CONSUMERS AWARENESS: THE RISKS ON ENDOCRINE DISRUPTORS IN INFANT FOOD (Part 2)

Facts: the increased synthesis of industrial chemical molecules which can cause harm to the endocrine system

- How Endocrine disruptors enter in the body
- Main Endocrine disruptors impacting children's health / the importance of staying updated

CONSUMERS UPDATES
SAFFI facts and briefing sheet n.7 (April 2023)

SAFFI
Safe Food for Infants in the EU and China

HOW THE ENDOCRINE DISRUPTORS ENTER IN THE BODY: THE RISK OF FOOD CONTAMINATION

EDCs primarily enter our bodies through oral, respiratory, and dermal routes. Generally, the oral route is considered the most significant, as EDCs can be present in contaminated water and food either through direct contamination or migration from "Food Contact Materials (FCMs)" that come into contact with food during various stages, including production, packaging, transportation, storage, food processing, and serving. However, there is still limited knowledge about the role of FCMs in the endocrine disruption caused by toxic chemicals, necessitating further investigation. Presently, over 175 chemicals capable of migrating and causing adverse effects in humans have been identified. However, more than half of the additives permitted for use in the U.S. and Europe lack appropriate toxicological studies.

In the atmosphere, chemical contaminants originate from waste combustion, vehicle emissions, the volatilization of pesticides and herbicides, the use of cosmetic sprays, and the adherence of EDCs to dust and particulate matter. These contaminants are frequently detected in both outdoor and indoor air, including homes and educational institutions. Recent preliminary research in France, for instance, has revealed significant levels of certain EDCs, including phthalates, in schools.

In water, EDCs can be found in wastewater from residential, hospital, commercial, agricultural, and industrial sources (partly due to filtration systems' limitations), as well as in clear surface and deep water. In oceans and seas, flame retardants have been identified not only in seawater but also in coastal sediments and all ocean sediments from the Pacific to the Arctic Sea. To this regard, it is of great importance to monitor the see food which is an important component of the diet in infants and children.

Transdermal absorption is another common route of entry. However, our understanding of the interactions between the skin and EDCs remains incomplete, necessitating further research, as seen in the case of parabens. Parabens, a class of preservatives used in cosmetics, drugs, and some foods, have antibacterial and antifungal properties. They have been widely used for over 70 years to prevent the growth of bacteria and fungi in products like shampoos, creams, toothpaste, and certain foods. Experiments with laboratory animals have shown that parabens have mild estrogenic activity, acting similarly to female hormones naturally produced by the body. A recent review of available data on paraben use, which is prevalent in cosmetics, indicates that a significant portion of the population uses these products excessively. This raises concerns about potential health risks, particularly for children, adolescents, and infants with more sensitive skin and potentially higher exposure levels compared to adults4. Nonetheless, the degree of their toxicity remains unclear, and regulatory bodies like the Food and Drug Administration (FDA) and the European Union's Scientific Committee on Consumer Safety (SCCS) report that while some literature suggests adverse effects in humans, there is currently no solid evidence confirming the unsafety of parabens.

Lastly, EDCs are found in soils due to deposition through atmospheric transport, dispersion from improperly collected and recycled waste, or, in agricultural settings, residue from pesticide use.

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MAIN EDCs IMPACTING CHILDREN'S HEALTH

The substances with potential endocrine-disrupting properties continue to be subjects of ongoing research, with approximately 800 of them identified to date. Among these, the most prevalent and rigorously regulated endocrine disruptors are commonly found in plastics, construction materials, combustion byproducts, pesticides, and some organisms produce them naturally. Many of these substances fall under the broad definition of Persistent Organic Pollutants (POPs). This term encompasses a class of organic compounds known for their toxic attributes, environmental persistence, accumulation in food chains, and potential threats to both children's health and the environment. A concise overview of major Persistent Organic Pollutants (POPs), the foods they contaminate, and the primary health risks associated with these POPs is presented in the table below. The key endocrine disruptors are outlined below, along with a brief description of their toxic characteristics.

