

Proposed Amendments to NYS S7408 / A8007 2025

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These amendments are proposed to strengthen and expand the effectiveness of [Senate Bill S7408](#) / [Assembly Bill A8007](#), introduced April 15, 2025, by addressing gaps in applicability, implementation, and liability protection. See attached bibliography in the second tab of the Google document, or access it directly [here](#).

§ 2. Legislative intent. *(This section is added to the public health law to provide legislative context and rationale for the provisions introduced in § 3 and the subdivisions that follow.)* The legislature finds and declares the following:

1. New Yorkers are increasingly exposed to microplastics, PFAS, and other hazardous chemicals through common single-use food and beverage containers, particularly those made of or lined with plastic and bioplastic. [A growing body of peer-reviewed scientific research](#) has found that these chemicals leach into food—especially hot, greasy, or acidic items—and accumulate in the human body, posing risks to cardiovascular, reproductive, and endocrine health.
 2. Most single-use containers used for takeout and retail food services—including those labeled as compostable or biodegradable—contribute to plastic pollution and chemical exposure, despite appearing environmentally friendly.
 3. The State has an interest in protecting public health and advancing environmental sustainability by reducing reliance on single-use packaging and empowering consumers to make safer choices.
 4. States such as [California](#), [Illinois](#) and [Oregon](#) have already expanded BYO (Bring Your Own container) policies to include restaurant takeout and grocery store deli counters. These examples demonstrate that safe and practical BYO systems are both achievable and effective.
 5. Allowing reusable container use for takeout and prepared foods reduces landfill-bound waste, mitigates lifecycle emissions from plastic production and disposal, and aligns with New York State's climate and sustainability goals, including those set forth in the Climate Leadership and Community Protection Act (CLCPA).
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§ 3. The public health law is amended by adding a new section 1352-f to read as follows: *(Formerly § 2, renumbered due to insertion of new § 2 on legislative intent.)*

Amendment 1: Expand BYO for Food Takeout

Insert the following as a new paragraph (c) under subdivision 2 ("Requirements"):

c. A food service establishment that provides food for takeout may allow a customer to have food served in a reusable food container provided by the customer in substitution for a disposable container, provided that:

(i) the reusable container appears clean and appropriate for the type of food served, based on a reasonable visual inspection of cleanliness, size, and material; and

(ii) the food is transferred in a manner that avoids direct contact between the customer's container and any food-contact surfaces of service equipment or utensils.

Amendment 1-A: Community Container Collections for Dry Bulk Foods and Beverages

Insert the following as a new paragraph (d) under subdivision 2 (“Requirements”):

d. A retail food store or food service establishment may permit customers to use reusable containers obtained from a community collection maintained on-site, including but not limited to jars for dry bulk foods and cups or mugs for beverages, provided that:

(i) all containers appear clean, food-grade, and free of visible residues or contamination, based on a reasonable visual inspection by store personnel;

(ii) containers from the community collection are clearly designated as customer-supplied, segregated from new unused containers, and offered for use at the customer’s own risk; and

(iii) signage is posted near the collection area clearly stating that containers are donated and maintained by customers, must be washed by customers before being placed in the bin for others, and are offered for use at the customer’s own risk.

State and local code conformity.

Notwithstanding any other provision of law, including but not limited to section 271-2.26 of Title 1 of the New York Codes, Rules and Regulations and section 81.46 of Title 24 of the Rules of the City of New York, the provisions of this paragraph shall govern the use of reusable food and beverage containers from community collections in retail food stores and food service establishments.

Amendment 1-B: BYO Containers for Salad Bars and Hot Bars

Insert the following as a new paragraph (e) under subdivision 2 (“Requirements”):

e. A retail food store or food service establishment that offers self-service salad bars, hot bars, or other temperature-controlled prepared foods may allow customers to use their own reusable food containers in substitution for disposable containers, provided that:

(i) customers use clean containers that are appropriate for the type of food served, based on a reasonable visual inspection by store personnel;

(ii) containers are used in a manner that avoids direct contact with food pans, utensils, or other food-contact surfaces, beyond those utensils provided for normal service; and

(iii) signage is posted at the point of service stating that reusable containers are permitted only if they do not touch food pans or utensils.

Amendment 2: Liability Protection for Food Service Establishments and Retail Food Stores

Insert the following as a new subdivision 4 titled “Liability”:

4. Liability.

Nothing in this section shall be construed to impose liability on a food service establishment and retail food stores that, in good faith, accepts a reusable container provided by a customer, including claims related to foodborne illness, alleged contamination, or the condition, safety, or integrity of the container, provided the establishment complies with the applicable provisions of this section.

