16-4 The Importance of vanadium concentration in water used in medical hydrology

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Introduction: The dream of mankind since immemorial times is opportunity to drinking water from the source of life, water that restores health. The healing waters, which include spring and mineral waters derived from groundwater and deepwater. Depending on the geological origin of water they contain different content of minerals including metals like vanadium. Data available from animal studies, cell culture, and few clinical observations suggest the benefit from vanadium supplementation in diabetes.

Objectives: Vanadium, depending on the consumed dose may be toxic or therapeutic. Unfortunately the WHO or other comparable authority did not rule definitively on this matter. Because of it, the aim of this study was, based on literature, to compare vanadium concentrations in some waters, particularly derived from the ground and deepground.

Methods: Literature review. Measurements of the concentration of vanadium in publications included in this review, in the tested water samples were performed with spectroscopic techniques.

Results: The concentration of vanadium in mineral water and groundwater ranges from 0–138μg/l, this means that some water content was below the detection limit. The survey of the chemical composition of 571 European bottled mineral waters from Austria, Belgium, Bosnia Herzegovina, Croatia, Czech Republic, Denmark, Finland, Great Britain, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Russia, Spain, Switzerland, Ukraine shows that the concentration of vanadium was above the detection limit (1μg/l) only in about 12% of the samples, while 132 samples of water from Australia, Belgium, Brazil, Canada, Czech Republic, Denmark, Dominican Republic, England, Finland, France, Germany, Hong Kong, Iceland, Israel, Italy, Japan, Kenya, Mexico, Netherlands, Peru, Poland, Slovenia, Spain, Sweden, Switzerland, Trinidad, the US and Yugoslavia vanadium concentration contain within 0.0006–93.1μg/l. The content of vanadium shows a fairly close relationship with the geological structure of the region of origin. In volcanic regions concentration increases in relation to the water of the river as much as 100 fold. The vanadium content in groundwater in Spain in the areas of Grenada ranged from 10.8–13μg/l, in Italy in area of Etna 18–138 μg/l, Lake Bracciano 17–30 μg/l and the Costello 1–82 μg/l, whereas, at the Lake Biwa in Japan 0.26 μg/l mm and in rainwater in Kyoto 0.37 μg/l μm.

Conclusions: There is an urgent need to identify desirable and maximum permissible content of vanadium in the waters, especially in the waters used in medical hydrology. They can be useful here, observations of the state of health of the population living in regions with varying
vanadium content.

Keywords: Vanadium concentration, Deep water, Ground water

**Literature**

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