Desalination and Water Treatment
www.deswater.com
19 (2010) 191–197
July
1944-3994 / 1944-3986 © 2010 Desalination Publications. All rights reserved.
doi: 10.5004/dwt.2010.1884

An investigation of nitrate and iron concentrations and their relationship in shallow groundwater systems of Kathmandu

Dhundi Raj Pathak*, Akira Hiratsuka

Graduate School of Engineering, Osaka Sangyo University, 3-1-1 Nakagaito, Daito, Osaka 574-8530, Japan
email: s07dn02@sub.osaka-sandai.ac.jp, drpathak@ymail.com

Received 16 September 2009; Accepted 15 February 2010

ABSTRACT

Groundwater is vulnerable to contamination by chemicals, including nitrate, which can pass through soil to the shallow groundwater systems. Nitrate-N is commonly used as an environmental indicator to trace the impact of anthropogenic activities on groundwater. An understanding of the fate of nitrate in groundwater is vital for managing risks associated with nitrate pollution to safeguard groundwater supplies. Hence, groundwater samples were collected in ninety wells of shallow groundwater systems of Kathmandu, Nepal including shallow tube wells, dug wells and stone spouts (locally called *Dhunge Dharas*). The samples were analyzed for nitrate-nitrogen (NO_3-N), iron (Fe) along with pH and temperature. The nitrate-nitrogen and iron (Fe) concentrations ranged from 0.0 to 26.4 and 0.0 to 5.24 mg/L, respectively. An understanding of the relationship between nitrate and iron in groundwater is crucial to explore the mechanism of natural denitrifi cation and its ability to reduce nitrate concentrations. In general, elevated nitrate concentrations were not found in sampled groundwater sources in study area where elevated iron concentrations were common. The observed negative correlations between nitrate and iron suggest that the nitrate in shallow groundwater is being consumed. Moreover, this study highlights the current status and trends of the nitrate and iron in shallow groundwater systems and their relationship to water depth and well types.

Keywords: Nitrate-N; Denitrification; Ferrous iron; Shallow groundwater; Nepal

* Corresponding author.