INTRODUCTION

In Egypt, tilapiane fish represented one of the most common species in the river Nile and numerous lakes. Tilapiane species are extremely recommended as one of successful culturing fish as they primarily exhibit excellent growth rates even on low protein diets. They also tolerate wider ranges of environmental conditions. Moreover, they are highly and widely acceptable as food because of their high delicacy by a huge number of people throughout the world. Consequently special interest has been given to study the physiological, genetical and environmental conditions related to improve Tilapia production ***(Pullin and Meconnell, 1982)***.

Pollution of rivers and streams with chemical contaminants has become one of the most crucial environmental problems within the 20^{th} century. Water borne chemical pollution entering rivers and streams cause tremendous amounts of destruction.

The impact of massive chemical pollution on the biochemical quality of the aquatic environment has greatly stimulated research on the biological effects of potentially dangerous substances, commonly discharged as waste from industrial complexes or agricultural activities bodies. The variety of pollutants, particularly heavy metals which are known to be toxic to human beings as well as to aquatic organisms, are enormous. Bioaccumulation of heavy metals in fish may critically influence both growth rate and quality of fish **(Hodson *et al*., 1984; Haggag *et al*., 1999 and Zaghloul, 2001)**.

Exposure to heavy metals even in low concentrations affect survival of fish and other aquatic organisms. Metals have been implicated in anemia **(Dieter and Finely, 1979)**, changes in physiological functions that reduce the ability to survive **(Post, 1983)**.

Heavy metals, contrary to most pollutants, are not biodegradable and undergo global ecobiological cycling in which natural waters are then main pathways **(Nurberg, 1984)**. Thus, heavy metals have a great ecological significance due to their accumulative toxic behavior **(Purves, 1985)**.

Several studies have linked increases in cytogenetic abnormalities in fish and shellfish to polluted environments. This was done largely through laboratory bioassays of polluted water sample in nature **(Alink *et al*., 1980; Hose *et al*., 1987 and Metcalf, 1988)**. Earlier reports linked environmental conditions with increased mutation in developing germ cells of a water fern growing in industrially polluted rivers **(Klekowski, 1978)**.

The action of chemical mutagens in inducing chromosome damage stems not only from the possibility that the presence of chemical mutagen in the environment could result in an increased incidence of cancer, but also from the fact that exposure to these agents may result in an increased incidence of transmitted genetic disease **(Evans, 1983)**. Also, the chromosomal aberrations can be used as an indicator of DNA damage. Irrespective of the nature of the primary lesions responsible for aberration formation are DNA-strand breaks **(Natarajan and Obe, 1978)**.

At the end of 1950's a new technique was elaborated for the analysis of protein forms of blood serum, muscle, liver and blood enzymes, etc. by electrophoresis in starch and acrylamide gels **(Hunter & Markert, 1957 and Hubby & Lewontin, 1966)**. The use of electrophoreses has proved to be genetically useful for estimating genetic variations, mutations between species and between populations and for identifying stocks of the wild and cultivated aquatic species even at any stage of life **(Chen & Tsuyuki, 1970; Heines *et al*., 1971; Avtalion *et al*., 1975a,b; Moav *et al*., 1976 and Van der Bank *et al*., 1989)**.

The aim of the current study is, firstly, throwing head lights over the problem of water pollution with heavy metals due to industrial and agricultural drainages. Secondly, clarify the effect of polluted water on genetic processes of Tilapia (*Tilapia Zilli*) by estimating chromosomal aberration test in somatic cells. Lastly, this work clarifies the biochemical effect of industrial and agricultural pollution on the proteinogram patterns of the liver of the studied *Tilapia zilli*.