Amendment 3: Autonomy for Food Establishments

Insert the following as a new paragraph (5) under subdivision 2:

5. Nothing in this section shall require a food service establishment to accept a reusable container if the establishment determines, based on reasonable concerns related to food safety or operational feasibility, that acceptance is not appropriate.

Amendment 4: Update Signage Requirements in Subdivision 3

***Modify subdivision 3 as follows: (Former paragraphs a .and b. are repealed and consolidated into a single provision to reflect Amendment 3.)*

3. Notification.

Every food service establishment in the state that serves food and beverages to customers in single-use containers is encouraged to conspicuously post signage informing customers that they are permitted to request the service in their own reusable containers, both for takeout and leftovers from partially consumed meals in their own reusable food containers, consistent with the provisions of this section.

Amendment 5: Coordination with Department of Agriculture and Markets

Insert the following as a new § 4. (renumber current § 3 as § 6):

§ 4. The commissioner shall consult with the Department of Agriculture and Markets to review and recommend the repeal of [Section 271-8.3\(e\)](#) of the New York State Food Code, which currently prohibits consumer-provided reusable containers at grocery store delis and salad bars, to allow safe and voluntary BYO practices consistent with the provisions of this act, as is already practiced in states such as California (CA AB619, enacted 2019), Illinois (IL HB2086, enacted in 2023), Oregon (OR SB545, enacted 2023) and Maine (LD 2091 / Chapter 528, enacted 2024).

§ 5. This act shall take effect one year after it shall have become a law.

(Renumbered current § 3 as § 5.)

Bibliography: Case for BYO

The CASE FOR BYO: Bibliography

By [BYO - US Reduces](#)

Updated: October 24, 2025

Why This Bibliography Matters

BYO (Bring Your Own) rights is not just a matter of waste reduction—it's a public health issue. Single-use foodware, whether plastic, paper-lined, or marketed as compostable, has been shown to leach harmful chemicals and release microplastics that enter our bodies through the food we eat and the beverages we drink. This annotated bibliography compiles peer-reviewed studies, government reports, and policy precedents that together form the scientific and policy basis for expanding BYO access—not only in restaurants but also in grocery store delis and across the broader food service sector. It is time for New York to catch up with California, Illinois, and by ensuring that all people have the right to use their own clean and safe reusable containers to protect their health.

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The Case of BYO

Brake, Michelle. “The Case for BYO.” *B.Y.O. – US Reduces*. January 1, 2025.

<https://usreduces.org/the-case-for-byo/>.

US State BYO Codes

[CA](#) (2019), [OR](#) (2023), [IL](#) (2023), [ME](#) (2024)

Oregon Metro. *Choose to Reuse: A Guide to Switching to Reusable Serviceware.*

<https://www.oregonmetro.gov/tools-working/guide-choosing-reusable-serviceware>.

Accessed June 16, 2025.

This guide includes downloadable PDF tools on Oregon’s statewide BYO policies for food establishments, developed in alignment with [SB 545 2023](#): (1) “[Written Plan for SOP: Refilling of Consumer-Owned Food Containers at Food Service and Retail Food Establishments](#),” (2) “[How-To Guide for Retailers: Oregon’s New Refillable Container Rules](#),” and (3) “[How-To Guide for Restaurants: Oregon’s New Refillable Container Rules](#).” These documents outline procedures for health-compliant container refills, when written plans are required, and which practices are permitted for takeout, beverage, and leftover containers.

Zero Waste Ithaca. “NYS Codes Affecting BYO (Bring Your Own): Health vs. Food Code.”

Updated August 4, 2025 <https://zerowasteithaca.org/foodcode/> Accessed August 4, 2025.

*This webpage includes a pdf to NYS Food Code discussing explicit language **prohibiting BYO**, specifically in § 271-8.3(e).*

International BYO Codes Comparison

B.Y.O. – U.S. Reduces. “From Australia to Japan: Examining BYO Policies Worldwide.”

<https://usreduces.org/food-codes/>.

Toxicity of Disposable Foodwares

Cronin, Katya S. “FDA-Approved: How PFAS-laden Food Contact Materials are Poisoning Consumers and What to Do About It.” *Business, Entrepreneurship & Tax Law Review* 6 (2022): 117. GWU Legal Studies Research Paper No. 2022-73, GWU Law School Public Law Research Paper No. 2022-73. Available at SSRN:

<https://ssrn.com/abstract=4301327>.

