



NEWS

Food contact chemicals among 921 substances tied to breast cancer risk

Researchers expand list of known substances with characteristics linked to breast cancer by more than four-fold; many are in standard consumer products, including 189 in food contact according to FPF's database on migrating and extractable food contact chemicals (FCCmigex); authors call for improved hazard identification methods, advocate for more comprehensive chemical testing, especially focusing on the mammary gland and broader range of chemicals

⌚ February 1, 2024 📲 Lindsey Parkinson ✍ 4 minutes

In an [article](#) published on January 10, 2024, in *Environmental Health Perspectives*, Jennifer E. Kay and co-authors from the *Silent Spring Institute* and the *University of California, Berkeley* published a list they developed of over 900 chemicals with evidence that they may increase breast cancer risk.

The researchers reviewed information from “authoritative databases,” including *International Agency for Research on Cancer (IARC) Monographs* and the *US Environmental Protection Agency’s (EPA) ToxCast* to find which chemicals have been found to induce mammary tumors in rodents. Then they looked at multiple aspects of endocrine activity and genotoxicity of these chemicals to assess the [key characteristics](#) of rodent mammary carcinogens, and to identify other chemicals that exhibit these effects and may, therefore, increase breast cancer risk (FPF [reported](#) also [here](#)).

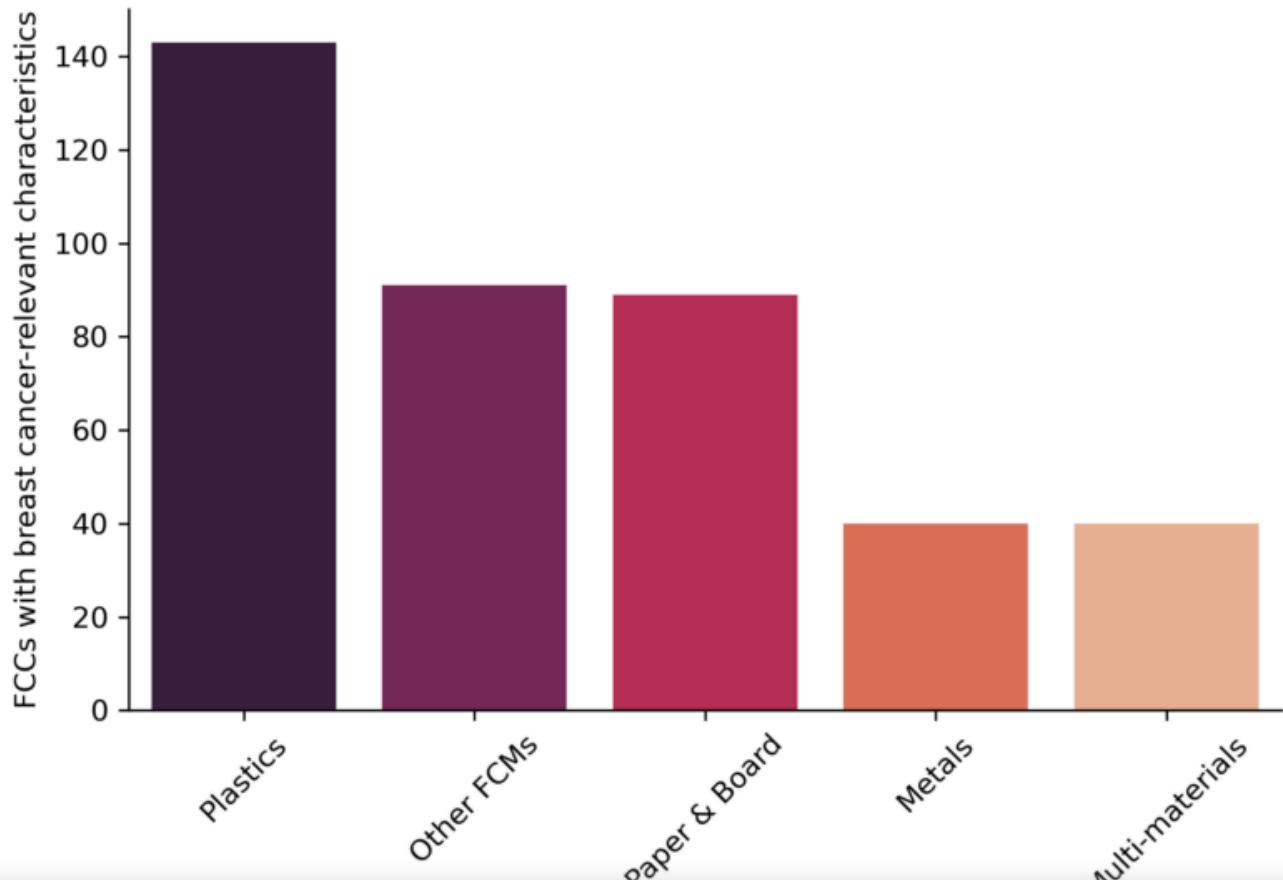
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Of the 921 breast cancer-relevant chemicals found by Kay and co-authors, 189 have been measured in food contact articles according to the *Food Packaging Forum's* database on migrating and extractable food contact chemicals ([FCCmigex](#)). Migration experiments more closely resemble real-use situations but even when limiting FCCmigex results to migration, 121 breast cancer relevant chemicals have still been detected.

