

Fidra is asking the UK Government to introduce legislation banning *all* bisphenols from use in thermal paper by 2023 to improve health and environmental protection against chemical exposure, and to enable safe and effective product recycling.

Key Points:

- Bisphenols are a group of widely used industrial chemicals, often found in thermal papers such as receipts, tickets and labels.
- Bisphenols have been linked to numerous health and environmental impacts, including fertility issues, cancers, and obesity in humans, and reduced reproductive success in wildlife.
- Bisphenols in thermal papers can contaminate recycling streams, undermining the safety and effectiveness of the circular economy.
- Bisphenol-A was banned in January 2020 from UK till-receipts based on the risk to human health. In many cases, this has led to regrettable substitution to alternative bisphenols with similar health and environmental impacts.
- EU member states are already taking action on bisphenols, with Germany proposing a ban across the full chemical group.
- Leading UK retailers support Fidra's call for a group-based restriction, banning the use of *all* bisphenols in thermal papers.

Impact public health

Bisphenols have been detected in the bodies of almost every individual ever testedⁱ and have been linked to numerous health concerns, including **breastⁱⁱ, prostate and ovarian cancerⁱⁱⁱ, obesity^{iv}, fertility issues^v, diabetes and neurobehavioral difficulties^{vi}**. The hormone-disrupting nature of these chemicals means pregnant women, children and infants are particularly vulnerable^{vii}, resulting in many countries restricting Bisphenol-A (BPA) from certain products to help minimise exposure^{viii}.

BPA, the most widely researched bisphenol, is classified as **toxic to reproduction** by the European Chemicals Agency (ECHA) and is a known **Endocrine Disrupting Chemical (EDC)^{ix}**, meaning it can interfere with normal hormone function. However, restrictions on BPA have led to regrettable substitutions with other, less well studied bisphenols, such as BPS^x. Growing evidence suggests **common bisphenol alternatives may be equally, or in some cases more, harmful than BPA^{xi,xii}**.

Bisphenols impact the environment & undermine the circular economy

As a result of their continued and widespread application, **bisphenols are now ubiquitous in our environment**. They have been found in air^{xiii} and on beaches^{xiv} across the world, and are spread directly onto land through sewage sludge used as agricultural fertilizer^{xv}. Once in the environment, they have been shown to cause **hormonal disruption and reduced reproductive success in multiple wildlife species^{vi}**. To address this ongoing environmental contamination, Germany is proposing **a ban on all structurally similar bisphenols and their derivatives**. The restriction is reasoned as a necessary “*emission reduction measure*”, essential to protect the environment from BPA and other bisphenol alternatives^{xvii}.

Bisphenols have also been found to **contaminate recycling streams for products such as pizza boxes^{xviii} and toilet paper^{xix}, compromising the safety of secondary materials**. Not only does this **prolong exposure of people and the environment to hazardous chemicals**, it also **undermines public confidence in the circular economy**.

Taking action on bisphenols and other endocrine disruptor chemicals

In 2020, **BPA was banned from use in receipts across the UK and EU** due to the health risks posed to the unborn children of cashiers. This was based on high dermal exposure of cashiers handling till receipts. However, given the substance specific approach, the ban **did not protect against regrettable substitution and cashiers remain at risk from high levels of bisphenol exposure**.

A recent ECHA survey estimated that by 2022, 61% of all thermal paper would contain Bisphenol S (BPS) as a replacement to BPA^{xx}. BPS is a suspected reproductive toxicant and endocrine disruptor^{xxi}. These health concerns resulted in a subsequent ban on BPS from receipts in Switzerland^{xxii}. BPB was also identified as an endocrine disruptor by the French authority, ANSES, in 2019^{xxiii}. The **continued risk of regrettable substitution amongst bisphenols** led to Germany's recent development of a group-based restriction proposal^{xvi}.

The 2020 EU Chemicals Strategy for Sustainability highlights the need for urgent action to address endocrine disruptors, such as bisphenols, stating that the Commission will **‘ensure that endocrine disruptors are banned in consumer products as soon as they are identified, allowing their use**

only where it is proven to be essential for society^{xxiv}.

The solution

A recent survey demonstrated clear **support from leading UK retailers for group-based legislation banning the use of bisphenols in till receipts**, with human health, environmental protection and economic savings listed as key benefits^{xxvi}. Retailers also highlighted the role legislation has in supporting companies taking proactive measures in chemical management, creating a level playing field and reducing the burden of successive restrictions. This research clearly demonstrates that **a group-based ban on bisphenols in receipts is both viable and supported by UK retailers**.

Some UK retailers are already using bisphenol-free alternatives. As of December 2021, 14 major UK retailers were using bisphenol-free thermal paper for receipts, with two others phasing in bisphenol-free stock^{xxv}. There has also been a marked increase in retailers offering digital or 'no-receipt' options to consumers, bringing additional environmental and cost-saving benefits.

Fidra is therefore calling on the UK Government to take immediate steps to end this source of unnecessary endocrine disrupting chemicals, setting an international standard in public health and environmental protection, and creating the foundation for a safe and effective circular economy.

We recommend the UK Government introduce legislation banning the use of all bisphenols in thermal paper by 2023.

