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EFFECTS OF ABATTOIR WASTEWATER ON RIVER/STREAM: A CASE STUDY OF EKULU RIVER EMENE ABATTOIR ACTIVITIES

Odenigbo C.

Department of Civil Engineering, Enugu State University of Science and Technology.

ABSTRACT: *This study examines the extent of contamination of untreated waste water in abattoir especially in Emene and the impact on the ecology of micro-organisms in the waste water. There has been no sewage treatment system constructed for managing waste water from the abattoir and recent publication showed that zoonotic diseases like tuberculosis are yet to be fully controlled in abattoir. The waste water generated flows directly with the Ekulu River without treatment, the activities of this abattoir remain unregulated. This paper aimed at assessing the abattoir waste water sample from Ekulu River Emene Abattoir for physical and chemical properties with respect to the following parameters; temperature, pH, conductivity, turbidity, acidity, alkalinity, total solid, dissolve and suspended solid, total hardness, copper, iron, lead, chloride, sulphate, COD, BOD, calcium/magnesium and phosphorus. The result analysis obtained for these parameters shows that the downstream sample B contains more of these parameters by far than the upstream sample A, which is an indication that the abattoir activities in/beside the river is having adverse effect on streams/rivers.*

KEYWORDS: Abattoir, Wastewater, River, Pubic Health, Sewage Treatment, Nigeria

INTRODUCTION

Agbawe (1992) identified improper management and supervision of abattoir activities as a major source of risk to public health in south eastern Nigeria. Waste water from abattoir typically contains fat, grease, fresh blood, undigested feed, bones and hair. The water which is characterized with high organic levels (Bill et al, 1982; Coker et al, 2001) the total amount of waste produced per animal slaughtered is approximately 35%. For example, in Enugu State, they have many abattoirs but the one at Emene metropolis Nigeria, animals like (cows, goats, sheep etc) are slaughtered daily throughout the year. The waste water generated flows directly into Ekulu River without treatment, the activities of this abattoir remain unregulated.

In Nigeria nearly every town and neighborhood is provided with slaughter house or slaughter slab. In 1979 Edward Oyedemi published on slaughter facilities for tropical conditions and nominated industrial site, and that each of them has advantages and disadvantages. The advantages of the rural site according to him is weighed, the sites recommended that a rural location can be chosen where possible. They recommended that abattoir should be built on firm gently stepping land away from other buildings, residential areas. He further suggested that the site for abattoir should be chosen well away from town boundaries including projected town boundaries.

The global waste water generation is increasing at an exponential rate, as a result of rapid population growth and urbanization. Data's obtained could be helpful in defining future

waste management practices in the abattoir. Hence waste water from abattoir environment has been a great concern to public health authorities in Nigeria. This report will re-awaken concerned government agencies and other stakeholder to sit up and give attention to abattoir operators.

METHODOLOGY

Data Collection

Two samples were collected from the Ekulu River namely: Upstream (sample A) which was taken before contamination with abattoir waste water and Downstream (sample B) which was taken after contamination with abattoir waste water.

Water Analysis/Experimental Procedures

This was carried out to determine the abattoir waste water parameters which include sample A (upstream) and sample B (downstream) respectively and they are determined by physical and chemical tests.

Method of Physical Tests

The physical test analysis of waste water from abattoir is aimed to determine the level of impurity; some physical tests include; temperature, turbidity, solids, dissolved solids, volatile solids.

Method of Chemical Tests

Chemical tests are quantified in terms of organic and inorganic constituents present in the water sample. Some chemical test includes pH, hardness, Alkalinity, Acidity, chlorides, Iron and Manganese, Dissolved oxygen, biochemical oxygen demand COD, chemical oxygen demand etc.

RESULT AND DISCUSSION

Result Analysis

Sample Description: Abattoir Waste Water

Animals Required: Characterization of Water

Sample A: Upstream (Ekulu River, Emene, Enugu)

Sample B: Downstream (Ekulu River, Emene, Enugu)

S/N	PARAMETERS	UNIT	(A) UPSTREAM	(B) DOWNSTREAM
1	Physical Analysis temperature	^{o}C	30	29
	pH		6.5	7.0
	Conductivity	$\mu s/cm^3$	11.56	46700
	Turbidity	NTU	77	189
2	Chemical Analysis			
	Acidity	Mg/L	50	200
	Alkalinity	Mg/L	50	200
	Total solid	Mg/L	1660	3010
	Dissolved solid	Mg/L	560	1870
	Suspended solid	Mg/L	1100	1140
	Total hardness	Mg/L	28	80
	Copper	Mg/L	2.27.2018 0.041	36.93
	Iron	Mg/L	0.000604	0.5221
	Lead	Mg/L	56.8	0.0169
	Chloride	Mg/L	10.0	639
	Sulphate	Mg/L	6	81.7348
	COD	Mg/L	10.62	266
	BOD	Mg/L	12.11	282.225
	Calcium/magnesium	Mg/L	0.06495	131.2064
	Phosphorus	Mg/L		0.32095

DISCUSSION

From the experiment carried out, it was observed that the result analysis obtained from the parameters (upstream and downstream) has different physical characteristics in terms of temperature, pH, conductivity and turbidity. The upstream sample exhibits the lowest of the parameters compared to the downstream sample although slightly higher in temperatures. The experiment further shows that both samples (i.e. upstream and downstream has different chemical characteristics in terms of acidity, alkalinity, solids, hardness, copper, iron, lead, COD, BOD, etc. The sample B contains more of these parameters than sample A, which is an indication that the abattoir activities in/beside the river is having adverse effect on streams/rivers.

Effects of Abattoir Waste Water

- There has been no sewage treatment system constructed for managing waste water from the abattoir.
- Waste water thus flows along drainage canal only to run off somewhere along the roadsides and according to the slope of the topography and eventually empting into a stream.
- Sources of water for cleaning and sanitation in this facility were borehole, nearby streams and 40,000 litres of water used daily to clean up the carcasses of slaughtered animals.

- Domestic animals being free-range and are usually part of the human swelling homes often visit the stream, drink from it and even swim in it, especially the pigs.

CONCLUSIONS AND RECOMMENDATIONS

It is practically obvious that the downstream sample i.e. (sample B) contains more of those parameters tested for by far than the upstream sample (i.e. sample A). This is a clear indication that abattoir was waste water on Streams/River due to abattoir activities has serious impact in the quality of water.

On the contrary, almost all the parameter of the downstream sample with respect to the WHO standard for drinking water/safe water quality pose serious health risk due to the excess amount of those chemical properties it contains.

The following recommendations are advocated for effective management of the effects of abattoir waste water.

- The waste water should be recycled for the interest of the public. According to the World Bank, 1995 says that abattoir waste water could be used for farming.
- There should be sewage treatment constructed for managing waste water from the abattoir.
- Abattoir should be built on firm gently sloping land away from residential areas and other buildings.
- Abattoir operators should be trained with respect to public health implication of their activities.

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