



Ecological and geochemical parameters of drinking water in connection with the risk of thyroid disease in the Bryansk region after the accident at the Chernobyl nuclear power plant

Liudmila Kolmykova and Elena Korobova

V.I. Vernadsky Institute, Rus. Ac. of Sci., Geochemical, Moscow, Russian Federation (kmila9999@gmail.com)

Analysis of the macro-and microelement composition of drinking water in the Bryansk region, which is endemic in the goiter, showed that the content of I and Se in water in most of the surveyed settlements in the region does not reach a physiologically optimal level ($10 \mu\text{g/l}$ for I, $2.5\text{-}3.3 \mu\text{g/l}$ for Se) and is controlled by the geochemical conditions of their formation. Low levels of I and Se can aggravate the negative reaction of the thyroid gland to pollution of the I-131 area as a result of the Chernobyl accident (1986).

Within the framework of the research, the ranking of individual settlements in particular districts according to the degree of I and Se deficiency in drinking water was carried out. The areas with the lowest I concentration in drinking water ($3.18\text{-}5.66 \mu\text{g/l}$, $n=37$) are located in in the northern, northeastern and southern parts of the region.

The settlements where despite the mean low amount of iodine in drinking water, the particular hand-dug wells and private boreholes associated with groundwater and soil water contained optimal levels of iodine (from 10.1 to $22.7 \mu\text{g/l}$, $n=40$) have been revealed. These wells may serve as additional sources of the element in local diets. Such sources have been found in Novozybkovsky, Zhiryatinsky and Kletnyansky districts (western and central parts of the region).

In addition, locally elevated concentrations of Mn (up to 10 Maximum Permissible Concentration (MAC)), Fe (up to 26 MAC), Si and Sr (up to 2 MAC) in drinking water associated with certain hydrogeological complexes were found. These factors, in addition to the deficit of I and Se, can contribute to the spread of natural endemic diseases among the local population.