INTRODUCTION

River basins generally constitute areas with a high population density owing to favorable living conditions such as the availability of fertile lands, water for irrigation, industrial or drinking purposes, and efficient means of transportation. Rivers play a major role in assimilating or carrying off industrial and municipal wastewater, manure discharges and runoff from agricultural fields, roadways and streets, which are responsible for river pollution **(Stroomberg *et al.*, 1995).**

The fresh water form only about 1% of the total water available on earth **(Abdelrassoul, 1998),** this makes it imperative that water to be protected from pollution and kept in very good conditions.

The River Nile is considered as one of the longest rivers in the world. Its length is approximately 6740 km. It flows from great Lakes south Oghanda and Ethiopia plateau to Egypt. In the north of Cairo by about 25 Km at Delta Barrage, the River Nile is divided into two branches, namely, Demietta and Rosetta.

The River Nile and its two branches have a dominating influence on the country's economic, cultural, public health, socioeconomic and political aspects. It constitutes over ninety percent of fresh water resources of Egypt. It is the main source of drinking water, beside its use for irrigation, navigation, industry and fish production.

The Nile water and its two branches are subjected to different sources of pollution, which affect its physical, chemical and biological characteristics. These sources include agricultural, industrial and domestic wastes. Pollution

from these sources has been increased significantly due to the increase of population (**Abdel Bary *et al.*, 1999).**

The quantities and characters of wastewater from agricultural lands are highly variable. The most important pollutants found in runoff from agricultural areas are sediments, animal wastes, plant nutrients, crop residues, inorganic salts, minerals, chemical fertilizers and pesticides (**Fishbein, 1974).**

Elsokkary (1992) reported that about 3570 million m^3 of agricultural drainage water is annually discharged into the River Nile between Aswan and Cairo and 14 billion m^3 of agricultural runoff flow annually into the Nile Delta Region.

In order to increase agricultural production, more and more fertilizers and chemicals are being used on the land, some of which leach into the Nile water and its two branches **(Biswas, 1994).**

Industrial wastewater is considered as the most important pollutant for the environment especially for drinking water. However, rapid industrialization without adequate environmental safeguards contributes to the River water contamination with industrial chemicals, trace elements and organic compounds **(Biswas, 1994).**

Typical domestic wastewater is composed of 99.9% water and 0.1% solids most of which are organic compounds including proteins, fats, carbohydrates, soap and detergents in a suspended, colloidal or dissolved forms **(El-Gohary, 1995).**

The non-point sources of pollution are multiple. They include rainwater washing over farmlands, urban depositing agrochemicals, construction materials (cement), and septic effluent from rural areas. Accidental spillage of oils and chemicals may occur in case of chemical tankers. These non-point sources are uncontrolled sources of pollution **(Saleh, 1993).** In addition, bottom sediment is considered one of the most important non-point sources of pollution. Both point and non-point pollution sources contribute to deterioration of the River water quality.

All domestic, industrial and agricultural wastes affect in some way the normal life of the River Nile and its two branches. When the influence is sufficient to render the water unacceptable for its best usage, it is said to be polluted. However, the common types of pollutants include oxygen-consuming matter, inorganic solids, poisons, nontoxic salts and unaesthetic wastes **(Mark, 1986).** Moreover, pollution of streams by organic matter is almost as serious as pollution by pathogenic organisms because of their effect on human health.

As a result of shortage in water, reuse of wastewater in agriculture has been practiced in some towns among them El-Kalubia Governorate. Wastewater, mostly without pretreatment, has been used in some locations such as El-Rahawy area for the production of grains and vegetables for human and cattle consumption. This wastewater causes soil deterioration in some areas and transports high amounts of potential toxic substances.

THE AIM OF WORK

Hereby, the present study was carried out to achieve two main objectives:-

1- Assess the water quality of the Rosetta branch (one of the River Nile branches) in Control (taken from El-kanater El-khyria) and those of sector I and sector II (taken from downstream Sabal Drainage and industrial region in Kafer El-zyat at Benofer area respectively).

2- Evaluate the impact of the water quality of the Rosetta branch on hemoglobin content and respiratory functions of the blood (blood gases, acid–base status, oxygen equilibrium curve and P_{50}) in the three locations.