

Modelling of mercury concentration in human body under chronic exposure conditions

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Abstract

The dynamics of mercury concentrations in the human body is investigated by using a modified biologically based dynamic (MBBD) model, which considers the inputs via ingestion of both organic and inorganic mercury. The MBBD model reproduces the methylmercury and inorganic mercury concentrations in biological matrices and in main organs of European populations residing close to chlor-alkali plants. The calibration procedure of MBBD model parameters is based on the experimental datasets published in previous works. The model is validated by using the total mercury concentrations measured in biological matrices collected in the adult population residing in the Augusta Bay. The model results show that the total mercury concentrations in blood and hair of populations residing in Italy and Spain are higher than the risk level 1 fixed by Human Biomonitoring Commission and World Health Organization. The high methylmercury concentrations in major organs of Italian and Spanish populations obtained numerically are enough to cause adverse effects for human health. The MBBD model could become a useful tool for studying and preventing diseases associated with chronic mercury exposure conditions.

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