Science Policy Outreach Task Force at Northwestern University OVERVIEW ON THE USE, IMPACT AND ALTERNATIVES TO BPA



SPOTlight: BPA is a commonly used chemical in paper and plastics manufacturing, but studies show that concentrated exposure can lead to several significant health concerns.

What is BPA?

- First synthesized in 1891, Bisphenol-A (BPA) is a mass-produced chemical that has been used heavily in the production of plastics since 1950 due to its low cost and high performance.^{1,8}
- BPA is primarily used for the manufacturing of plastics and epoxy resins, and is often found in food and beverage storage containers, thermal paper used in receipts, and other plastic products.²

How are humans typically exposed to BPA?

- BPA leaches into foods or beverages packaged in plastic bottles or cans containing BPA. Humans are primarily exposed to BPA by ingesting these foods.³
- BPA is often present in paper and plastic garbage. Waste treatment plant runoff allows BPA to enter water systems leading to human and wildlife exposure.⁴

How are humans exposed to BPA through contact with receipts?

- In addition to exposure through food ingestion and water contamination, materials coated in BPA, such as receipts, can readily transfer the chemical to the skin.⁵ BPA serves as the primary color developer in the thermal paper used to print cash register receipts. When heated to the appropriate temperature the color developer activates the dye present in the paper to produce the color.⁴
- Studies on cashiers, who have repeated contact with BPA-coated thermal paper, have shown increased presence of BPA in urine samples, indicating BPA internalization from skin contact.⁵

What are the health impacts of exposure to BPA?

- Studies with animals and humans suggest that BPA exposure impacts the reproductive system and neurological developmental. There is marginal evidence of BPA demonstrating carcinogenic effects in animals with inadequate evidence in humans.⁴
- BPA is a known disruptor of the body's endocrine system and may interact with estrogen receptors when internalized.³ Studies using animals link BPA exposure to human diseases such as early onset of puberty in women, an increased incidence of prostate and breast cancer, and ADHD.³

What are some possible alternatives to BPA?

- Eliminating or reducing BPA in receipts could require substantial changes to the paper production process. This is because any new color developer must be feasible for large scale production and suitable for the temperature conditions of the specific printer.⁴
- In 2004 the European commission set limits for the level of BPA that can leach out of plastics, prompting many companies to turn to Bisphenol S (BPS) as an alternative. In 2010 a major US manufacturer of thermal paper announced the use of BPS as a color developer.⁶ However, BPS has a similar structure to BPA and thus presents many of the same health concerns as BPA.⁴
- In 2015 the EPA produced a comprehensive report of human health and environmental impacts of 15 BPA alternatives for thermal printing. Two alternatives, Pergafast and Urea Urethane Compound, are predicted to have low to moderate human health effects compared to BPA and BPS.⁴ In 2017 Pergafast was the most commonly used alternative to BPA for color developing in Germany.⁷
- To limit the use and exposure of BPA and similar chemicals, electronic receipts could be explored as alternatives to thermal paper.⁴

References and additional resources

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