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A statistical evaluation of the contribution of mineral and tap water to the dietary intake of AS, B, Cu, Li, Mo, Ni, Pb, U and Zn by humans

Abstract

Agriculture is a main contributor to environmental loads of nearly all elements of the periodic table. Mineral fertilizers, especially mineral phosphorus fertilizers, contain significant amounts of elements which affect the environment. The annual average loads of the elements arsenic (As), boron (B), copper (Cu), lithium (Li), molybdenum (Mo), nickel (Ni), lead (Pb), uranium (U) and zinc (Zn) to the entire agricultural land in Germany by the application of phosphorus fertilizers correspond to 38, 1575, 170, 10, 71, 50, 14, 239 and 604 tons, respectively. Some of these elements are essential for plants and higher organisms, for example B, Cu and Mo; others show a significant toxicity for life processes such as As, Pb and U. However, also essential elements such as Cu and Zn are toxic in higher concentrations. There are two major pathways by which elements enter the food chain: either by the uptake into food and forage plants or by leaching in potable ground and surface water bodies. As data on the contribution of drinking water to the total daily intake of these elements are scarce a study was conducted to evaluate the relative significance of mineral and tap waters to the total daily intake of the elements As, B, Cu, Li, Mo, Ni, Pb, U and Zn by humans. Preliminary results of this study are presented.