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HUMAN AND ENVIRONMENTAL EXPOSURE TO TOXIC CHEMICALS – CHEMICAL ANALYTICS AND EXPOSURE ASSESSMENT

Eva Kumar
Department of Health Security, Finnish Institute for Health and Welfare, Kuopio, Finland

Abstract
The use of industrial and consumer chemicals is indispensable in modern societies. Chemicals make important contributions to agricultural production, disease prevention and sanitation, and modern-day manufacturing processes, and thus are critical to the growth of economies. However, due to their ubiquitous presence, we are continuously exposed to chemicals that can be harmful to human and environmental health. Some classes of such toxic chemicals include polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), per- and polyfluoroalkyl substances (PFAS), novel brominated flame retardants, and unintentional by-products of many industrial processes, e.g., dioxins, furans. These chemicals are persistent, and toxic in nature. They can also accumulate in human tissues, for example, PFAS (a group of > 4700 chemicals) have been detected in human and animal populations globally. Humans are exposed to these chemicals mainly via food, drinking water, air, and dust. The main concern associated with these chemicals is that they act as endocrine-disrupting chemicals and can interfere with hormone systems even at very low doses.

After completing my PhD at Linnaeus University under the supervision of Prof. William Hogland in 2013, I moved to Finland and joined the Chemical Risks team in the Department of Health Security at the Finnish Institute for Health and Welfare. Our team investigates the routes by which the general population is exposed to the persistent chemicals. Our research focus is on the assessment of the health risks associated with the exposure to (new) chemicals and chemical mixtures. We also conduct monitoring of the persistent organic pollutants in humans, biota, and the environment. Our state-of-the-art laboratory is the Finnish National Reference Laboratory for dioxins and PCBs in food. Most of our analytical methods are accredited by the Finnish national accreditation body FINAS (SFS-EN ISO/IEC 17025:2005, laboratory T077).

Keywords: Industrial and consumer chemicals, persistent organic pollutants, chemical analytics, health risk assessment

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