In Humans Study Finds Thousands of Food-Contact Chemicals Raising Safety Concerns

Researchers analyzed biomonitoring data and other databases to investigate the presence of food-contact chemicals (FCCs) in humans.

Their findings indicate that 25% of known FCCs are present in humans, with many lacking comprehensive hazard data, which could help improve food safety and public health policies.

Study

The study used a two-step approach to identify FCCs detected in human samples. First, FCCs from multiple databases were compared with chemicals listed in biomonitoring programs and metabolome/exposome databases.

These sources included data from programs across the United States, Canada, and Europe. FCCs found in food contact materials but not included in these databases were then prioritized for further analysis.

In the next step of the research, the researchers systematically reviewed the scientific literature to find evidence of these FCC traces found in human samples such as blood and urine.

This systematic evidence mapping is a critical part of the study, as it identifies additional FCCs not detected in biomonitoring databases, providing a broader view of human exposure.

The results were compiled into a new database to support future safety assessments and regulatory decisions.

Results

This study investigated the presence of FCCs in humans through the analysis of data from multiple biomonitoring programs and metabolome/exposome databases. Of 14,402 known FCCs, evidence for the presence of 3,601 FCCs in humans was found. This includes 63 prioritized FCCs detected in samples from humans, indicating a significant presence of these chemicals in the general population.

FCCs were detected in biomonitoring programs or identified in scientific studies using databases like the Blood Exposome Database and the Human Metabolome Database (HMDB).

In biomonitoring programs, 194 FCCs were found in human samples, with programs monitoring over 400 chemicals since 1999. A significant overlap was seen between FCCs listed in these

programs and metabolome/exposome databases, highlighting the importance of these databases in tracking human exposure to FCCs. Among the databases, the Blood Exposome Database had the highest number of FCCs.

A systematic evidence map was created for 175 prioritized FCCs, revealing that 63 were detected in human samples, specifically in breast milk, urine, and blood. These FCCs include volatile organic compounds (VOCs), per- and poly-fluoroalkyl substances (PFAS), metals, and pesticides.

However, there are significant data gaps for many other chemicals, particularly oligomers and antioxidants, which are frequently found in food contact materials but are not regularly monitored in human samples. This lack of data limits the ability to fully assess their potential health impacts.

For some chemicals, like oligomers and antioxidants, the evidence of presence from human samples was limited, even though they are commonly detected in food contact materials (FCMs).

The study also flagged 100 FCCs as being of high concern for human health due to their hazardous properties, including carcinogens and reproductive toxicants like phthalates and benzophenone. Interestingly, for 59 of these prioritized FCCs, no hazard data was available, which complicates efforts to assess their safety. The findings suggest potential health risks from FCC exposure, emphasizing the need for further research to understand the implications of these chemicals in humans.

Conclusion

The study provided valuable insights into human exposure to food-contact chemicals (FCCs). It revealed that humans are exposed to at least 3,601 FCCs, but there are significant gaps in knowledge about the remaining chemicals, particularly in terms of hazard data.

The newly developed database helps integrate this data with previous databases on FCC migration, supporting further research on human exposure and health risks.

The study focuses on specific chemical groups like phthalates, PFAS, antioxidants, and photoinitiators, highlighting gaps in biomonitoring and hazard assessments for these substances.

The integration of multiple databases into the FCChumon system offers a robust tool for policymakers and researchers to better prioritize chemicals for future study, but the study also notes considerable uncertainty in data sources and challenges in chemical analysis, particularly for complex chemical groups like oligomers.

However, there are significant gaps in hazard data and challenges in identifying metabolites, especially for chemicals not monitored regularly. Additionally, the study acknowledges uncertainty in data sources and challenges in chemical analysis, particularly for oligomers.

Future studies should focus on filling data gaps related to the hazard properties and health risks of FCCs, particularly intentionally added chemicals, such as antioxidants, and their metabolites. More targeted biomonitoring efforts and risk assessments are essential to better protect human health.

Source:

https://www.news-medical.net/news/20240919/Study-finds-thousands-of-food-contact-chemicals-in-humans-raising-safety-concerns.aspx