Three-quarters of the breast cancer relevant food contact chemicals (FCCs) were detected in food contact articles made with plastic, but all material groups except glass* contained some of the chemicals (see Figure 1. *note: some of these chemicals may be in metal closures of glass containers).



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assessments focusing on the effects of these compounds on the mammary gland, the development of assays for a broader range of chemicals, and a more comprehensive approach to chemical testing.

FPF's *Chief Scientific Officer*, Jane Muncke, together with 20 other scientists recently published a vision for safer food contact materials that discusses some of the same concerns (FPF [reported](#)). Muncke et al. developed the six clusters of disease concept, which highlights prevalent and increasingly concerning non-communicable diseases linked to chemical exposures: cancers, cardiovascular diseases, as well as reproductive, brain-related, immunological, and metabolic disorders. The vision proposes a novel approach for testing FCCs that includes assessing the health impacts of FCCs and real-life mixtures with respect to the most prevalent non-communicable diseases in the human population.

The ten most-often-detected breast cancer relevant chemicals in food contact articles are (see also Figure 2):

- Di(2-ethylhexyl) phthalate (CAS 117-81-7)
- Dibutyl phthalate (CAS 84-74-2)
- Bisphenol A (CAS 80-05-7)
- Diisobutyl phthalate (CAS 84-69-5)
- Benzophenone (CAS 119-61-9)
- Diethyl phthalate (CAS 84-66-2)
- Benzyl butyl phthalate (CAS 85-68-7)
- Styrene (CAS 100-42-5)
- Dimethyl phthalate (CAS 131-11-3)
- Irganox 1010 (CAS 6683-19-8)