Cronin explores the health, legal, and socioeconomic consequences of PFAS contamination in food contact materials, highlighting regulatory loopholes that allow these chemicals to persist. She argues for stronger FDA regulations, including rescinding current authorizations, improving oversight of premarket requests, and imposing stricter labeling requirements. The paper emphasizes the long-term health risks and economic

inequalities linked to PFAS exposure, making a compelling case for urgent policy changes.

Dahlstrom, Michelle. "Alarming New Study Prompts Call to Ban 4,200 Chemicals 'of Concern' Found in Common Products." *MSN*, July 2025.

<https://www.msn.com/en-au/science/environmental-science/alarming-new-study-prompts-call-to-ban-4-200-chemicals-of-concern-found-in-common-products/ar-AA11ogYL>.

This news piece summarizes the Nature study's finding that over 4,000 chemicals in plastics should be banned due to health risks. It emphasizes that many of these chemicals can leach into food and drink even if they are not chemically bound to the plastic. Using everyday examples such as baby pacifiers, it underscores the urgent need for transparency about which chemicals are present in consumer products.

Geueke, Birgit, Lindsey V. Parkinson, Ksenia J. Groh, Christopher D. Kassotis, Maricel V. Maffini, Olwenn V. Martin, Lisa Zimmermann, Martin Scheringer, and Jane Muncke. "Evidence for Widespread Human Exposure to Food Contact Chemicals." *Journal of Exposure Science & Environmental Epidemiology*, September 17, 2024. Kozlove, Max. "Microplastics Linked to Heart Attack, Stroke and Death." *Scientific American* (Reprinted from *Nature* magazine). March 9, 2024.

<https://www.nature.com/articles/s41370-024-00718-2>

This study identifies over 14,000 chemicals used in food contact materials, including packaging, with 1,800 known to migrate into food. Biomonitoring has detected 25% of these chemicals in human bodies, yet many remain untested for toxicity. The findings highlight significant gaps in knowledge regarding their health and environmental impacts, emphasizing the need for stronger regulatory oversight.

Glenn, Gregory, Randal Shogren, Xing Jin, William Orts, William Hart-Cooper, and Lauren Olson. "Per- and Polyfluoroalkyl Substances and Their Alternatives in Paper Food Packaging." *Comprehensive Reviews in Food Science and Food Safety* 20, no. 3 (2021): 2596–2625. <https://doi.org/10.1111/1541-4337.12726>.

Marchiandi, Jaye, Wejdan Alghamdi, Sonia Dagnino, Mark P. Green, and Bradley O. Clarke. "Exposure to Endocrine Disrupting Chemicals from Beverage Packaging Materials and Risk Assessment for Consumers." *Journal of Hazardous Materials* 465, 2024: 133314. <https://doi.org/10.1016/j.jhazmat.2023.133314>

This peer-reviewed study analyzed 162 non-alcoholic beverages packaged in plastic, glass, carton, aluminum, and tin, detecting 63 endocrine-disrupting chemicals—including

PFAS, bisphenols, and parabens—in 90 percent of samples. Aluminum and tin cans showed the highest bisphenol A and analogue levels, with estimated daily intakes up to 2,000 times higher than EFSA’s new BPA safety limit, particularly endangering children. The findings were summarized in an accessible Environmental Health News article by Katherine McMahon and Sarah Howard, “Beverages in Metal Cans May Be a Source of Chemical Contamination, Study Finds” (January 9, 2024), which highlights the public-health implications of epoxy-lined metal packaging and misleading “BPA-free” labeling.

<https://www.ehn.org/beverages-in-metal-cans-may-be-a-significant-source-of-chemical-contamination-study-finds>

Monclús, Laia, Hans Peter H. Arp, Ksenia J. Groh, Anna Faltynkova, Marianne E. Løseth, Jane Muncke, Zhanyun Wang, Richard Wolf, Lisa Zimmermann, and Martin Wagner. “Mapping the Chemical Complexity of Plastics.” *Nature* 643, no. 8071, July 9, 2025: 349–355.

<https://doi.org/10.1038/s41586-025-09184-8>.

This peer-reviewed study presents a global inventory of 16,325 known plastic chemicals, categorizing them by function, presence in plastic, and hazard profile. Over 4,200 chemicals were identified as persistent, bioaccumulative, mobile, or toxic, with 15 priority chemical groups in which more than 40 percent of the individual substances meet these hazard criteria. The authors call for eliminating known hazardous chemicals, increasing transparency, and simplifying plastic formulations to enable safer, more sustainable materials.

