EVALUATION OF PYSICO-CHEMICAL CONTENTS OF WASTE WATER (EFFLUENTS) FROM FAST FOOD INDUSTRIES IN AWKA ANAMBRA STATE

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ABSTRACT

The physcio-chemical analysis of waste water (effluents) from fast food industries in Awka Anambra State Nigeria, were carried out. Result of the parameters analyzed: p^H 10.50 > 6.60 < 9.40 compared with 6.00 - 9.00, TSS mg/dm^3 200.00 > 120.00 < 165.00 compared with 100. BOD mg/dm^3 75.00 > 43 < 60 compared with 50, COD mg/dm^3 180.00 < 190.00 > 172.0 compared with 100, Cr mg/dm^3 0.025 > 0.001 < 0.0020 compared with 0.5, Mg mg/dm^3 2.10 < 4.00 > 2.51 compared with 25, Hg mg/dm^3 0.001 > Nd < 0.001 compared with < 0.05, Zn mg/dm^3 0.35 > 0.22 < 0.5 compared < 1.00, Cl mg/dm^3 1.10 > Nd < 0.5 compared with 0.5, showed that the effluents values vary with the limit set as standard by the World Health Organisation (WHO) and Federal Environment Protection Agency (FEPA). It was concluded that there is a need for the treatment of the effluent from the fast food industries before discharged into public drains and local water bodies. The various fast food industries should set up an internal check body which will make sure that there is little or no waste because, when the production of effluent reduces, the risk of polluting the entire environment decreases so as to ensure a sustainable development.

Key words; Precambrian, Basement, Keffi, Protolith, Geochemical, Garnet, Staurolite.

INTRODUCTION

The increase in public awareness and concern about the state of human environment in recent times has been accomplished by evidence of the extent to which pollution has caused severe environmental degradation. Some of these interest have reached panic level especially after some well-published, health disaster were known to have been caused by some specific pollutants (Gray 1989 and Wardled 1999). There had been an uncontrollable exploitation and degradation of the environment over the past few decades as a result of enormous technological advancement, rapid industrialization and urbanization specifically: many urban and rural areas of the industrialized world are continually threatened with the uncontrollable waste loads from industries as it affects their ecological balance (Nemerrow 1971, and Wesly 1989).

Fast food industries require large amounts of water for their processes, only a small fraction of it is incorporated in their products and some of it is lost by evaporation while the rest are lost by flowing as waste water (effluents). The prevailing p^H is the resultant of the disassociation of organic or inorganic

compounds and their subsequent hydrolysis. Effluents from fast foods can be characterized based on the relative oxygen demand expressed as Biological Oxygen Demand (BOD) or Chemical Oxygen Demand (COD), total suspended solid (TSS). p^H, Temperature and flow parameters (Matcalf and Eddy (1991), Mccanl and Janice 1974).

The aim of the paper is to characterize effluents from fast foods industries in Awka Anambra State. The objectives were;

1. To determine the concentration Cr, Mg, Zn, Ag in the effluent.
2. To determine the physico-chemical characteristics such as p^H, TSS, COD, CI^-
3. To compare the levels of these metals with both local and international regulatory standards (FEPA, WHO)
4. To access the efficiency of waste water treatment and management of these industries
5. To identify the variation in the levels and pattern of these metals in the effluents.
6. The study will serve as a base lime study as well as predict likely implications in other areas with similar environment as the investigated site and suggest guideline and appropriate strategies to be employed to minimize damage and maximize benefits to our soil and water.

Several Authors have reported the pollution of effluent from industries (Nelson 1978, Alpha Standard Method 1992).

Ademola (2008) reported heavy metal concentration in river sediments in Okitipupa, South East of Nigeria. Heavy metal have been found in many sea animals (fishes and crabs). According to findings by many Authors, these sea animals get contaminated by industrial effluents containing heavy metals (FEPA Guideline 1999, Ademola 2008).

