HBM4EU science and policy for a healthy future

HBM4EU - the European Human Biomonitoring Initiative - is funded under the European Commission's Horizon 2020 programme and is investigating the exposure of the European population to priority chemical substance groups and resulting impacts on health. Diet is the main pathway of intake for several of these chemical groups, and as such, HBM4EU is generating valuable evidence of immediate relevance to the "Farm to Fork" strategy.

As mentioned in the European Commission's roadmap for the Farm to Fork Strategy, the current food system needs to be changed to significantly reduce the use of pesticides and fertilizers and the related risks to the environmental and human health. Policy measures to reduce the use of pesticides, and to manage the risks to human health and the environment of chemicals used in the food system are already in place. Further measures may be put forward under the Zero Pollution Agenda, as part of the European Green Deal. There are also linkages between the Farm to Fork Strategy other policy agendas, such as the forthcoming Biodiversity Strategy, the climate ambition and the Action Plan on the Circular Economy. As an example, the reuse of sewage sludge on agricultural land can lead to the dispersal of contaminants in soil and subsequent contamination of food and feed.

In order to secure the trust of the regulated communities, stakeholders and the public, it is essential to demonstrate the effectiveness of existing policies through monitoring activities. Human biomonitoring conducted through harmonised approaches at European scale provides a tool for monitoring the exposure of the European population to known or new chemicals. It can also be used to establish a baseline of exposure for the European population against which to measure the effectiveness of future risk management measures aimed at minimising human exposure to chemicals via the food chain. Comparable human biomonitoring data from across Europe can allow an understanding of regional differences and can identify vulnerable groups, in order to inform targeted measures to reduce exposure. Internal exposure data provides a complete picture of human exposure via both dietary exposure and other pathways, and can enhance chemical risk assessment.

The HBM4EU initiative is conducting human biomonitoring activities across 30 European partner countries to assess the current exposure levels of the EU population to the priority chemical substance groups, with data to be made available in 2021. Population exposure will be assessed against human biomonitoring health-based guidance values, which correspond to internal exposure levels at which there is no appreciable health risk. The consortium is also identifying the main sources of exposure, including dietary exposure, and assessing the exposure of vulnerable groups, such as children and highly exposed population groups.

Human biomonitoring determines internal human exposure following exposure to chemicals in food, as well as other matrices. This include chemicals used in food production, packaging and distribution systems such as fertilizers, pesticides and food contact materials, food contaminants such as mycotoxins, the soil contaminants cadmium and arsenic and the drinking water contaminate lead. HBM4EU is generating data on a range of relevant substances, with examples considered below.

Regarding work on pesticides, HBM4EU is monitoring exposure to mixtures of pesticides both in hotspots where residents live close to agricultural fields and in control areas in five EU European countries. In addition, HBM4EU is generating data on current exposure levels of the EU population to specific pesticides, including new data on children's exposure in different EU-countries. Children

eat more in relation to body weight and are therefore more exposed to pesticide residues from food items. The main dietary sources of exposure will be investigated and compared with measurements of pesticide residues in food items. Potential health risk will be characterised with special focus on pregnant women and children as vulnerable population groups.
We are working on a number of environmental contaminants to which people are exposed via diet, including cadmium, lead and arsenic. Regarding cadmium, HBM4EU will produce evidence on the current exposure of the European population and explore variation across countries and population groups. A possible link between soil contamination with cadmium and human exposure via dietary sources is being explored. Evidence on internal exposure to cadmium will inform a reflection on the maximum acceptable level for cadmium in food stuffs.

HBM4EU explicitly aims to support European regulatory processes on chemicals. For example, in response to a request from DG SANTE, partners provided information on human exposure to copper to support reflections on the use of copper compounds as an active substance in plant protection products.

Regarding mycotoxins, HBM4EU is investigating whether exposure to mycotoxins differs across population groups and identifying the main factors driving these differences, such as age, gender, settings and location. The work will investigate trends in human exposure to mycotoxins across Europe over time, and explore factors associated with these trends, including food safety policies and the impacts of climate change. The risk associated with human exposure to mycotoxins will also be characterised.

Chemicals used in food contact materials include phthalates and the substitute Hexamoll DINCH used in food contact materials. Bisphenol A and its substitutes BPS and BPF are used in printing ink for food packaging, as well as in plastic lining of food cans. Regarding per- and poly fluorinated substances (PFAS), HBM4EU will establish the current exposure levels of EU population, and evaluate relevant exposure pathways, including via food contact materials and drinking water. Chemicals that arise from food processing include polycyclic aromatic hydrocarbons and acrylamide. In addition, non-targeted screening is used to detect emerging chemicals in human matrices, as a means of identifying emerging risks.

Harmonised European human biomonitoring activities at European level can provide valuable evidence against which to track the effectiveness of the future Farm to Fork Strategy. Human biomonitoring should therefore be acknowledge in the strategy as a critical tool for science-based monitoring of current and future risk management measures to minimise human exposure to chemicals via the food chain.

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