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ABSTRACT

The consumption of Petrol or kerosene contaminated food products by people in rural areas exposed to oil drilling regions could be dangerous. Thirty male albino wistar rats with an average weight of 150-200g were selected for this study. They were grouped into five (5) groups; Group A (6 rats) served as control, Group B (6 rats) were given high dose of petrol contaminated fish, Group C(6 rats) were given low dose of petrol contaminated fish, Group D received high dose of kerosene contaminated fish ,while Group E received low dose of kerosene contaminated fish. The feeding lasted for only two weeks. At the end of 2 weeks, blood samples were collected from the animals by cardiac puncture and their serum were used to conduct liver function test.

The result from the analysis indicated that there was a significant increase in the Liver enzymes namely: Aspartate amino transferase, alkaline phosphatise, alanin transferase in the animals exposed to both high and low doses of the food contaminated with kerosene and fuel. Also there was increase in the total bilirubin of the rats exposed to high dose of the food contaminated with kerosene ($p<0.05$). There was a slight increase in conjugated bilirubin in the animals that received high dose of Petrol and Kerosene contaminated food. It could be deduced from this research that kerosene and Petrol contaminated fish has a toxic effect on the liver, thus causing damage or inflammation to the liver.

Key words: Petrol, kerosene, liver, aspartate transaminase, alkaline phospatase, contamination.

INTRODUCTION

Petroleum production started in Nigeria in 1958 and the industry has over the years become a vast operation covering both on shore and off shore oil fields (Awobajo, 1981). Through these years, there has been a case of petroleum and refined petroleum spills onto agricultural lands due to petroleum products; pollution of farm lands by busted overlaid pipelines conveying of crude oil or refined petroleum products can contaminate the soils of games, wild life, poultry and humans to varying degrees of toxicological effects. Pollution by petroleum is a widespread and common problem which might arise either operationally or accidentally wherever oil is produced, transported, processed or used at land and sea. On land, petroleum products account for a large proportion of chemicals at contaminated sites. (Kostecki et al, 1995). Contamination of ground water and soil specific hydrocarbons has made many countries to enact regulation requirements. Due to the complications involved in the composition of this product, petroleum has the potential to elicit multiple types of toxic effect such as acute lethal toxic effect, sublethal chronic toxicity or depending on the exposure, dosage and the organisms exposed. Kerosene and Petrol are commonly known as fuel. They are distilled from crude petroleum which are complex mixtures of different hydrocarbons and related substances, some of which are highly toxic or carcinogenic to consumers of marine products (EH20,1982)

CHEMICAL COMPONENTS OF PETROL AND KEROSENE

Petrol contains benzene, toluene, xylene, catalytic cracked naphtha with a moderate octane rating, high olefins (alkene) contents at moderate aromatic levels, hydrocrackate, alkykate and blended with gasoline while kerosene which consists of alkyl benzenes (single ring) and alkylnapacenes (double ring) and olefins which are usually not present at more than 50% by volumes.

Petroleum is mainly used in driving vehicles like cars, vans, lawnmowers, leaf flower, small boat, motors, some larger vehicles like trucks; it can also be used in making gums while kerosene is used as a source of light, solvent lubricant, preparing insecticides, transportation in entertainment industry for fire performances and in chemistry.

MATERIALS AND METHODS

Animals

The apparently healthy male albino wistar rats were selected randomly and kept in a metal cage with iron netting under standard environmental condition, in animal house of our university. They were all allowed to have free access to vital feeds (Guinea feed Benin) and water ad libitum. They were stabilized for two weeks before being used for the experiment.

EXPERIMENTAL DESIGN

30 male albino rats were used for the study. They were placed into five groups namely Groups A, B, C, D and E. Group A consists of 6 rats which were used as control, Groups B (6 rats) received high dose of petroleum contaminated diet, (fish), Groups c (6 rats) received low dose of petroleum contaminated diet, Group D (6 rats) received high dose of kerosene contaminated diets (fish) and lastly, Group E (6 rats) received low dose of kerosene contaminated diet.

The animals were fed for 14 days with the petrol and kerosene contaminated diet (fish) mixed with their feed while the control rats received normal rat and water ad libitum.

PREPARATION OF PETROL AND KEROSENE DIETS

Dried fish was obtained from a local market at Uli Anambra State, it was torn into pieces; some portion were mixed with 15 ml of petrol and kerosene respectively (for high dose) while 7.5 ml of kerosene and fuel each were mixed in 50ml of water and used to soak the dried fish before mixing it with the feed (low dose). These were allowed to dry before administering them to the rats respectively. The diets were administered to the test rats in groups B and E while the control group A received normal rat feed. All the rats received drinking water ad libitum.

Toxicity Studies

The LD 50 of the petrol and kerosene diets in rats were determined using Lorke's method (1983)

Preparation of Blood sample for test

At the end of feeding the rats with contaminated kerosene and fuel diets, the rats were anaesthetized with ketamine hydrochloride by injecting 0.6ml inl into the rats. The animals were sacrificed by cervical dislocation and blood was collected by cardiac puncture using a 5ml hypodermic syringes and needles. Samples collected were immediately placed in plane tubes and allowed to clot. Serum samples expressed were used to carry out the biochemical analysis.

The liver function tests of the sample were done as described by Baker and Silverton (1998)

STATISTICAL ANALYSIS:

The results obtained in the study were represented as mean and standard deviation (Mean ± S.D), while students' T test was used to compare the result of the control and the test. A p-value of less than ($p < 0.05$) or equivalent ($p= 0.05$) was considered significant.

