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# African Journal of Environmental Science and Technology

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| Date | [illegible] Feb 201[illegible] |
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| Manuscript Title | Assessment of effluents discharged from textiles industries in Selected Villages Kaduna State, Nigeria |
| Current Status | Reviewers' Evaluation |

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# Reviewer Comment

Manuscript Number: AJEST/04.09.14/1786

Manuscript: Assessment of effluents discharged from textiles industries in Selected Villages Kaduna State, Nigeria

General Comments

This manuscript contains the assessment of effluents discharged from textile industries in selected Nigeria. Title is not reflecting in the study presentation. Need to thorough check. Language should be improved to make the expression more idiomatic. There are lots of omissions of space between two words, articles, helping verbs, conjunctions etc in the sentences. Need to add some latest reference.

Introduction

The study aim to compare the quantity of pollutants in the water with the acceptable limits of WHO and assess the rate at which chemical related effluents discharged from the industry affect the quality of water, which is not reflect in the title.

Methodology

Methodology is not clear and amalgam with introduction and result. Study map is scientific.

Results

Result part need explain with scientific ways. Table format is not correct.

Discussions

References

Originality: 2
Contribution: 3
Technical Quality
Clarity Of Presentation: 3
Depth Of Research: 3
Recommendation:0
Additional Comments

Decision: Requires Major Revision

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*ength Research Paper*

# Assessment of effluents discharged from textiles ndustries in selected villages in Kaduna State, Nigeria


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**A major serious source of pollution is the industrial effluent discharge by the process industries into the water bodies. Industrial effluent consists of water with varieties of potentially harmful substances. The study analysed the public health effects of effluents discharged from Kaduna textile industry into the waters of river Kaduna. Physicochemical qualities of effluents at the downstream were assessed. Parameters measured include pH, temperature, electrical conductivity, depth, turbidity, biological oxygen demand (BOD), dissolved oxygen, chemical oxygen demand, nitrate, sulphate, acidity, alkalinity, organic matter and carbon levels and these were simultaneously monitored in the river using standard methods. Unacceptable, high levels of the parameters were observed in the four sampling points during the study period and are severally outside the compliance levels of the Federal Environmental Protection Agency (FEPA) Guidelines and World Health Organization (WHO) tolerance limits for domestic uses. The study recommend the need for the intervention of appropriate regulatory agencies to ensure production of high quality treated final effluents by wastewater treatment facilities in selected villages of Kaduna**



**Key words:** Pollution, textile industry, industrial effluent and water quality.


## RODUCTION

water we drink is essential ingredient for our wellbeing a healthy life but unfortunately, polluted water and air common throughout the world (European Public Health nce, 2009). All people, whatever their stages of elopment, social and economic condition, have the to have access to drinking-water in quantities and of ality equal to their basic needs (WHO, 2004). Over ast three decades, there has been increasing global concern over the public health impacts attributed to water pollution, in particular, the global burden of disease. It is estimates that about a quarter of the diseases facing mankind today occur due to prolonged exposure to water pollution. Most of these water pollution-related diseases are however not easily detected most especially in developing countries and may be acquired during childhood and manifested later in adulthood. The discharge of


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ndustrial effluent into water bodies is one of the main causes of environmental pollution and degradation in many cities, especially in developing countries. Many of these industries lack liquid and solid waste regulations and proper disposal facilities, including the harmful waste. Such waste may be infectious, toxic or radioactive (WHO, 2004).

Industrial pollution is one of the problems presently facing Kaduna State in Nigeria due to concentration of textile manufacturing industries. The industries together with municipal effluents ultimately polluted water in the river. The water pollution may infect our food in addition to groundwater contamination when used to irrigate crops and this poses great risks to public health.

In an attempt to contribute to the understanding of the nature of the problems, this study undertook a comparative analysis of textile industries effluent discharge in Kundende, Rigasa, Nasarawa and Kakuri in relation to acceptable limit of world health organisation in Kaduna State, Nigeria.

