

Research Article

**Studies On the Toxicity Effect of Mercuric Chloride on The Ovary (Gonads) In Gambusia Affinis**

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**Abstract**

Mercury is a naturally occurring metal with a long history of human uses. It has been found in Egyptian tombs dating back to 1500B.C. more recently, scientists have said that the substance can behave as a neurotoxin in certain form and harm unborn children if ingested by pregnant women. Mercury and its compounds have found usage in a very wide range of activities through the ages. In the present study the toxic effects of heavy metals on fish in aquatic ecosystem, heavy metals are considered as the most important pollutants. Heavy metal such mercury are of the most important pollutant which effect aquatic environment and fish. Lethal and sub lethal doses are prepared in different ppm. or concentration of mercury chloride and their toxic effects in gonads.

**Keywords-** Gambusia, ovary, Mercury

**INTRODUCTION**

The work done on the fishes related to their reproductive biology is considered as one of the pioneering works related to fishes. Geiser, S.W.(1921) has critically described the seasonal changes in ovaries of *Gambusia affinis*. In 1931, Craig Bennelt, M.A. worked on the reproductive cycle of the three spined stickle back. Mercury forms few organic compound and it was believed that the mercury although poisonous would not get into food chain but microbial action converted inorganic mercury into Methyl Mercury. Fish absorb methyl mercury from water 100 times faster than they absorb including the amount and route of intake, the duration of exposure, and the species affected. Reproduction is an important biological trait to produce new individuals organism and is fundamental for the life of an individual as well as the survival and development of the species (ROYCHOUDHURY *et.al*2014). The reproductive system controls the morphological development and physiological differences between male and female as well as influences the behavior of the organism.(Lukac N.*etal* 2009) Industrial development and agricultural activities have resulted in varying degrees of environmental pollution and recognition of toxic elements in the food chain(Satarug S. *et .al*).Many elements have been described as highly toxic, while others are essential to living systems(Anyanwu B.O.*et. al*.2020).Unpolluted water contains trace amounts which do not exceed than 0.1microgram/litre of mercury (Deviln *et al* 2006).The main source of mercury in environment is the fungicides, especially in the organic fungicides as mercurial materials which are organic compounds of mercury. The chronic data about mercury toxicity indicates that the organic form of mercury, methylmercury is the most chronically toxic of the mercury compounds(USEPA 1986,Deng *et al* 2015),and it is estimated that 70 to 100% of the mercury in fish is present as methylmercury (Amlund *et al* 2007,Nostbakken *et al* 1999).The LC<sub>50</sub> of methylmercury for fish is reported to be in the range of 0.0004-0.125mg/L, depending on the species,which is far lower than the LC<sub>50</sub> of inorganic mercury(WHO 1989)the adverse effect of methylmercury where first recognized in the early 1970s following the pollution of Minimata Bay, japan (Tsubaki *et al* 1977).

**MATERIAL & METHODS**

For The present study the fresh water fish *Gambusia affinis* female was selected. The sexual dimorphism present in the females and recognizable by swollen belly. The collection of fishes was made for one complete reproductive cycle. Fresh fishes were collected. Prepared the lethal & sub-lethal doses in different ppt. or concentration of mercury chloride and gonad were dissect out and fixed in aqueous bouins fluid for the study of

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toxic. Effects in gonads the paraffin block of the gonads were prepared and sections of gonads were obtained at 6 micron thickness and stained in heidennain's (1870) azan method. We measure their total body weight & gonads weight by maintain temperature and pH.

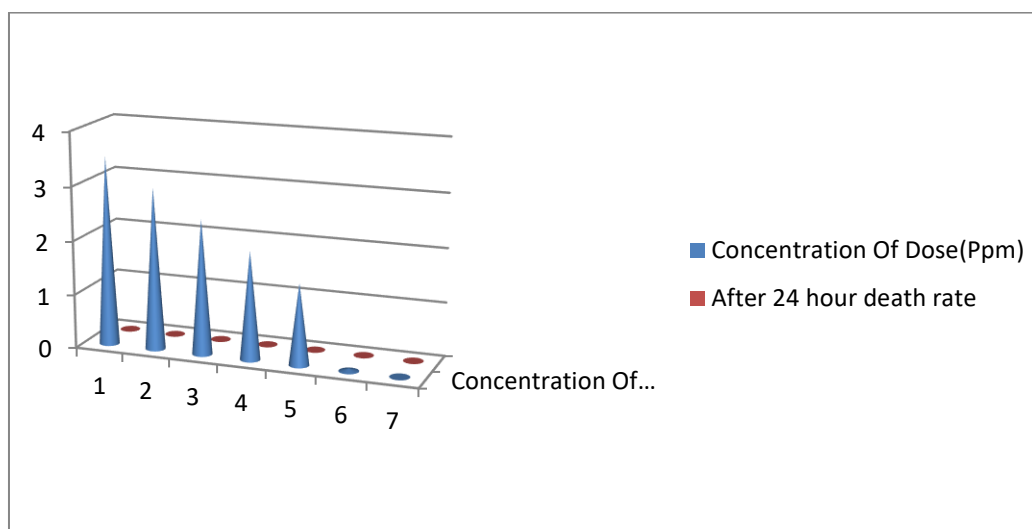
### OBSERVATION

The stained slides were examined for histological details. There observations have been done in between a normal and controlled fish.

In the histological slides on ovary the following change have been observed in polluted mercury chloride in gambusia . Shrinkage in the size of ovary the treated ovary shows slower rate of oogenesis, lesser number of oocytes & ovarian follicles, pyknosis & presence of atretic follicles the showing deformities in oocytes, damage the developing stage of oocytes, Hyposecretion of ovarian hormones.

Table Shown in the exposure in different doses

S.No.	Concentration Of Dose(Ppm)	After 24 hour death rate
1	3.5	Sudden death
2	3.00	Half an hour
3	2.5	100% death (1 hr)
4	2.0	100% death (3 hrs)
5	1.5	100% death (3.5 hrs)
6	0.05	LC <sub>50</sub>
7	0.002	Survive Long Time(24 Hour)



### RESULT AND DISCUSSION

In present investigation on gambusia affinis treated in different doses 3.5 ppm caused sudden death. In dose of 3.0ppm resulted half hour survival. Then we treated in different reducing doses 2.5,2.0,1.5,1.0,0.05 ppm. Finally in dose of 0.002ppm the fish survived for long time we came to conclusion that the G.affinis survives for long time in sub-lethal dose 0.002ppm. The normal condition treated fish exhibit almost all the developing stage gonad where as fishes treated for long time showing deformities in ovary, slower rate of oogenesis, lesser number of different stage of oocytes, all these changes lead to the decreased rate of metabolism of the body which might probably be

due to the toxic effect of mercuric chloride. Therefore it can be said that gonads are severely effected by the pollutants.

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