Point of view

Hazardous of Polyfluoroalkyl (PFASs) Toxicity:

Today, we live with several thousand manmade chemicals without knowing their toxic efects. Scientists and concerned citizens have been steadily raising awareness of the dangers of these toxicologically unidentified chemicals. Per- and polyfluoroalkyl substances (together, PFASs) are more than 3000 types and are deemed "emerging contaminates" by the EPA, meaning that they are chemicals or materials thought to pose a potential threat to health and the environment, but haven't yet been studied well to regulate their toxic effect. The multiple pathway entry of PFASs in human system includes air inhalation, dust ingestion, food and drinking water and dermal adsorption.

Nearly 7.6 billion individuals, globally are getting exposed to these highly persistent PFASs through ingestion of food sources, including fish, shellfish, meat produced from livestock that consumes contaminated water, foods cooked using contaminated water, or crops irrigated with contaminated water. These PFASs can make an entry to human gut when they are used as meat. Hand to mouth contact with stain resistant or water repellent clothes, carpets, wrappers of our food packets, the non stick cook wares, the microwaveable bags of popcorns or other fabrics that have been treated with PFASs. People are more vulnerable to their exposure when food is cooked in contaminated water as boiling increases their concentration. Industrial workers get exposures during manufacturing of PFASs containing products. PFASs can also be absorbed through skin by the application of personal care products especially sunscreen, baby powder and certain lotions.

PFASs contribute to environmental contamination largely due to the fact that they are highly resistant to degradation processes, and thus persist for many years in water, air and can enter the food chain via bioaccumulation in the human body as well as certain animal species where they can remain for a long period without metabolised. These compounds take anywhere from 2-9 years to be eliminated from the human body. PFASs may affect the development of foetuses and young children, leading to possible growth, learning or behavioural problems. Other studies have pointed out possible links to cancer, immune system disorders, and fertility problems. They are not only toxic to human but also to animals. Some animals exposed to high levels of PFAS show changes in hormone levels and in liver, thyroid, and pancreatic functions.

EPA's 2016 advisory body has recommended standards only for some PFAS compounds, such as perfluorooctanoic acid (PFOA) and perfluorooctanesulfonate (PFOS) whose exposure limit is 0.07 ppb (or 70 ppt). The European Union's guidance on PFOA recommends 0.001 ppb for surface water. Recent scientific studies have recommended a level of 0.001 ppb is most appropriate to safeguard public health. There is a need to make an attempt to detect the nano level PFASs in the surface water as well as ground water in order to set standards for the many remaining unidentified PFASs sources. Till date, bare minimal work has been done hence, understanding of threshold level and mechanism of action is crucial for ascertaining the toxicity of such compounds in Indian population. There is an urgent need of generating data before getting too late. The data will help to identify new pathways to enter in the human body. This understanding will be helpful in the reduction of risk either by the way of eliminating their production or by finding a safer alternative in the absence of their elimination.

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