Summary of most common persistent organic pollutants: Associated contaminated food and health hazards

Persistent organic pollutants	Contaminated food	Possible hazards
Polyaromatic hydrocarbons	Dairy products, grain, flour and bran, rice, fruit and vegetables, oyster, water	Mutagenicity/carcinogenicity, DNA damage, oxidative stress, impaired male fertility, respiratory diseases, cognitive dysfunction among children and cancer (breast cancer)
Organochlorine pesticide	Eggs, dairy products, meat and meat products, rice, fruit and vegetables, honey, oil, fish, mussel, water	Neurologic symptoms, endocrine disruption, infertility and fetal malformation, diabetes, cancer (breast cancer, testicular, prostate and kidney cancer), reproductive problems, cardiovascular problems, high blood pressure, glucose intolerance and obesity
Polychlorinated biphenyls	Eggs, dairy products, meat and meat products, rice, fruit and vegetables, oil, fish, mussel, water	Endocrine disruption, neurologic disorders, liver injury, diabetes, cancer (breast, prostate, testicular, kidney, ovarian and uterine), cardiovascular problems and obesity
Polybrominated diphenyl ethers	Fish, mussels	Reproductive problems, cancer (testicular), diabetes, obesity and cardiovascular problems
Perfluorinated compounds	Eggs, fish, water	Breast cancer
Hexabromocyclododecanes	Eggs, oil, fish	Endocrine disruption, reproductive problems and behavioral disorders
Polychlorinated naphthalenes	Meat and meat products	Cancers
Dioxins/furans	Eggs, dairy products, meat and meat products, oil, fish,	Language delay, disturbances in mental and motor development, cancer, diabetes, endocrine disruption, high blood pressure, glucose intolerance, and cardiovascular problems

(Pettoello-Mantovani M. et al., JPEDs, 2021; 229 (2): P315–316. E2)

CONSUMERS SHOULD ACQUIRE INFORMATION AND STAY UPDATED ON THE RISKS OF ENDOCRINE DISRUPTORS CONTAMINATS IN INFANTS AND CHILDREN'S FOOD: ADDRESSING ENVIRONMENTAL HEALTH CONCERNS

Environmental issues impacting health protection often prioritize the most visible aspects, such as air pollution resulting from industrial and residential emissions, as well as excessive vehicle usage in urban areas. These issues are readily perceivable by citizens and often lead to various forms of public protest, compelling authorities to implement measures that are observable by everyone. In contrast, limited attention is given to substances that quietly and insidiously jeopardize our health, albeit in highly detrimental ways. Persistent Organic Pollutants (POPs) exemplify this hidden threat. While they may be challenging to detect, they have the capacity to inflict severe and often irreversible harm on various forms of life.

The European Union is deeply committed to supporting research initiatives aimed at developing effective systems for monitoring the presence of contaminants in infants' and children's food, particularly those chemicals capable of causing endocrine disruption. One of the primary research programs funded by the EU is the Horizon 2020 initiative known as the "Safe Food For Infants" program (SAFFI), with a specific focus on infant nutrition. The expected outcomes of SAFFI will contribute to safeguarding this particularly vulnerable population from unforeseen contaminants, including endocrine disruptors, through predictive toxicology. The core objective of this European Union program is to furnish stakeholders involved in food safety with a robust Hazard Control Decision Support System. Such a system will enhance risk-based food safety monitoring and the management of biohazards across the entire food chain, from primary production to consumption.

Furthermore, it is essential that consumers are proactive in acquire comprehensive information regarding the risks associated with food contaminants, with a particular emphasis on the adverse effects of endocrine disruptors on children's health. The capacity to prevent undesirable health outcomes in children is of utmost importance, and require great attention and concern by Consumers.

SAFFI: THE SINO-EUROPEAN CONSORTIUM PARTNER CENTERS

Coordination: French National Research Institute for Agriculture, Food and Environment (INRAE),

- Five international infant food companies (Friesland Campina, HiPP, YIOTIS, Beingmate, YFFC)
- Two food safety authority institutions (ZAIQ and ANSES)
- Three European technological SMEs (CremeGlobal, Computomics, BDS)
- The Union of 49 National European Societies of Pediatric (EPA-UNEPSA)
- Seven leading European and Chinese academic institutions (WU, UNITO, IRTA, IVV; ZJU, ZAAS, JAAS)

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Creme Global

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computomics molecular data analysis
HiPP organic
FrieslandCampina
貝因美 BEINGMATE
JOTIS
INRAE transfert
浙江大學 ZHEJIANG UNIVERSITY
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