Schwartz-Narbonne, Heather, Chunjie Xia, Anna Shalin, Heather D. Whitehead, Diwen Yang, Graham F. Peaslee, Zhanyun Wang, Yan Wu, Hui Peng, Arlene Blum, Marta Venier, and Miriam L. Diamond. "Per- and Polyfluoroalkyl Substances in Canadian Fast Food Packaging." *Environmental Science & Technology Letters* 10, no. 3 (2023): 343–349. <https://pubs.acs.org/doi/pdf/10.1021/acs.estlett.2c00926>.

Sajedi, Sarah, Chunjiang An, and Zhi Chen. “Unveiling the Hidden Chronic Health Risks of Nano- and Microplastics in Single-Use Plastic Water Bottles: A Review.” *Journal of Hazardous Materials* 495 (September 5, 2025): 138948. <https://doi.org/10.1016/j.jhazmat.2025.138948>.

This review synthesizes findings from over 141 studies on nano- and microplastics (NMPs) in bottled water. The authors highlight ingestion rates of up to 90,000 microplastic particles annually from bottled water and link exposures to respiratory, reproductive, neurological, and carcinogenic risks. The article underscores major regulatory gaps and calls for urgent research and policy intervention.

Soltanighias, Tayebbeh, Abubakar Umar, Muhammad Abdullahi, Mohamed Abou-Elwafa Abdallah, and Luisa Orsini. "**Combined Toxicity** of Perfluoroalkyl Substances and Microplastics on the Sentinel Species *Daphnia magna*: Implications for Freshwater Ecosystems." *Environmental Pollution* 363, no. 1 (December 15, 2024): 125133. <https://doi.org/10.1016/j.envpol.2024.125133>.

Vázquez Loureiro, Patricia, Khanh-Hoang Nguyen, Ana Rodríguez Bernaldo de Quirós, Raquel Sendón, Kit Granby, and Agnieszka A. Niklas. "Identification and Quantification of Per- and Polyfluorinated Alkyl Substances (PFAS) Migrating from Food Contact Materials (FCM)." *Chemosphere* 360 (2024): 142360. <https://doi.org/10.1016/j.chemosphere.2024.142360>.

This study examines the presence and migration of PFAS from food contact materials, particularly in high-temperature applications. Results indicate that fluorotelomer alcohols were the most prevalent among the detected PFAS, raising concerns about their stability, persistence, and potential health risks.

Microplastics

Brynzak-Schreiber, Ekaterina, et al. "Microplastics Role in Cell Migration and Distribution During Cancer Cell Division." *Chemosphere*, April 2024. <https://www.sciencedirect.com/science/article/pii/S0045653524003564>.

This study shows that polystyrene micro- and nanoplastics can enter human gastrointestinal cancer cells, accumulate in non-dividing tumor regions, and be passed between cells during division. Short-term exposure to 0.25 μm particles significantly increased cancer cell migration, suggesting a possible role in tumor progression and metastasis. The findings raise concern about the hidden, persistent biological impact of microplastics, especially in colorectal cancer.

Chaïb, Iseline, Périne Doyen, Pauline Merveillie, Alexandre Dehaut, and Guillaume Duflos. "Microplastic Contaminations in a Set of Beverages Sold in France." *Journal of Food Composition and Analysis* 144 (2025): 107719. <https://doi.org/10.1016/j.jfca.2025.107719>.

*This French government-funded study found that beverages packaged in glass bottles were consistently more contaminated with microplastics than those in plastic, metal, or brick containers—contrary to expectations. The researchers traced this contamination to the outer **paint** on metal caps, which flaked off and entered the bottles during sealing. Even after rinsing and blowing the caps clean, capped bottles still released up to 86.7 microplastics per liter, compared to just 1.5–2.2 MPs/L in typical plastic bottles with plastic caps. The study suggests that abrasion, storage friction, and sealing pressure cause flakes of polyester- or alkyd-based paint to migrate into the liquid, even though the*

paint is only on the exterior of the cap. These findings raise critical concerns about painted metal caps used in commercial packaging. For home glass reuse, caps without paint or with smooth plastic designs may be significantly safer. Upright storage and pre-rinsing remain important precautionary steps.

Chartres, Nicholas, Courtney B. Cooper, Garret Bland, Katherine E. Pelch, Sheipali A. Gandhi, Abena BakenRa, and Tracey J. Woodruff. "Effects of Microplastic Exposure on Human Digestive, Reproductive, and Respiratory Health: A Rapid Systematic Review." *Environmental Science & Technology*, December 18, 2024.
<https://doi.org/10.1021/acs.est.3c09524>.