## Statement of problems

A major serious source of pollution is the industrial effluent discharge by the process industries into the water bodies. Industrial effluent consists of water with varieties of potentially harmful substances. The wastewater is a by-product of utilized portable water (domestic wastewater) or industrial process water (industrial wastewater). In the process industries, water could be used as coolant, process water and raw material, etc. It is also used in purification of either the raw materials or finished products. In the process of usage, industrial water becomes polluted and contaminated with various substances it comes in contact with. The discharge of such wastewater or industrial effluents into water bodies such as streams, rivers, lakes, seas, oceans or farmland, etc., could be hazardous to man, aquatic lives, plants and every other living things that derive their water from the polluted sources (Dix, 1981). Effluent discharge from industries, especially from textile industries in Kaduna town has been on the increase on daily basis. Its effective management has constantly been a problem to the industrialists, the community and the government of Kaduna. Adverse effect of these to human health, biodiversity and agricultural farmlands are now eminent. The question that readily comes to mind is how consumable are surrounding rivers in relation to world health organization standard. It is therefore significant in environmental management and decision making to assess and evaluate the magnitude of negative impact.

## Aim and objectives

The aim of this study was to assess the quality of effluents discharge in river Kaduna in comparison with WHO accepted limit. In specific, the objectives are: To compare the quantity of pollutants in the water with the acceptable limits of WHO, to assess the rate at which chemical related effluents discharged from the industry affect the quality of water.

## RESEARCH METHODOLOGY

### Study area

Kaduna is the capital of Kaduna State. It has always been the seat of government right from the time of colonial rule in Nigeria. It was the capital of then, northern religion when the country was divided into twelve (12) states; it became the capital of the emergent north central state. Kaduna was first developed as an army encampment and later grew to become a cosmopolitan city. The city, located on the Kaduna River, is a trade centre

Kaduna occupies an approximate total land area of 3,080 $km^2$ and also has an estimated population in the 1991 census of about 711,155. The recent 2006 population census estimated Kaduna as 1,458, 900. The river Kaduna takes it source from the Kujama hills in the Jos plateau and flows for 210 km before reaching Kaduna town. It crosses the city dividing it into north and south area. Beyond Kaduna, the river flows about 100 km into the Shiroro dam areas. The river is joined on its course by three tributaries which include river SarkiPawa, Tubo/Damari and Dinya, the Shiroro. It continues to flow for 200 km and finally discharges into the river Niger on the Northern shores of Pategi (Figure 1).

The entire study was designed to involve three different stages which included:

1. Preliminary studies: it involved collection of reports and preparation of maps.
2. Field work which involved collection of water samples.
3. Analysis and report writing: it involved laboratory analysis of sample.

In the first stage, reconnaissance and a pilot survey was conducted before the definition and mapping of the study area. Thereafter, the sampling strategies/procedures were designed with the required instruments of investigation. At the data collection stage, all the selected villages were identified and water sample collected. This was followed by data analysis stage, where data collated were summarized and presented including composite water sample test from laboratory analysis where the following parameters were tested: temperature, dissolved oxygen, turbidity, conductivity, total dissolved solid, pH, fluoride (F), manganese ($Mn^+$), ammonia ($NH_3$), nitrate ($NO_3^{-2}$), sulphate ($SO_4^{-2}$), nitrite ($NO_2^-$), sodium ($Na^+$), Potassium ($K^+$), alkalinity, calcium, chloride ($Cl^-$), magnesium ($Mg^{2+}$), bicarbonate and carbonate ($CO^3_2$). The data collected from the sources of water segments established within the villages were subjected to one-way analysis of variance (ANOVA). ANOVA was also used to test for existence of significant variation between groups of water quality parameters and among the four designated sources of water.

### Quantity of pollutants in the water and acceptable limits of National Standard and WHO

In comparing the quantity of pollutants in the water with the acceptable limits of National Standard and WHO, the selection of parameters and the determination of maximum allowable limits were computed and shown in Table 1 taking into consideration the WHO guidelines for domestic water quality.

