DISTRIBUTION OF TRACE METALS IN DRINKING WATER OF SOME RURAL HABITATIONS IN WESTERN UTTAR PRADESH, INDIA AND THEIR SUITABILITY FOR DRINKING PURPOSE

Renu Chaudhary and Veena Chaudhary*

Deptt. of Chemistry, R.G. (P.G.) College, Meerut, U.P., India
**Deptt. of Chemistry, C.S.S.S. (P.G.) College, Machhra, Meerut, U.P., India*

Abstract: A study was conducted to assess the distribution of manganese, copper zinc and iron in drinking water in some part of western Uttar Pradesh. Ground water in the study area is neutral to moderately in nature. It was observed that the ground water in the study area is having higher concentration of iron and zinc which is vulnerable to drink. Iron was much higher than the acceptable limit in approximately 59% of water sample as per guide line of (WHO) However, the concentration of zinc were permissible limit but it was much higher than acceptable limit as per EPA guideline. The concentration of copper and manganese was within the limit. The suitability of ground water for drinking purpose were examined using WHO and EPA classification, which indicate that ground water, was unsuitable for drinking purpose in few location.

Keywords: Trace metals, Drinking water, Manganese, Copper, Zinc, Iron

REFERENCE

APHA (1998). Standard methods of the examination of water and waste water (18th edn) American Public Health Association,(APHA) New York, 11-20

APHA–AWWA–WPCF (1994). Standard methods for the examination of water and wastewater (15th edn.). Washington, DC: American Public Health Association(APHA)

BIS (1998). Specifications for drinking water. Bureau of Indian Standards, New Delhi, 171-178

Borah K.K.; Bhuyan B., and Shrama, H.P. (2010). Lead, Arsenic, Fluoride and Iron contaminationin drinking water in the garden belt of Dainana district, Assam, India. *Environmental Monitoring and Assessment* **169**(1-4):347-52.

Cantere, L.W. (1987). Ground water quality protection. Lewise publication Chelsee, MI.

Colter, A. and Mahler, R.L. (2006). Iranian drinking water. Asia Pecific. North West Extension Publication Universitry.

Datta, P.S. (2005). Ground water ethics for its sustainability. *Current Science*.**89**(50):812-817

Davis, J.A, Kent, D.B., Coston, J.A, Hess, K.M and Joye, J.L (2000). Multispecies reactive tracer test in an aquifers with spatially variable chemical conditions. *Water Resources Research*, **36** : 119-134

Edmunds, W.M. and Smedley, P.L. (2000). Residence time indicators in groundwaters: The East Midlands Triassic sandstone aquifer. **Applied Geochemistry, 15**: 737-752.

Edmunds, W.M. (2000). Hydrogeochemistry. In, H.K. Jones and N.S. Robins (eds.) *The chalk aquifer of the South Downs*. Keyworth, *British Geological Survey*. pp 55-63.

Eugenia G.A.; Vicente and Rafael (1996). Heavy metals in the application of inorganic fertilizers pesticides to rice farming soils. *Environmental Pollution*, **92**:19-25

ISI (1983) Indian Standard specification for drinking water, IS10500, ISI, New Delhi,

Kedziorek, M.A.M, Duputy, A., Bourg, A.C.M., and Compere, F. (1998). Leaching of Cd and Pb from a polluted soil during prelocation of EDTA: Laboratory column experiments modeled with a non-eqilbrium solubilizatin step. **Environment Science and Technology**, **32**: 1609-1614

Krisnamurthy, C.R and Pushpa, V. (1995). Toxic metals in the Indian environment. Tata McGraw Hill Publishing Co. Ltd. New Delhi pp. 280.

Lindsay, W.L. and Norvell, W.A. (1978). Development of DTPA soil test for zinc, iron, manganese and copper. *Soil Sci. Soc. America. Proc.* **15**, 149-151

Merian, E. (1991). Metals and their compounds in the environment. VCH Veglaggesellchaft, Germany. pp, 1438

Moharir, A.D.S., Ramteke, C.A.,Mogne, S.R.W. and Saran, R. (2002). Surface and ground wate quality assessment in Bina region. *Indian Journal of Enviornmental Protection* **22**(9):961-969.

Nriagu, C. (1980). Zinc in the environment Part I Ecological cycling, John Willey, New York

Pathak, H., and. Biswas, D.R., R. Singh, (2002). Fertilizer use and environmental quality, *Fertilizer News* **47** (11) 13-20.

Pizarro F, Olivares M, Uauy R, Contreras P, Rebelo A, Gidi G. (1999). Acute gastrointestinal effects of graded levels of copper in drinking water. *Environ Health Perspect*, **107**:117–121.

Rajmohan, N. and Elango, L. (2005). Distribution of iron, manganese, zinc and atrazine in ground water in parts of polar and Cheyar river basin, South, India. *Environmental Monitoring and Assessment*, **107**:115-131

Ramkrishna, C. R., Sadashivaia, C. and Ranganna , G.F. (2009). Assesment of water quality index for the ground water in Tumukar Taluk,

Karnataka State India. *Electronic Journal of Chemistry*, **6**(2): 523-530

Rao N. P., Latha, P and Ramesh P.V.K (2007). Water quality assessment a village level-A case study. *Indian Journal of Environmental Protection*. **22**(11): 996-1000

Rao S.M. and Mamtha P (2004). Water quality in sustainable water management. *Current Science*, **87**(7): 942-947

Richards, L. A. (1954). 'Diagnosis and Improvement of Saline and Alkali Soils.' Agric. Handbook. No.60. (U.S. Dep. of Agric.: Washington)

Sangu, R.P.S. and Sharma S.K. (1987). An assessment of water quality of River Ganga at Garhmukteswar. *Indian Journal of Ecology* **14**(20): 278-287.

Shankaran S.M.A (1997)**.** Hydrogeochemical assessment and current status of pollutants in ground water of Pondicherry region, South india. Ph.D Thesis, Anna University, Chennai

The times of India,12 March (2010). Ground water 33% of India undrinkable**.**

USEPA (1991)**.** Maximum contaminant level goals and National Primary Drinking Water Regulation for Lead and Copper, Final Rules Federal Register, **50**: 2410-2564

Vallce, B.L. (1957). Zinc and its biological significance. *Archive of Industrial Health*, **16**:**147**-156

Whitten, K.W., Davis, R.E., Peck, M.L and Stanley, G.G. (2004). General chemistry 7th Edition Brooks/Cole Thompson Learning, Belmant, USA. pp 919-921

WHO (1993). Guideline for drinking water supply quality (2nd edn) I. Recommendations World Health Organisation, Geneva.pp 180

WHO (2003). Guideline for drinking water quality (2nd edn) Ist Recommondation

Zahara, J.M., Smith, S.C., and Kuzel, I.S. (1995). Adsorption and dissociation of Co-EDTA complexes in iron oxide containing subsurface sands. **Geochim Cosmochim Acta**, **59**(23): 4825-4844.