“Legislation in the right area tends to force manufacturers to solve problems they otherwise might not, it also provides a level playing field for purchasing organisations and removes any barriers around commercial competitiveness.” Steve Packer, Director, Pizza Hut Restaurants

Conclusions and Recommendations

With growing evidence around the health and environmental risks associated with bisphenols, there is an urgent need to protect people and our environment, as well as to ensure safety and public trust in recycled products. UK retailers have clearly demonstrated their support for a ban on bisphenols in thermal paper, many already opting for bisphenol-free receipts. However, the widespread use of regrettable substations clearly shows that voluntary action alone is not enough.

Extending the current BPA restriction to cover all bisphenols would eliminate this source of harmful pollution, create a level playing field for retailers and simplifying chemical legislation. It would also encourage investment in innovative solutions, supporting the Green Recovery and demonstrating the UK's commitment to safe and effective chemical policy.



- ⁱ Concentration of bisphenol A in thermal paper. DOI: <https://doi.org/10.1080/17518253.2010.502908>
- ⁱⁱ Bisphenol S induced epigenetic and transcriptional changes in human breast cancer cell line MCF-7. DOI: <https://doi.org/10.1016/j.envpol.2018.12.084>
- ⁱⁱⁱ A comprehensive review on the carcinogenic potential of bisphenol. DOI: <https://doi.org/10.1007/s11356-021-13071-w>
- ^{iv} Urinary Bisphenols and Obesity Prevalence Among U.S. Children and Adolescents. DOI: <https://doi.org/10.1210/js.2019-00201>
- ^v Bisphenol A: an emerging threat to female fertility. DOI: <https://doi.org/10.1186/s12958-019-0558-8>
- ^{vi} Endocrine-disrupting chemicals: implications for human health. Lancet Diabetes DOI: [https://doi.org/10.1016/S2213-8587\(20\)30129-7](https://doi.org/10.1016/S2213-8587(20)30129-7).
- ^{vii} Early Life Metabolism of Bisphenol A: A Systematic Review of the Literature. DOI: <https://doi.org/10.1007/s40572-013-0003-7>
- ^{viii} SGS. Accessed June 2021: <https://www.sgs.com/en/news/2018/10/bpa-bans-and-restrictions-in-food-contact-materials>
- ^{ix} ECHA. Accessed June 2021: <https://echa.europa.eu/hot-topics/bisphenol-a>
- ^x The use of bisphenol A and its alternatives in thermal paper in the EU during 2014 -2022. DOI: <https://doi.org/10.2823/592282>
- ^{xi} Substitution of bisphenol A: a review of the carcinogenicity, reproductive toxicity, and endocrine disruption potential of alternative substances: Critical Reviews in Toxicology DOI: <https://doi.org/10.1080/10408444.2019.1701986>
- ^{xii} Editor's Highlight: Transcriptome Profiling Reveals Bisphenol A Alternatives Activate Estrogen Receptor Alpha in Human Breast Cancer Cells. DOI: <https://doi.org/10.1093/toxsci/kfx101>
- ^{xiii} Ubiquity of bisphenol A in the atmosphere. DOI: <https://doi.org/10.1016/j.envpol.2010.06.040>
- ^{xiv} Sandy beaches as hotspots of bisphenol A. DOI: <https://doi.org/10.1016/j.envres.2020.110175>
- ^{xv} A study on temporal trends and estimates of fate of Bisphenol A in agricultural soils after sewage sludge amendment. DOI: <https://doi.org/10.1016/j.scitotenv.2015.01.053>
- ^{xvi} Bisphenol A exposure, effects, and policy: A wildlife perspective. DOI: <https://doi.org/10.1016/j.jenvman.2012.03.021>
- ^{xvii} ECHA. Accessed December 2021: <https://echa.europa.eu/registry-of-restriction-intentions/-/dislist/details/0b0236e1853413ea>
- ^{xviii} Danish Consumer Council. Accessed June 2021: <https://kemi.taenk.dk/bliv-groennere/test-unwanted-chemicals-found-pizza-boxes>
- ^{xix} Widespread occurrence of bisphenol A in paper and paper products: implications for human exposure. DOI: <https://doi.org/10.1021/es202507f>
- ^{xx} The use of bisphenol A and its alternatives in thermal paper in the EU during 2014 -2022. DOI: <https://doi.org/10.2823/592282>
- ^{xxi} ECHA. Accessed September 2021: <https://echa.europa.eu/brief-profile/-/briefprofile/100.001.137>
- ^{xxii} Chemical Watch. Accessed December 2021: <https://chemicalwatch.com/77769/switzerland-bans-the-use-of-bpa-and-bps-in-thermal-paper>
- ^{xxiii} Evidence for Bisphenol B Endocrine Properties: Scientific and Regulatory Perspectives. DOI: <https://doi.org/10.1289/EHP5200>
- ^{xxiv} European Commission. Accessed September 2021: <https://ec.europa.eu/environment/pdf/chemicals/2020/10/Strategy.pdf>
- ^{xxv} Fidra, 2021. <https://www.fidra.org.uk/wp-content/uploads/How-UK-Retailers-are-Tackling-Chemicals-of-Concern-Fidra-Report.pdf>