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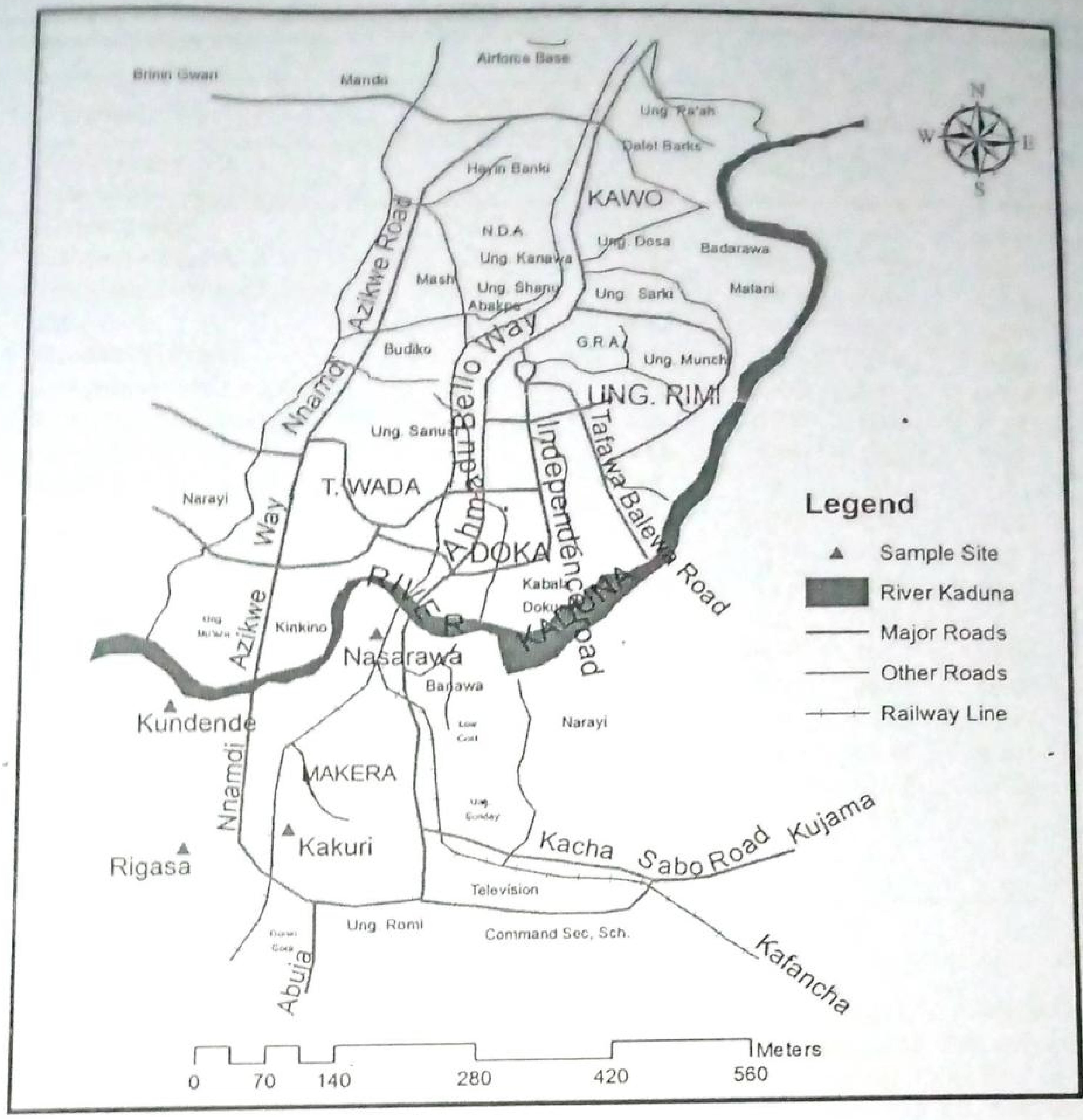


Figure 1. Map of Kaduna showing water sample collection site.

comparing the quantity of pollutants in the water, certain neters were considered based on WHO standard. The selection rameters and the determination of maximum allowable limits conducted by taking into consideration the WHO guidelines mestic water quality. However, water of higher quality may be ed for some special purposes such as renal dialysis and ng of contact lenses, or for certain purposes in food ction and pharmaceutical use.

er samples were collected from Kundende, Rigasa, Kakuri Nasarawa. The laboratory test was conducted by Federal y of Water Resources Regional Water Quality Laboratory , Niger State, Nigeria. Bacteriological tests were used to nine if water is bacteriologically safe for human consumption. was based on detection of coliform bacteria, a group of rganisms recognized as indicators of pollution from human or l wastes. Coliform bacteria are found in the intestinal tracts ecal discharges of humans and all warm-blooded animals. iological test were performed on drinking water by contacting al health department to obtain the specially prepared bottles structions for taking a water sample.

Chemical tests on calcium, magnesium, sodium, chloride, sulphate, nitrate, potassium, fluoride concentration in the samples were determined using an atomic absorption spectrophotometer (AAS) to identify impurities and other dissolved substances that affect water used for domestic purposes. Water begins to decrease in palatability when the amounts of minerals, that is, dissolved salts, exceed 500 to 1,000 ppm, but this depends on the nature of the minerals. Most testing laboratories report quantities of chemical substances by weight in volumetric units such as milligrams per litre (mg/L).

## RESULTS AND DISCUSSION

### Chemical related effluents discharged from the industry

Water samples collected at the downstream of discharge point were subject to analysis, the mean ± standard

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