

SURVEY OF DRINKING WATER FROM AKOLA DISTRICT FOR THE OCCURRENCE OF NITRATES

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ABSTRACT

Nitrogen is the most important component of nitrate, nitrates are the chief source for plants and plays important role in its development. Study on nitrates in drinking water shows that there are certain regions where there is increase in nitrate percentage so as to make it harmful to humans as well as animals. Over all 8714 samples were analyzed and more than 40% of the sources contain non permissible limits whereas about 35% are near to harmful levels and rest of the samples analyzed shows normal values.

KEYWORDS: Akola district, drinking water, Nitrates,

INTRODUCTION

Drinking water containing high percentage of nitrates is harmful to humans as well as animals. Nitrate is a naturally occurring ion, which makes up part of the nitrogen cycle. The nitrate ion (NO_3) is the stable form of combined nitrogen for oxygenated systems (Croll and Hayes, 1988). Although it is chemically unreactive, it can be microbially reactive. Nitrate (NO_3) is a naturally occurring form of nitrogen (N) which is very mobile in water. It is essential for plant growth and is often added to soil to improve productivity. Water moving down through soil after rainfall or irrigation carries dissolved nitrate with it to ground water. In this way, nitrate enters the water supplies of many homes where they use springs or wells (Young *et al.*, 1980). Nitrates are associated with digestive tract cancers. It is seen that, infants under 6 months of age are susceptible to nitrate poisoning since bacteria's of their digestive tract convert nitrate to nitrite (NO_2). Nitrite then reacts with hemoglobin, which carries oxygen in blood, to form methemoglobin. Methemoglobin cannot carry oxygen, thus the affected baby suffers oxygen deficiency. The resulting condition is referred to as methemoglobinemia, commonly called "blue baby syndrome" (Croll and Hayes, 1988). Consumption of high-nitrate water by pregnant women and nursing mothers is not as likely to be harmful to babies as direct consumption. The health effects in these cases are not completely understood, so it is recommended that pregnant women and nursing mothers should limit nitrate consumption. Possible connections between nitrate and other health problems such as nervous system disorders, cancer, and heart damage are not well documented and are currently being researched (Young *et al.*, 1980).

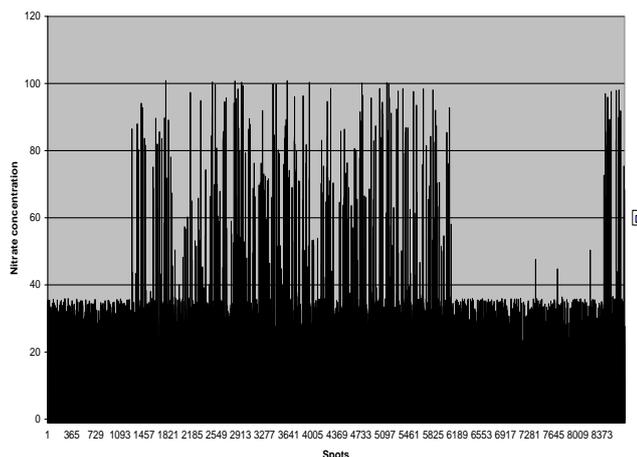
MATERIALS AND METHODS

Water samples from the sources like hand pump, dug well, tube well and canal and every possible source of drinking water was considered. Samples were collected from various villages in and around Akola district. 8714 samples of drinking water were taken from the respective source of the local areas of Akola district and samples were analyzed for the presence of nitrates according to the norms of WHO and standard protocol was followed to estimate (WHO, 1998)

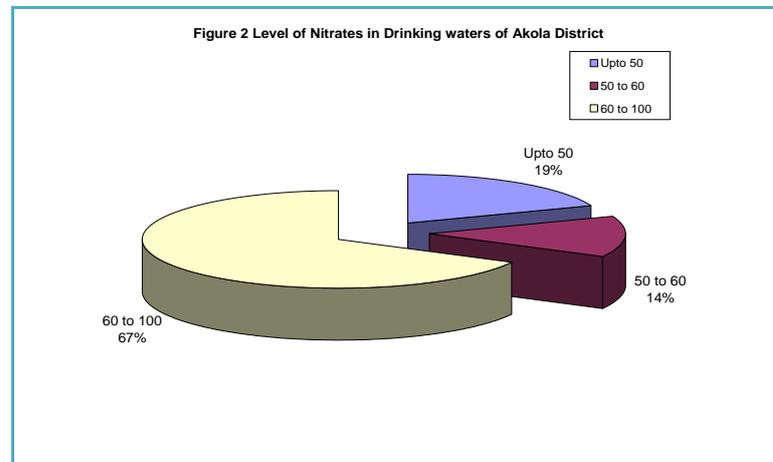
RESULTS AND DISCUSSION

As discussed earlier non-permissible level of nitrates are associated with several diseases and health complications. Here, we report the presence of nitrates in drinking water, which is above 67 %, places contain harmful level and 14 % contains nearly permissible amount of nitrates while up to 19 % are considered to be in limits. Degree of prevalence of nitrates is shown in figure 1, 2.

Figure 1 Nitrates in drinking water of Akola district



For the developing countries like India, treatment of drinking water to remove nitrate is expensive, consider not only the initial purchase price but also the cost of regular maintenance when purchasing a water treatment system (Gregory *et al.*, 2004). Therefore, simple household treatment procedures such as boiling, filtration, disinfection, and water softening do not remove nitrate from water. Boiling actually increases the nitrate concentration of the remaining water (Tandia *et al.*, 2000).



REFERANCES

- Croll B.T. Hayes C.R. (1988).** Nitrate and water supplies in the United Kingdom. *Environ Pollut* 50:163-187.
- Gregory D. Jennings and Ronald E. Sneed (2004).** Nitrate in Drinking Water, *Environmental Health Perspectives.*, Plant Physiol, Ed. By Pande and Sinha, Himalaya Publishing House, New Delhi.
- Tandia A.A., Diop E.S., Gaye C.B. and Travi Y. (2000).** Nitrate pollution study in the aquifer of Dakar (Senegal). *Schriftenr Ver Wasser Boden Lufthyg.* 105:191-198.
- WHO. (1985).** Health Hazards from Nitrates in Drinking Water. Report on a WHO Meeting. Copenhagen, 5-9 March 1984. Geneva: World Health Organization.
- WHO. (1998).** Guidelines for Drinking-Water Quality. 2nd ed. Vol 2: Health Criteria and Other Supporting Information. Geneva: World Health Organization.
- Young C.P. and Morgan-Jones M. (1980).** A hydrogeological survey of chalk groundwater of the Banstead, (1991) Vol 43, pp163.