Austin Journal of Hydrology

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Editorial

Nitrates as an Environmental Factor Stimulating the Manifestation of Iodine Deficiency

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Received: October 06, 2015; **Accepted:** October 07, 2015; **Published:** October 08, 2015

Editorial

Iodine deficiency is still a major issue for the public health in a number of countries despite the successful realization of strategies for its elimination [1]. The fact that iodine deficiency was discovered in regions where it had been considered eliminated with the prophylactic programs [2] supports the assumption that other additional factors (goitrogenic food, protein malnutrition, insufficiency of microelements such as selenium) can influence its incidence and severity [3-6]. Particularly sensitive to iodine deficiency are the vulnerable groups such as children, pregnant women, etc.

A significant part of Bulgaria is considered as an iodine-deficient area. The National Strategy for Prevention and Control of Iodine Deficiency Disorders (IDD) was developed in 1994, and regular surveys undertaken in 2000–2003 indicated a normalization of the iodine supply in the Bulgarian population, including some at-risk population groups (children, schoolchildren, pregnant women). Despite the results achieved, mandating periodic cohort surveys for tracking the elimination of iodine deficiency are necessary because of the many environmental factors stimulating the manifestation of IDD.

Environmental pollution with a number of organic and nonorganic chemical products (nitrates, pesticides, thiocyanate, phenol, etc.) influences in one or another way the relative iodine deficiency or directly suppresses thyroid hormone synthesis, thus demonstrating a goitrogenic effect [7] and stimulating the manifestation and severity of IDD in regions with endemic iodine deficiency. Nitrate is the most common chemical contaminant in the world's groundwater aquifers harmful to human health [8]. Its intake in humans is via drinking water and food and might affect the thyroid gland function. The nitrate ion (NO_3^-) inhibits iodide (I^-) transport into the thyroid gland because it shares the same transport mechanism. This inhibition could lead to a decrease in thyroid hormone (T4, T3) secretion, followed by an increase in Thyroid-Stimulating Hormone (TSH) and thyroid gland enlargement (goiter) [9].

Nitrate in drinking water has been recognized as a factor for enhanced goiter incidence in many countries including Bulgaria [10] and discussed in numerous documents of the WHO [11]. Uncontrolled fertilizer application resulted in steady accumulation of nitrate in soil worldwide; the pollutant then easily passes through the soil into water. More than two-third of the ground water in Bulgarian rural areas has been affected [12]; at the same time 47.6% of drinking water in the country is derived from groundwater [13]. Nitrogen from human waste also appears to be an important source of nitrates especially in rural areas lacking centralized water and sanitation systems. The conclusion of the conducted surveys was that the excessive nitrate concentration is the most common problem of drinking water in Bulgaria [13].

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Citation: Gatseva PD and Bivolarska AV. Nitrates as an Environmental Factor Stimulating the Manifestation of Iodine Deficiency. Austin J Hydrol. 2015; 2(1): 1014.