LC 50 values determined by different methods given in Table 3.

Table1. Physico- Chemical characteristics of test water used for bioassay experiments

S.No.	Parameters.	Range.	Mean+- SE
1.	Conductivity.	520-560.	568+-2.0
2.	Temperature.	20-22.	20+- 04
3.	Dissolved Oxygen.	8.9- 8.22.	8.5+-0.1
4.	Alkalinity mg/l	170-175	171+-0.4
5.	Hardness mg/l	100-170	107+- 3.1
6.	PH.	7.05-7.08.	7.06+-6.2

Table 2. Mortality data freshwater cat fish *Clarias batrachus* during 96 hrs definitive test due to Nuvan and Dimecron

S.No.	No.of. Fishes	Concentration. of Nuvan.	96 hrs. Mortality.	%. Mortality.	Contraction of Dimecron	96 hrs. Mortality.	% Mortality
1.	10	2.38.	0	0.	3.03.	0.	0
2.	10.	2.49.	2.	20.	4.85.	3.	30
3.	10.	2.80.	4	40.	6.60.	6.	60
4.	10.	2.50.	7.	70.	8.50.	7.	70
5.	10.	3.0	9.	90.	10.30.	9.	90
6.	10.	3.30	10.	100.	12.40.	10.	100

Table 3. Comparison of 96 hrs LC 50 value of Nuvan and Dimecron to freshwater cat fish *Clarias batrachus*

Methods.	NUVAN			DIMECRON			
	96 hrs LC50	95% confidence. Limits.		96 hrs LC50	95% confidence Limits		
		Upper Limit.	Lower Limit.		Upper. Limit.	Lower Limit	
1.Direct interpolation. Method	1.76.	-	-	5.02.	-	-	
2.Log interpolation. Method	1.75.	-	-	4.88.	-	-	
3.Log probit interpolation Method.	1.69.	-	-	4.25.	-	-	
4.Unweighed regression. Method.	1.57	2.98.	2.15	4.62.	6.02.	5.22	
5.Dragster Behrens Method	1.69	2.70.	2.67.	4.37.	5.58	5.15	
6.Probit Method.	1.51.	3.76.	1.65.	4.12.	5.61.	4.68	
MEAN.	1.6616	3.1466.	2.1566.	4.5200.	5.0736.	5.0166	5.0166
SD.	0.0917.	0.4485.	0.4164.	0.3270	0.2007.	0.2377	
SE.	0.0409.	0.2592.	0.2407.	0.1360.	0.1180.	0.1410	

The average LC50 value of all six metods was applied for acute toxicity was considered. For Nuvan LC50 to *Clarias batrachus is 1..66+-0.36* mg/l upper confidence limit 3.14+-0.25 and lower confidence limit was 2.1566 mg/l.Dimecron LC50 value was 4.5200 upper and lower confidence limit was 5.0736 ,5.0166 mg/l..No much variation in these values determined by different methods. Thus any of the methods employed for the present study,can we used for LC50 for determination but each one has its own advantages and disadvantage s.It is also concluded that Nuvan is more toxic than Dimecron.During acute toxicity test abnormal behavior also observed on *Clarias batrachus* jerky and erratic movent followed by dashing of the cat fish to aquarium walls.The cat fish also tried to jumped out of water.The swimming effect some time also became restricted and finally the fish lost equilibrium.The secretion of mucous was evident soon after the specimens introduced into the pesticide solution. The opercular movements and surfacing behaviour were also increased. Before the death due to pesticides the body movement and opercular movements were stopped.

DISCUSSION

The evaluation of nature and degree of harmful effects produce by toxic substances to the aquatic organism in evaluated by toxicity tests The test also provide other useful information by which not only an organism but the aquatic ecosystem as a whole can be protected (Annon1975).The 96 hrs LC50 have generally been found to be satisfactory for the measurement of acute toxicity (Parrish1985).The parametric methods of toxicity determination are based on transferring the concentration levels so that the transformed concentration mortality relationship has a known functional for they are applicable to bioassay experiments as well as acute toxicity testing (Parrish1985).The organophosphorus pesticides Nuvan(Dichlorvos) and Dime rim (Phosphamidon) are two commonly used pesticides and thus greater information is needed with regard to their toxicity to different fishes and other organisms.The LC50 value of different fishes were recorded by different workers given in table 4.

Table 4. 96 hrs LC50 value of nuvan and Dimecron to different fishes as reported by various workers

Pesticide	fish.	96hrs LC50	References
Nuvan.	*Abramis brama.*	16.66 mg/l.	Chuiko and Slynko (1995)
Nuvan.	*Silurus glanis.*	16.67 mg/l.	Ural and Koprucu. (2006)
Nuvan.	*Ctenopharyn godon*	6.5 mg/l.	Tilak and Swarna (2009)
Nuvan.	*Cirrhinus mrigala.*	20.72mg/l.	Shrivastava et.al.(2012)
Nuvan.	*Oreochromis mossambicus*.	2.90 mg/l.	Nimai *et.al.(*2016)
Dimecron.	*Liza parsia*.	0.42 mg/l.	Mohapatra and Noble(1992)
Dimecron.	*Heteropneustes fossilis*	4.8mg/l.	Thomas and Murthy (1976)
Dimecron.	*Labio rohita.*	1.75ppm.	MD.Noir Alan 2010

The difference in 96 hrs LC50 of the same toxicant to different fishes may be attributed to individuals traits including those of behaviour and additional structures such asaccessary respiratory organs.The individual characteristics such as size and weight ,sex biological behaviour are important determinants to variation in LC50 values.The loss of equilibrium before the death have also been observed by others workers (Verma *et. al.* 1979,1981 Murthy 1986,Murthy and Murthy 198

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