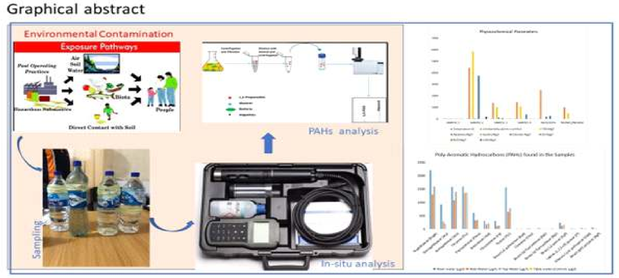
LAGOS STATE UNIVERSITY

THE IMPACTS OF FUEL DEPOT AND TANKERS ACTIVITIES ON THE PEOPLE AND THE ENVIRONMENT: A CASE STUDY OF IJEGUNEGBA COMMUNITY, ORIADE LGA, LAGOS, NIGERIA

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Graphical abstract



Introduction

- Water is an invaluable natural resource that is essential to human survival and the ecosystem's health as there is basically no life without water. (WHO, 2017. Molly Sargen., 2019).
- Environmental degradation is an easy feet to achieve, especially when there is neglect from company/factory owner and agencies. The levels of pollution and pollutant from oil and gas in an area can be tracked by knowing the amounts of Polycyclic aromatic hydrocarbons (PAH) there is.

2. Materials and Methods

- The purpose of this research was to investigate groundwater quality (physicochemical parameters) as well as check for presence and concentrations of Poly-Aromatic Hydrocarbon (PAHs) of some selected functional borehole water, table water, well water, and water from the river in Jetty Ijegun-Egba community especially those closer to the depot, Oriade LGA, Lagos State, Nigeria.
- Groundwater sample was collected from the study area following the **"envelope" principle,** i.e. 5 sub-sampling sites within the representative area of the single sampling.
- Sampling was done twice from 4 different sources in the community, with 3 weeks interval in order to compare and look out for any significant changes.
- Groundwater samples were collected with new 1.5 liters sized pet-bottles from the different sampling locations within the Ijegun-Egba community, in-situ analysis was carried out at the point of collection to check for physical parameters.
- Samples were transported in an ice cooler to the laboratory for further analysis.
- PAHs were determined through Gas Chromatography with Flame Ionized Detection (GC-FID) after digestion: **Water Sample PAH Separation, Gas Chromatography Analysis.**

Results

Table 1: Mean values of Physicochemical parameter of samples

S/N	PARAMETER	UNITS	TABLE WATER AS CONTROL	WATER FROM THE RIVER	WELL WATER	TAP/BOREHOLE WATER	WHO/IEPA	NSDWQ/ NESREA
1	Appearance	N.A	Clear Colourless liquid	Colourless liquid with particles	Clear Colourless liquid	Clear Colourless liquid	NS	NS
2	Odour	N.A	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
3	Temperature	^{0}C	26.55	26.2	25.4	25.7	25	NS
4	Conductivity	µS/cm	55	4,432.5	1,400	1,470	2,500	1,000
5	pH	N.A	7.05	7.0	7.0	4.0	6.5-8.5	6.5-8.5
6	TDS	Mg/l	45	5,836.5	1,018	1,071		500
7	Alkalinity	Mg/l	22.58	38.85	116.55	13.125	200	NS
8	Acidity	Mg/l	8.2	6.6	9.6	11.2	NS	NS
9	Chloride	Mg/l	1.0	3,746	83.44	377.5	250	≤350
10	DO	Mg/l	8.60	8.205	7.82	8.805	≥9.00	≥4.0
11	BOD	Mg/l	0.95	2.575	2.335	0.285	≤5.0	≤6.0
12	COD	Mg/l	19	191.5	33.5	15		≤30.0

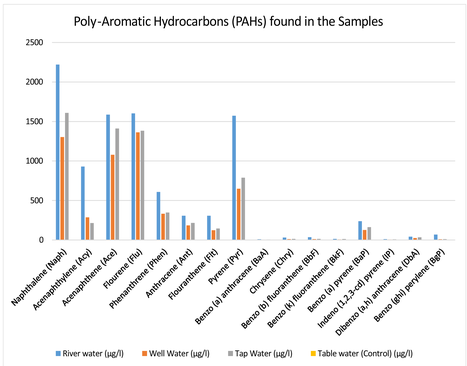
N.A – Not Available

NS – Not Specified

Table 2: Mean values of the 16 PAHs detected

Compound	River wate (µg/l)	Well Water (µg/l)	Tap Water (µg/l)	Table wate (Control) (µg/l)
Naphthalene (Naph)	2221.58	1302.61	1608.95	0.26
Acenaphthylene (Acy)	930.03	286.57	214.8	0.07
Acenaphthene (Ace)	1586.93	1078.32	1410.92	0.38
Fluorene (Flu)	1602.52	1362.34	1382.6	0.72
Phenanthrene (Phen)	609.28	332.64	348.64	0.21
Anthracene (Ant)	308	184.91	216.73	0.13
Flouranthene (Flt)	306.92	123.57	145.7	0.09
Pyrene (Pyr)	1573.61	648.61	788.21	0.6
Benzo (a) anthracene (BaA)	9.2	2.92	4.79	0.01
Chrysene (Chry)	31.16	11.12	13.93	0.01
Benzo (b) fluoranthene (BbF	36.17	11.4	14.29	0.01
Benzo (k) fluoranthene (BkF	14.08	7.13	12.45	0.01
Benzo (a) pyrene (BaP)	237.72	127.64	162.47	0.05
Indeno (1,2,3cd) pyrene (IP)	11.46	4.32	7.39	0.01
Dibenzo (a,h) anthrace (DbA)	41.74	24.77	35.03	0.03
Benzo (ghi) perylene (BgP)	69.16	9.6	11.09	0.01

Results



Discussion

- Generally, the physicochemical characteristics of the waters in the Ijegun-Egba Community are varied and were comparable with the results obtained from similar studies across Nigeria.
- All the water samples tested showed the occurrence of one or more individual PAHs, suggesting that PAHs were ubiquitous in the waters of the Ijegun-Egba community.

Conclusion

- From the results, it is evident that the activities of the oil depots/ tank farm are wreaking havoc in the environment.
- The unusually high appearance of PAHs in the waters suggests that petrol and oil deposits somehow find themselves either through percolation, soil runoffs during erosion, etc. into the water bodies.
- According to Verma *et al*, 2014, "leaching of PAHs from soils into groundwater is negligible, as the compound tends to adsorb strongly to the soil organic matter". So for the ground waters to show these high amounts of PAH presence, that indicates how heavily contaminated this environment is.

Recommendations:

- It is essential that the Lagos state government through its water scheme extends its water pipes to the Ijegun community and provide portable water for the community.
- The Lagos State Environmental Protection Agency (LASEPA) should increase its monitoring activities and their testing to check and balance the activities of the oil deportation and make sure all guidelines are strictly followed. They should also trace where the leakages are (if any), to know how these pollutants are getting to contaminate the waters.
- Educate the people about the hazards in the area and how they can protect themselves from them.
- Citing of truck stations outside the community.

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