EXPERIMENTAL

The untreated effluent sample was collected using Grab sampling method from three various discharging points of the different fast food industries denoted by the alphabets A,B and C. The samples were collected using plastic sampling bottles with tight lids (Grab sampling method) and all the samples not immediately analyzed were refrigerated at 4°C. Temperature and p^H were determined, insitu, 360°C zill thermometer was used to check the temperature while 531 p^H meter or conductivity meter was used to find the p^H of the samples. Physical analysis on the sample was carried out within 6 hours of collection. Biological oxygen demand (BOD) and chemical oxygen demand (COD) were determined using Vohard's method. Total suspended solid (TSS) were also determined. Colourimeter was used to check the colour of the sample. Chloride ion was investigated.

The concentration of the following heavy metals, chromium, magnesium, mercury Zinc, were determined using Atomic Absorption Spectrophotometer pye290sp.

RESULTS AND DISCUSSION.

The result obtained are shown in the table below with the corresponding WHO/FEPA (Nigeria) standard.

Table 1: Results of Physico-Chemical Analysis of Fast Food Effluents

Parameter	Effluent Sample			WHO/FEPA
	A	B	C	Standard
Appearance	Yellowish	Colourless	Yellowish	Colourless
Temperature	36°C	33°C	37°C	Less than 40 °C
p^H	10.50	6.60	9.40	6.00-9.00
TSSmg / dm^3	200.00	120.00	165.00	100
BOD	75.00	43	60.00	50
CODmg/dm^3	180.00	190.00	172.00	100
Cr mg/dm^3	0.025	0.001	0.0020	0.5
Mg mg/dm^3	2.10	4.00	2.51	25
Hg mg/dm^3	0.001	Nd	0.001	<0.05
Zn mg/dm^3	0.35	0.22	0.5	<1.00
Cl - mg/dm^3	1.10	Nd	0.5	0.5

Nd = not detected.

The result of trace metals load in the effluent sample was analyzed. Trace quantity of metals such as chromium (Cr), magnesium (Mg), Mercury (Hg) and zinc (Zn) were detected in all samples and their values revealed that the effluent fall within the WHO/FEPA permissible standard. Other parameters like Biological Oxygen Demand (BOD) that had 75 mg/dm^3 and 60 mg/dm^3 in A and C fast food industries against the permissible limit of 50 mg/dm^3 standard. Chemical oxygen demand (COD) was 180 mg/dm^3, 190 mg/dm^3 and 172 mg/dm^3 among the three industries (A, B, C) fast food industries and are against the permissible limit standard of 100 mg/dm^3. Total suspended solid (TSS) was 200 mg/dm^3,120 mg/dm^3 and 165 mg/dm^3 against the permissible limit of 100 mg/dm^3. These are not good enough for the aquatic animals. The researchers discovered that the effluents would eventually run into the river to be hazardous to the aquatic animal (Vogel 1989). Some would be absorbed by the soil causing damages in some crops.

CONCLUSIONS

The results of the physicochemical analysis of effluents compared with WHO / FEPA standards showed that although we may think that waste water generated from food industries are harmless since they are gotten from food items, so we may think these effluents may not be a major source of

environmental pollution through discharge of the effluent into streams, land and the environment in general. Some form of treatment is necessary before disposal. That is due to the fact that the total suspended solids (TSS), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) all fall outside the permissible limits set by WHO / FEPA.

RECOMMENDATION

The Authors recommend treatment of effluents with lime before discharge into water flow (river and stream). The development of appropriate and affordable technologies using local material for small scale entrepreneur will enable the industries to treat their waste at low cost that might yield a satisfactory effluent for the receiving stream. To consolidate effective effluent management each food industry should: articulate its corporate environmental unit with its management structure with an internal environment policy and file same with FEPA / WHO, conduct annual environmental system for audit of its operations and submit reports to FEPA /WHO. These steps should be taken in other to ensure compliance with legislation and company policy (Okonkwo and Aboatu 1999), set up a small environment unit within management structure with an internal environmental system for checks and balances. Constant monitoring is recommended since accumulation contaminants could be dangerous to aquatic life and human health.

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