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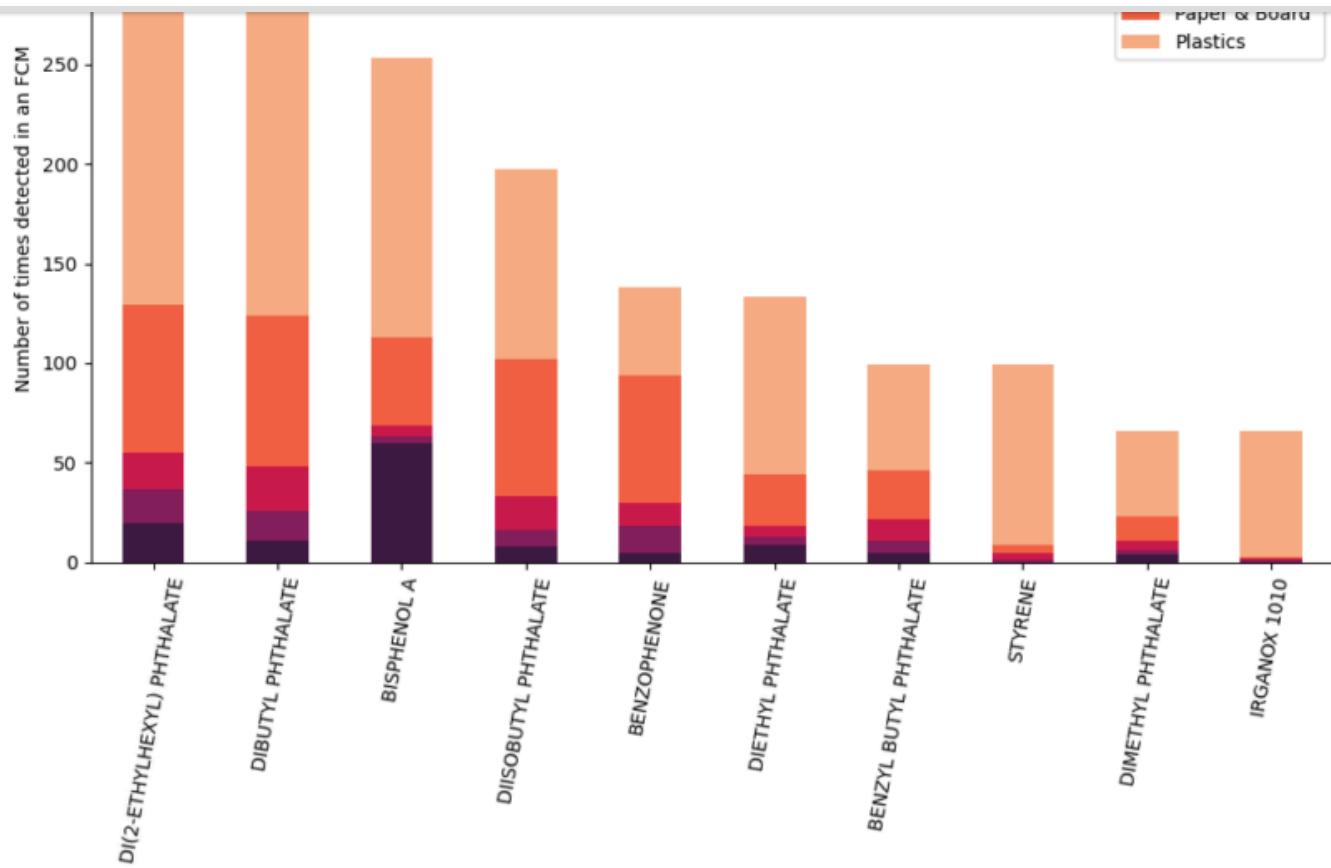


Figure 2. The ten most studied food contact chemicals included in Kay et al.'s list of breast cancer relevant substances. Bars represent the number of times it has been detected in migration or extraction experiments from a food contact article, color represents the material of the article.

Many of these breast cancer-relevant FCCs have been under scrutiny at multiple regulatory jurisdictions in recent months and years. The *European Food Safety Authority (EFSA)* in 2023 lowered the tolerable daily intake for [bisphenol A](#) (BPA) by a factor of 20,000 (FPF [reported](#)). The *US Food and Drug Administration* is expected to make a decision on BPA this year (FPF [reported](#)) while Washington State banned bisphenol-based can liners entirely and has a plan to reduce citizen exposure to [phthalates](#) (FPF [reported](#)). The *European Chemicals Agency* recently expanded its substances of very high concern

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This concern for chemical testing and regulation is reflected by Kay et al. who “argue that many of these [chemicals] should not be considered low hazard without investigating their ability to affect the breast, and chemicals with the strongest evidence can be targeted for exposure reduction.”

Reference

Kay, Jennifer E., et al. (2024). [“Application of the key characteristics framework to identify potential breast carcinogens using publicly available *in vivo*, *in vitro*, and *in silico* data.”](#) *Environmental Health Perspectives*. DOI 10.1289/EHP13233

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Jones, R.R. and A.J. White. (2024). [“New Motivations and Future Directions for Investigating Environmental Risk Factors for Breast Cancer.”](#) *Environmental Health Perspectives*. DOI: 10.1289/EHP13777

Liza Gross (January 10, 2024). [“More Than 900 Widely Used Chemicals May Increase Breast Cancer Risk.”](#) *Inside Climate News*.

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