Cockburn, Harry. "Microplastics Found in Highest Amounts in These Popular Drinks." *The Independent*, August 17, 2025.
<https://www.independent.co.uk/news/uk/home-news/microplastics-hot-drinks-tea-coffee-highest-contamination-b2809095.html>.

European Food Safety Authority (EFSA). *Literature Review on Micro- and Nanoplastic Release from Food Contact Materials during Their Use*. EFSA Supporting Publication 2025: EN-9733. Parma: European Food Safety Authority, 2025.
<https://doi.org/10.2903%2Fsp.efsa.2025.EN-9733>

Comprehensive EU-commissioned review of 1,700 studies (2015–2025) on plastic particle release from food packaging. EFSA confirms limited but real evidence of microplastic release due to abrasion and aging, while finding that many prior studies overstated particle counts through contamination or misidentification. The report concludes that current data are insufficient to quantify consumer exposure or assess nanoplastics, urging standardized, contamination-controlled methods before risk evaluation.

Gaspar, Lauren, Sydney Bartman, Hannah Tobias-Wallingford, Giuseppe Coppotelli, and Jaime M. Ross. "Short-Term Exposure to Polystyrene Microplastics Alters Cognition, Immune, and Metabolic Markers in an Apolipoprotein E (APOE) Genotype and Sex-Dependent Manner." *Environmental Research Communications* 7, no. 8 (August 20, 2025): 085012.
<https://doi.org/10.1088/2515-7620/adf8ae>

This study demonstrated that short-term exposure to polystyrene microplastics caused cognitive and immune disruptions in mice, with stronger effects in those carrying the APOE4 gene variant linked to Alzheimer's risk. The Washington Post reported on the findings, highlighting how microplastic accumulation in the brain may trigger Alzheimer's-like symptoms in genetically predisposed individuals:

<https://www.washingtonpost.com/climate-environment/2025/09/02/alzheimers-symptoms-microplastics-mice-study/>

Krystek, Petra, Albert A. Koelmans, Joris Quik, Elmer Swart, Stefan Krause, Juliette Legler, Hilde Arderma, and Dick Vethaak. "Micro- and Nanoplastics in Soil: New Insights, Knowledge Gaps and Challenges." *Chemosphere* 373 (March 2025): 144117.
<https://doi.org/10.1016/j.chemosphere.2025.144117>.

Marfella, Raffaele, et al. "Microplastics and Nanoplastics in Atheromas and Cardiovascular Events." *The New England Journal of Medicine* 390, no. 1 (2024): 900–910.
<https://doi.org/10.1056/NEJMoa2309822>.

Mason, Sherri A., Victoria G. Welch, and Joseph Neratko. "Synthetic Polymer Contamination in Bottled Water." *Frontiers in Chemistry* 6 (2018): 407.
<https://doi.org/10.3389/fchem.2018.00407>.

This study investigates microplastic contamination in 11 brands of bottled water across nine countries, finding that 93% of the samples contained microplastics, with an average of 10.4 particles >100 µm per liter. The research highlights the prevalence of polypropylene from bottle caps and underscores the need for further study on the health impacts of microplastics in drinking water.

Osaka, Shannon. "In a First, Scientists Find Microplastics Are Building Up Deep in Our Brains." *The Washington Post*, February 3, 2025.
<https://www.washingtonpost.com/climate-environment/2025/02/03/microplastics-human-brain-increase/>.

Ranjan, Ved Prakash, Anuja Joseph, and Sudha Goel. "Microplastics and Other Harmful Substances Released from Disposable Paper Cups into Hot Water." *Journal of Hazardous Materials* 404, pt. B (2021): 124118. <https://doi.org/10.1016/j.jhazmat.2020.124118>.

Raza, Sarah. "Reusing Plastic Water Bottles, To-Go Containers? Scientists Say That's a Bad Idea." *The Washington Post*. December 1, 2024.
<https://www.washingtonpost.com/climate-solutions/2024/12/01/single-use-plastics-reuse-risk/?location=alert>.

Sajedi, Sarah, Chunjiang An, and Zhi Chen. "Unveiling the Hidden Chronic Health Risks of Nano- and Microplastics in Single-Use Plastic Water Bottles: A Review." *Journal of Hazardous Materials* 495 (September 5, 2025): 138948.
<https://doi.org/10.1016/j.jhazmat.2025.138948>.

This review synthesizes findings from over 141 studies on nano- and microplastics (NMPs) in bottled water. The authors highlight ingestion rates of up to 90,000 microplastic particles annually from bottled water and link exposures to respiratory, reproductive, neurological, and carcinogenic risks. The article underscores major regulatory gaps and calls for urgent research and policy intervention.

