Effect of Industrial Effluents on the Ovary of Guppy, *Poecilia Reticulata*

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Abstract*—Poecilia Reticulata* a small hardy fish were exposed to industrial effluent from tanning industry for 96 hrs. Only acute toxicity studies were carried out. Chromium VI is present in the tannery effluent which is carcinogenic. Results included the Liquification of cytoplasm, atresia, degeneration of ovarian wall.

Keywords*—Poecilia Reticulata*, industrial effluent, toxicity, atresia, oocytes.

I. Introduction

POLLUTION is not new to anyone as it started far behind when our ancestors discovered the fire for the first time. The smoke evolved from the burning of woods used for preparation of food was the first ever start of pollution on earth. As the brain of man evolved and modified rapidly so his ideas of luxury changed rapidly creating pollution.

Since then humans are regularly researching for new luxurious needs and this needs has brought at the pollution to our doorstep. Not a single biosphere is untouched by pollution, and it increasing day by day.

Cloth washing, animal washing, bathing in open rivers is causing water pollution from a very long time but the industrialization and urbanization has increased pollution at alarming level. Industries and modern techniques introduced heavy metals, carcinogens and pesticides in the water body in turn affecting the fauna of the water body, the fishes mainly.

II. Material And Methods

Guppy fish was selected for the present study because of its easy availability; it is a hardy fish acclimatizes very easily. Fishes were collected from the river Godavari which gets its way within the city. Six batches of ten fishes were prepared and allowed to acclimatize to the laboratory econditions for 15 days. After 15 days five batches were placed in five separate aquariums and exposed to the industrial effluent brought from the tanning or leather industry from Paithan. The sixth batch of fishes was kept as control to compare with the experimental fishes. Fishes were given different doses of the effluent (Table No. 1).

After 96 hrs exposure some fishes died while the other remaining was dissected to get the ovary of the fish. Along with this the control fishes were also dissected for the ovary. Tissues were fixed in Bouin's fluid for 24 hrs and blocks were prepared in paraffin wax. A routine histological technique was applied for the block preparation and sections were cut of 5-7µ thickness. The sections were stained in Harris Alum Haematoxylin and Eosin. The stained slides of control and experimental were observed carefully and compared.

III. Results And Discussion

Studies on reproduction, survival and development during early stages play significant role in the study of water pollution [1] which adversely affect Histopathology is an important tool in studying aquatic pollution and many workers have employed this technique [2][3][4]. Heavy metals generally produces abnormalities in the fish tissues [5].

Ovary of the fish treated with tannery effluent showed regressive changes such as degeneration of the ovarian wall (Plate V). Yolk of the matured ova showed Liquification (Plate VII). Also hypertrophy of granulosa cells was observed which invaded the follicles and similar observations were made by Chan[6] when he exposed O. medakato mercury containing effluent.

In some cases almost entire yolk found to be degenerated and reached to the stage of atresia (Plate I). Premeiotic stages and immature ova were also found damaged, sometimes complete destruction (PlateVII). The germinal epithelium found affected to the extent of its total destruction (Plate II). Similar results were recorded earlier [7] in fish Garramullya on exposure to different industrial effluents.

The mature stages found completely destroyed while earlier stages showed extensive atrophic condition (Plate IV) and similar results were put forward by [8] On this line, many workers have expressed their views that, even at lower concentration of any pollutant it produces alterations in reproductive behavior and induces destruction in the developing oocytes [9].

Abnormalities were also noted in ovarian recurrence in guppy after 96 hrs treatment of effluent (Table No.1) and similar results were noted [10] in Channapunctatuswhen exposed to mercuric compound.

Cytoplasmic Liquification took place in growing oocytes on

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exposure of P. *Reticulata* to different concentrations of tannery effluent and similar observations were also made [11] when exposed Salmoclarkitoeldrin where atresia of oocytes apparently found significant.

Plate VIII shows the developing oocyte from control fish in which nuclear membrane, nucleus and nucleolus can be clearly seen, but when compared to effluent exposed fish in Plate VII the nuclear membrane and nucleus is completely degenerated and plus the nucleolus.

TABLE I
PERCENTAGE OF EFFLUENT ADDED TO WATER AND THE RATE OF SURVIVAL AND MORTALITY.

No. of fishes	Effluent in ml	Fishes Survived	Mortality of fishes	Mortality Percentage
10	7	10	Nil	NIL
10	10	08	02	20
10	15	07	03	30
10	20	06	04	40
10	25	05	05	50%

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