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OCCURRENCE AND LEVEL OF NITRATES AND NITRITES IN WATER

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NTRODUCTION

Nitrate constitutes an important component of man's chemical environment. A major source of human exposure is from food and drinking water. Nitrate in food may be present naturally or as additive introduced for various technological reasons. Vegetables are the principal source of dietary nitrate but wide variations in nitrate levels have been found depending on the types of vegetable, its sources, conditions of cultivation and storage. The occurrence of nitrate and nitrite in water has been reported in various concentrations (ECETOC,1988) In the case of water supplies, a World Health Organization(WHO) report in 1985 on the health hazard from nitrates in drinking water noted that nitrate concentration in surface waters in many countries had increased substantially over the past 30-40years and that the main reasons for this trend were the increased use of artificial fertilizers, changes in land use and waste disposal (municipal, industrial and transport wastes) (WHO, 1985). Discharges of municipal and industrial waste are concentrated sources of nitrogen compounds that are to a large extent released directly into surface waters. The ingestion of larger doses can cause severe gastroenteritis with abdominal pain, blood and urine, weakness and collapse. Incessant consumption of smaller doses can cause dyspepsia, mental depression and headache. Nitrate can also be reduced to nitrite in vivo and this nitrite can interact with hemoglobin forming methemoglobin a condition describe as methemoglobinemia (Brnning-fann and kaneene, 1993). Nitrite can also react with amines, amides and amino acids to form N-nitroso compound known to be carcinogenic in experimental animals. These consequences underscore the need to survey the level of contamination of water by these nitrosating agents (nitrate and nitrite) and hence this study.

MATERIAL AND METHODS

Reagents and Samples. All chemicals were of analytical grade. Water samples were collected from wells, bore holes, soak aways and gutters from different locations within University of Ibadan.

Nitrate and Nitrite. Nitrite was determined directly according to Montgomery and Dymock, 1965 and nitrate bb cadmium reduction technique (Follett and Ratcliff, 1963). Levels of nitrite were calculated using the standard curve.

RESULTS AND DISCUSSION

The analysis shows that all the sampled water contained nitrate at levels that varies from 0.24µg/ml (in tap water) to 16.08µg/ml (in soak away water) and co ntained nitrite at levels ranging from 0.026µg/ml (in tap water) to 0.478µg/ml (in gutter water) (see Table 1). Although the values might be below or above the acceptable daily intake (ADI) according to the WHO but there are evidences of toxicological effect through incessant consumptions. The result suggests the existence of nitrate and nitrite in water.

Table1. Nitrate and Nitrite level of Water

Sample	Concentration of Nitrite µg/ml	Concentration of Nitrate µg/ml
Tap Water	0.026	0.24
Bole Hole Water	0.042	0.60
Well Water	0.105	4.68
Soak Away Water	0.205	16.08
Gutter Water	0.478	7.56

WHO Standards for acceptable daily intake (ADI) values for nitrate nitrite are 5.0 and 0.2mg/kg body weight respectively (WHO,1978)

CONCLUSION

According to the study, nitrate and nitrite concentration in water samples in the study area have reached levels that could be considered harmful to human life. The most vulnerable groups are likely infants and youths. There is need to replicate this study in other cities.

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