Sample, Ian. "Microscopic Plastics Could Raise Risk of Stroke and Heart Attack, Study Says." *The Guardian*. March 6, 2024.
<https://www.theguardian.com/environment/2024/mar/06/microscopic-plastics-could-raise-risk-of-stroke-and-heart-attack-study-says>.

Soltanighias, Tayebbeh, Abubakar Umar, Muhammad Abdullahi, Mohamed Abou-Elwafa Abdallah, and Luisa Orsini. "Combined Toxicity of Perfluoroalkyl Substances and Microplastics on the Sentinel Species *Daphnia magna*: Implications for Freshwater Ecosystems." *Environmental Pollution* 363, no. 1 (December 15, 2024): 125133.
<https://doi.org/10.1016/j.envpol.2024.125133>.

ten Hietbrink, Sophie, Dušan Materić, Rupert Holzinger, Sjoerd Groeskamp, and Helge Niemann. "Nanoplastic Concentrations across the North Atlantic." *Nature*, July 10, 2025.
<https://doi.org/10.1038/s41586-025-09218-1>.

*This study provides the first basin-scale quantification of nanoplastics in the Atlantic, finding PET, PS, and PVC concentrations up to 32 mg m⁻³ and estimating they dominate the marine plastic budget. As highlighted in [ScienceDaily](#), **nanoplastics are now recognized as the most abundant form of plastic in the Atlantic** and are also present in rain, rivers, and air; **with prevention—not cleanup—seen as the only viable response**. Notably, the authors describe a paradox: PE and PP, which are the most widely produced plastics globally and the primary polymers in synthetic turf fibers and infill, were not detected, likely due to chemical alteration or method limitations. This gap suggests turf-derived polymers may still contribute to the nanoplastic load even if current techniques underreport them.*

Traylor, Summer D., Elise F. Granek, Marilyn Duncan, and Susanne M. Brander. "From the Ocean to Our Kitchen Table: Anthropogenic Particles in the Edible Tissue of U.S. West Coast Seafood Species." *Frontiers in Toxicology* 6 (2024).
<https://doi.org/10.3389/ftox.2024.1469995>.

Study finds microplastic contamination in 99% of seafood samples.

Tyc, Hanna J., Karolina Kłodnicka, Barbara Teresińska, Robert Karpiński, Jolanta Flieger, and Jacek Baj. "Micro- and Nanoplastics as Disruptors of the Endocrine System—A Review of the Threats and Consequences Associated with Plastic Exposure." *International Journal of Molecular Sciences* 26, no. 13 (2025): 6156.
<https://doi.org/10.3390/ijms26136156>.

This review synthesizes current knowledge on how micro- and nanoplastics (MNPs) interfere with human endocrine function, particularly impacting fertility, thyroid health, and hormone regulation through disruption of the HPG, HPT, and HPA axes. It underscores the systemic toxicity of plastic-associated endocrine-disrupting chemicals (EDCs) and calls for biomonitoring and regulatory action. For a journalistic summary, see this article from U.S. Right to Know:
https://usrtk.org/healthwire/microplastics-wreaking-havoc-on-human-hormones-fertility/?mc_cid=aa92e82d97&mc_eid=55a112411f.

Yang, Luming, Dunzhu Li, Yunhong Shi, Christopher Hill, Rekha Pilliadugula, Laura Page, Jing Wang, John J. Boland, and Liwen Xiao. "High Levels of Microparticles Release from Biodegradable Polylactic Acid Paper Cups Compared with Polyethylene-Lined Cups." *Chemical Engineering Journal* 468 (2023): 143620, June 6, 2023.
<https://doi.org/10.1016/j.cej.2023.143620>.
<https://www.sciencedirect.com/science/article/pii/S1385894723023513?via%3Dihub>.

Yang, Qiaoyi, Ye Peng, Xiaodong Wu, Xiaorui Cao, Peng Zhang, Zhuowen Liang, Jiawei Zhang, Yongfeng Zhang, Peipei Gao, Yunfang Fu, Peng Liu, Zipeng Cao, and Tan Ding. "Microplastics in Human Skeletal Tissues: Presence, Distribution and Health Implications." *Environment International* 196 (February 2025): 109316.
<https://doi.org/10.1016/j.envint.2025.109316>

This peer-reviewed study is the first to document microplastics in human bone, cartilage, and intervertebral discs, identifying polypropylene, EVA, and polystyrene particles and their inflammatory effects. The authors linked this invasion to inflammatory cytokines and impaired bone health, raising global concern. Coverage in ScienceAlert (September 26, 2025) emphasized how the findings connect with prior animal and in vitro studies showing that microplastics disrupt osteoclast activity, accelerate cell aging, and may hinder skeletal growth and repair. Its findings drew media coverage, including ScienceAlert (September 26, 2025).
<https://www.sciencealert.com/microplastics-found-deep-inside-human-bones-scientists-warn>

Zimmermann, Lisa, Birgit Geueke, Lindsey V. Parkinson, Christoph Schür, Martin Wagner, and Jane Muncke. "Food Contact Articles as Source of Micro- and Nanoplastics: A Systematic Evidence Map." *NPJ Science of Food* 9, no. 111, 2025.

