



Abstract

QÀRZ RI H[FHVVLVYH TXDQWLWLHV RI RUJDQLF PDWWHU LQWR QDWXUDO ZDWHU IRUP RI ZDWHU SROOXWLRQ 3K\VLFDQ DQG FKHPLFDQ FKDUDFWHULVWLFV RI WK VWXG\ 6HGLPHQW VDP SOHV ZHUH FROOHFWHG IURP IRXU ORFDWLRQV 6RNRUL

Keywords: River Sokori; Organic matter; Sediment; Water pollution; Monitoring

Introduction

Rivers are very important part of human natural heritage. They have been widely utilized by mankind since the beginning of time such that there are few, if any, still in good quality or "natural" condition. One major result of human activities on rivers is that of discharge of chemicals, containing a lot of heavy metals, into the waters. These activities include domestic activities, agricultural production, mining, industrial production, power generation, and forestry practices which lead to deterioration in water quality and quantity that impact not only the aquatic ecosystem, but also the availability of safe water for human consumption [1].

Urbanization, Agriculture Activities, Petroleum Activities, Effluent from Abattoirs and Other Food Processing Outlet and household waste mainly due to overpopulation, local soil erosion, inadequate water use management and intensive deforestation, increase in industrial activities and a greater exploitation of natural resources [7]. These changes have brought about a huge increase both in the quantity of discharge and the range of pollutants that reaches the aquatic environment and in turn have led to various deleterious effects on aquatic resources and ecosystem health [8,9]. Aquatic organisms, including fish, accumulate pollutants directly from contaminated water and indirectly via the food chain. Hence this study aimed at assessing the physical and chemical parameters of the water and the effects of refuse on the water body, fish and water sediment in the Sokori River in Abeokuta, Ogun State.

One prevailing issue in the scientific community prominent in workshops, seminars, conferences is water quality. It is a serious global issue in developing countries and countries whose economies are under transition. Water quality refers to the physical, chemical and biological characteristics of water [2] and the quality of a river at any time is a function of the lithology of the basin, atmospheric inputs, climatic conditions and anthropogenic inputs [3]. The river system, comprising both the main course and the tributaries, is a major source of fresh water supply. It serves as a one-way carrier of significant load of matter in dissolved and particulate form from both natural and anthropogenic sources. On the other hand, rivers play a major role in assimilating or transporting municipal and industrial wastewater and runoff from agricultural, mining and industrial activities. These wastewater discharges constitutes a constant source of pollution [4] whereas surface runoff is a seasonal phenomenon, largely affected by climate within the basin [5]. Seasonal variations in precipitation, surface runoff, interflow, groundwater flow and pumped in and out flows have a strong effect on river discharge and, subsequently, on the concentration of pollutants in river water [6]. In many regions of the world, especially, those with high population density, river water pollution is becoming increasingly evident.

Materials and Methods

Study area

The study area (Abeokuta) is located in the sub-humid tropical region of Southwestern Nigeria its geographical coordinates are 7°9' 0 s North and 3° 21' 0 s East). The town is about 81 km south-west of Ibadan and 106 km North of Lagos and at an altitude of about 157 m above sea level, the landscape has undulating characteristics due to the formation of granite rocks. The city enjoys a tropical climate with distinct wet and dry seasons with dry period of about 130 days. The mean annual rainfall and temperature are about 1,270 mm and 28°C

Pollution of aquatic environment in Nigeria occurs from different sources with its consequence effects on the aquatic ecosystem. Studies reveals that the major causes of pollution are Industrialization and

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Received April 17, 2017; Accepted April 27, 2017; Published May 04, 2017

Citation: Abdulraheem I, Ojelade OC, Adeosun FI (2017) The Effect of Refuse on the Water Quality of the Sokori River in Abeokuta, Ogun State. Fisheries Livestock Production 5: 233 doi: 10.15388/FLP.5.233

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respectively while the estimated mean annual potential evaporation is 1,100 mm. The city is underlain by crystalline pre-Cambrian Basement complex of igneous and metamorphic origin noted for their rather poor groundwater bearing properties. The city is drained mainly by River Ogun which passes through and divides the city into two, and the drainage pattern is dendritic. The study area which covers a geographical area of 1,256 square kilometers has a population of about 605, 461 and comprise of Abeokuta South, Abeokuta North, parts of Odeda and Obafemi-Owode Local Governments of Ogun State of Nigeria. The main occupation of the indigenes is farming, fishing, local textile making (Adire) trading, and pottery.

The study was conducted on river Sokori in Abeokuta, Ogun State, Nigeria. The River Sokori discharges into the Lagos Lagoon. River Sokori is a perennial river which has a coordinate of 3°28'E and 8°41'N at its source in River Ogun and 3°35'E and 6°35'N in the point where it empties into the Lagos Lagoon. River Sokori has an elevation of about 76 m.

Samples and physical and chemical parameters were collected and measured at four different locations along the River Sokori (Sokori, Isale-igbehin, Kuto and Ijaye).

#### Samples collection

River sediment collection: Sediments sample were directly collected from the four locations (Sokori, Isale-igbehin, Kuto and Ijaye) along the Sokori River. The samples were collected in a nylon cellophane bag and kept air tight condition to avoid further exposure to air. Sixteen [5] sediment samples were collected at the different locations.

After collection, some portions of sediment samples were dried in a vacuum oven at 105°C until constant weight. The sediments were sieved using a 2 mm sieve, lightly ground in an agate mortar for homogenization and prepared for analysis of heavy metal test.

Physical and chemical parameters determination: following physical and chemical parameters (temperature, dissolved oxygen, pH, electrical conductivity and total dissolved solid) were taken and recorded at the different locations using a multipurpose water parameters test kit. The transparency of the River at the different locations was determined with the use of Secchi Disc which is an instrument for determining the transparency of any water body. The depth of the River was determined using a straight iron rod which was lowered into the River to reach the bottom, the point at which water cut the rod was marked and measured with the use of measuring tape and recorded in situ. Manufacturers' instruction for the water test kits was strictly adhered to Data Analysis/Laboratory Procedure.

The samples after storage were digested for the extraction of heavy metals (Zn, Cr, Cd, Cu, and Pb) in the laboratory.

#### Digestion procedure

Materials Used for sample digestion



