SUMMARY

The River Nile and its branches are exposed to many kinds of chemical and biological pollutants as a result of increasing industrial and other urbanization activities where effluents are discharged directly into the water without prior treatment.

This study aimed to clarify the effect of environmental pollution (Industrial and Agricultural pollutions) on some genetic processes, DNA fragmentation and liver proteinogram pattern of *Tilapia zillii*.

The study included three groups:

1- **The first group:** Ten fishes were collected a live from unpolluted locality which were considered as control group.
2- **The second group:** Thirty fishes were collected a live from three different distances at 0 m (as zone 1), 300 m (as zone 2) and 1000 m (as zone 3) downstream to the mouth of agricultural discharge.
3- **The third group:** Thirty fishes were collected a live at three different distances at 0 m (as zone 1), 300 m (as zone 2) and 1000 m (as zone 3) downstream to the industrial discharge outlet.

From each group half of fishes were used for chromosomal preparation and the other half was used for electrophoretic studies.

Water analysis was done to water samples from seven localities to determine the following metals, iron, lead, cadmium, copper, zinc, mercury and nickel.

Chromosomal aberration and liver electrophoresis were used as an index to evaluate the relationship between the genetic processes and the effect of water pollution.

The following results were obtained:

1- The overall mean of iron, lead, cadmium, zinc, copper, nickel and mercury concentration (ppm) in the unpolluted water were 0.24, 0.015, 0.00, 0.00, 0.04, 0.00, 0.02 respectively. The all metals were within the acceptable permissible limit of WHO.

2- In the Agricultural polluted water, 100 % of water samples exceeding the permissible limit for iron, lead, cadmium, nickel and mercury at all distances 10, 300 m and 1000 m. while zinc was within the permissible limit and copper was not detected.

3- In the industrial polluted water, 100 % of water samples exceeding the permissible limit of WHO for iron, lead, cadmium, nickel and mercury at all distances (0, 300m and 1000 m). Whereas zinc and copper were within the permissible limit.

4- Both industrial and agricultural water pollutions caused an increase in the frequency of chromosomal aberrations but the frequency in industrial pollution was higher than in agricultural pollution.

5- The types of aberrations observed in this study were structural and numerical aberrations. The structural chromosomal aberration were centromeric attenuation, break, deletion, gap, fragmentation, end to end association, ring and stickiness while the numerical chromosomal aberration were monosomy and polyploidy.

6- The predominant types of aberrations by exposure to Agricultural pollution were deletion gap and end to end association.

7- The predominant types of aberrations by exposure to industrial pollution were contromeric attenuation break and ring.

8- Both industrial and agricultural water pollutions caused a significant increase in the frequency of fragmentation, polypoly, stickness and monosomy.

9- Both Agricultural and industrial water pollutions caused a significant increase in the percentage of DNA fragmentation but the mean value of % DNA fragmentation in industrial pollution was higher than in agricultural pollution.

10- The number of protein bands in liver of fishes which capture from agricultural polluted water was decreased at all distance comparing to the control group. Protein fraction of 27 kDa was observed in control group and at all distance 0, 300 m and 1000 m, 38 kDa and 18 kDa band disappeared in the control group and appeared at zone (1) and at zone (2) then disappeared at zone (3).

11- The number of protein bands in liver of fishes which capture from industrial polluted water also decreased at all distance comparing to the control group. This type of pollution was characterized by expressing the highly molecular weight (70 to 121 kDa). The band of 57 kDa and 25 kDa appeared in control and zone (1) but down regulated in all polluted group. 27 kDa and 21 kDa was observed in all polluted groups and control, 3 kDa band appeared in zone (1) and zone (2) but vanished at zone (3), 19 kDa appeared in the control and zone (2) only. On the other hand, the 15 kDa protein appeared in control group and zone (3) only. In contrast the fraction of 16 kDa appeared in zone (1) and zone (2) and disappeared in the control group and zone (3).