<https://doi.org/10.1038/s41538-025-00470-3>.

This systematic evidence map compiles findings from 103 studies on micro- and nanoplastics (MNPs) migrating from plastic food contact articles (FCAs), revealing that even normal use can result in exposure. The authors critically assess study design, polymer identification, and data quality, concluding that MNP migration from FCAs is underexamined but likely significant. They call for stricter testing protocols and regulatory oversight to better protect public health.

Bioplastics

Biodegradable Products Institute (BPI). 2025 DTSC Microplastics Comments. Submitted by Alex Truelove to the California Department of Toxic Substances Control, August 4, 2025. <https://calsafer.dtsc.ca.gov/document/details/9996>

BPI—an organization that markets itself as a leader in sustainable materials certification—opposes DTSC’s proposal to classify microplastics as candidate chemicals. In this comment, BPI argues that microplastics are not “chemicals” and seeks exemptions for biodegradable plastics, revealing the irony of a sustainability-branded group lobbying to weaken microplastics regulation.

Bouma, Krista, Dita Kalsbeek-van Wijk, Lodewijk Steendam, Dick T.H.M. Sijm, Theo de Rijk, and Ruben Kause. "Plant-Based Food Contact Materials: Presence of Hazardous Substances." *Food Additives & Contaminants: Part A*, May 30, 2024. <https://doi.org/10.1080/19440049.2024.2357350>.

This study examines the chemical composition of plant-based food contact materials (FCMs) in response to the European Single-Use Plastic Directive. Analysis of 28 samples from the Dutch market identified various contaminants, including plant protection products, PFAS, and heavy metals. Findings indicate that while most materials contained PFAS at trace or elevated levels, other contaminants such as unauthorized additives and hydrocarbons were also present. These results highlight potential risks associated with plant-based FCMs, suggesting that alternative materials may still pose environmental and health concerns.

Carnero, Ramírez, Antía Lestido-Cardama, Patricia Vazquez Loureiro, Letricia Barbosa-Pereira, Ana Rodríguez Bernaldo de Quirós, and Raquel Sendón. "Presence of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in Food Contact Materials (FCM) and Its Migration

to Food." *Foods* 10, no. 7 (2021): 1443. <https://doi.org/10.3390/foods10071443>.

This study reviews the presence of PFAS in food contact materials (FCM), highlighting their migration into food and the potential health risks associated with exposure. It emphasizes that PFAS are commonly found in fast food packaging, microwave popcorn bags, and non-stick cookware, with conditions such as heat and storage duration influencing their release. Some research even suggests that PFAS levels are higher in people who regularly eat out, raising concerns about widespread dietary exposure to these persistent chemicals.

Courtene-Jones, W., F. De Falco, F. Burgevin, R. D. Handy, and R. C. Thompson. "Are Biobased Microfibers Less Harmful than Conventional Plastic Microfibers? Evidence from Earthworms." *Ecotoxicology and Public Health*, November 5, 2024. <https://doi.org/10.1021/acs.est.4c05856>.

Goossen, Caleb P., Rachel E. Schattman, and Jean D. MacRae. "Evidence of Compost Contamination with Per- and Polyfluoroalkyl Substances (PFAS) from ‘Compostable’ Food Serviceware." *Biointerphases* 18, no. 3 (2023): 030501. <https://doi.org/10.1116/6.0002746>.

Guo, Xinhui, Wentao Zhang, Yingxin Lu, Haishui Yang, Lingling Shi, Feng-Min Li, Jie Zhou, and Davey L. Jones. "Biodegradable Microplastics Decreased Plant-Derived and Increased Microbial-Derived Carbon Formation in Soil: A Two-Year Field Trial." *Carbon Research* 4, no. 61 (2025). <https://doi.org/10.1007/s44246-025-00231-7>

A 2025 field study in Carbon Research found that both conventional and biodegradable microplastics harm soil, though in different ways. Polylactic acid (PLA), the most common “bioplastic,” didn’t increase soil carbon but shifted it from stable, plant-based lignin to short-lived microbial residues. This process drained nitrogen and sped up decomposition, leaving the soil more biologically active but less fertile and less able to store carbon over time. By contrast, conventional polypropylene (PP) plastics starved and weakened soil microbes through toxicity and lack of bioavailable carbon, reducing microbial diversity and soil structure. In other words, PLA overstimulates and depletes the soil, while PP suppresses it. The researchers conclude that neither plastic supports healthy soil systems and warn that policies promoting biodegradable plastics must weigh these trade-offs carefully, as “biodegradable” does not mean benign.