RESULTS

TABLE 1: shows the effect of high and low doses of kerosene and fuel contaminated diet on the liver function profile of male albino wistar rats

GROUPS	Total Bilirubin (mg/100ml) $\bar{x}$ ± S.D	Conjugated Bilirubin (mg/100ml)$\bar{x}$ ± S.D	Alkaline phosphatase (iu/l) $\bar{x}$ ± S.D	Aspartate Transaminase (iu/l) $\bar{x}$ ± S.D	Alanin Transaminase (iu/l) $\bar{x}$ ± S.D
Controls n=6	O.3 ± 0.1	0.7 ± 0.3	58.2 ± 1.6	8.6 ± 0.5	7.4 ± 1.5
Test rats after 28 days kerosene diet feed. Low dose n=6	3.7 ± 0.4	5.2 ± 1.2	105 ± 4.4	25 ± 2.5	23.0 ± 1.6
High dose n=6	6.2 ± 1.7	11.4 ± 3.0	130 ± 0.7	12.9 ± 1.8	127.0 ± 2.1
Petrol diet feed. Low dose feed n=	4.5 ± 1.8	13.2 ± 1.4	110 ± 0.9	126 ± 1.7	125.0 ± 5.4
High dose n=	8.4 ± 0.5	15.6 ± 0.8	128 ± 0.6	130 ± 0.6	124.0 ± 5.2
P- value	P<0.05	P<0.05	P<0.05	P<0.05	P<0.05

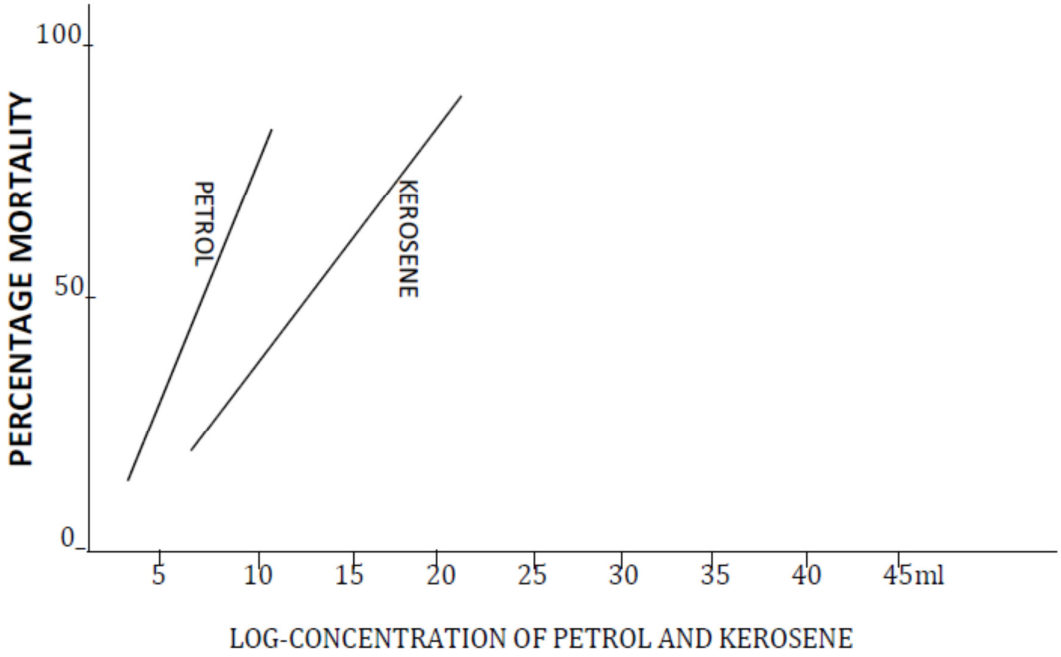

Figure 1: The lethality studies of petrol and kerosene used in studying the hepatotoxic effect of petroleum and kerosene contaminated diet on albino wistar rats

The LD_{50} of rats on petrol is 10ml/kg and that of kerosene is 15ml/kg.

DISCUSSION

The hepatotoxic effect of petrol and kerosene contaminated diet on the liver function profiles viz total bilirubin conjugated bilirubin, alkaline phosphatise, aspartate transaminase and alanin transaminase in male albino wistar rats has been investigated. The lethal dose of kerosene and petrol used in this study showed that petrol and kerosene are toxic substances (Fig 1) lethal dose for petrol is 10ml/kg and that of kerosene is 15ml/kg. The volume used was minimal so as to keep the test animals till the day of their sacrifice.

The observed significant increase ($P<0.05$) in the total bilirubin, conjugated bilirubin, alkaline phosphatase, aspartate transaminase and alanin transaminase in the test animals compared with their corresponding control indicates injury to the liver cells and hepatic tissues or cause conjugated hepatobillary injury on the albino wistar rats. Serum alanin amino transferase (ALT) is known to increase when there is liver disease and it has been used as a test for measuring hepatic necrosis (Bush, 1991). It has been established that the toxic content of petroleum such as benzene and lead are activated in the bone marrow where they could be mediated through disturbances in DNA function (Okoro et al, 2006). Hence, the observed increase in serum ALT suggests that the food contaminated with petrol and kerosene products are not safe for the hepatic tissues, hence should be deemed poisoned food.

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