Liu, Jing, Peng Xia, Yi Qiu, Xue Zhang, Ruqin Shen, Pan Yang, Hongli Tan, et al. "Long-Term Exposure to Environmentally Realistic Doses of Starch-Based Microplastics Suggests Widespread Health Effects." *Journal of Agricultural and Food Chemistry*, April 9, 2025.

<https://doi.org/10.1021/acs.jafc.4c10855>.

This study is the first to investigate the effects of prolonged exposure to starch-based microplastics in mammals. It found that environmentally realistic doses may disrupt liver function, insulin regulation, lipid metabolism, and circadian rhythms—raising concerns about the safety of bioplastics used in food packaging.

Perkins, Tom. "Starch-Based Bioplastic May Be as Toxic as Petroleum-Based Plastic, Study Finds." *The Guardian*, May 13, 2025.

<https://www.theguardian.com/environment/2025/may/13/starch-based-bioplastic-petroleum-plastic-study>

This article summarizes Liu et al's peer-reviewed 2025 research indicating that starch-based bioplastics, often marketed as safer and more sustainable, may cause health effects comparable to conventional plastics. It highlights rising concerns about the toxicological impacts of bioplastics despite their biodegradable image.

Plastic Pollution Coalition. "The Environmental Injustices of PLA Bioplastic Production." February 2024.

<https://www.plasticpollutioncoalition.org/wp-content/uploads/PPC-PLA-Report-Supplement.pdf>.

Sovová, Katerina, Marinella Farré, Carlos Barata, and Romà Tauler. "Sublethal Effects of Bio-Plastic Microparticles and Their Components on the Behaviour of *Daphnia magna*." *Environmental Research* 236, part 2 (November 1, 2023): 116775.

<https://doi.org/10.1016/j.envres.2023.116775>.

*This study examines the sublethal effects of bioplastic microparticles on the behavior and feeding responses of *Daphnia magna*, a model aquatic organism. The researchers found that bioplastic particles from commercial items were more toxic than their pure biopolymer counterparts and more toxic than high-density polyethylene (HDPE) particles. The study highlights the need for further research into the chemical and physical factors contributing to the toxicity of bioplastics, as the observed effects were not well-correlated with the known plastic additives.*

Yang, Luming, Dunzhu Li, Yunhong Shi, Christopher Hill, Rekha Pilliadugula, Laura Page, Jing Wang, John J. Boland, and Liwen Xiao. "High Levels of Microparticles Release from Biodegradable Polylactic Acid Paper Cups Compared with Polyethylene-Lined Cups." *Chemical Engineering Journal* 468 (2023): 143620, June 6, 2023.

<https://doi.org/10.1016/j.cej.2023.143620>.

<https://www.sciencedirect.com/science/article/pii/S1385894723023513?via%3Dihub>.

Zimmermann, Lisa, Andrea Dombrowski, Carolin Völker, and Martin Wagner. "Are Bioplastics and Plant-Based Materials Safer Than Conventional Plastics? In Vitro Toxicity and Chemical Composition." *Environment International* 145 (December 2020): 106066. <https://doi.org/10.1016/j.envint.2020.106066>.

This study investigates the chemical composition and in vitro toxicity of bioplastics and plant-based materials, comparing them to conventional plastics. The researchers found that most bioplastics and plant-based materials contain toxic chemicals, with cellulose- and starch-based products showing the highest toxicity. The study concludes that bioplastics and plant-based materials are similarly toxic to conventional plastics, emphasizing the need for improved chemical safety in the design of sustainable plastic alternatives.

Recycled and Reused Plastics

Gueke B, Phelps DW, Parkinson LV, Muncke J. Hazardous Chemicals in Recycled and Reusable Plastic Food Packaging. *Cambridge Prisms: Plastics*. May 22, 2023. <https://www.cambridge.org/core/journals/cambridge-prisms-plastics/article/hazardous-chemicals-in-recycled-and-reusable-plastic-food-packaging/BBDE514AAFE9F1ABB3D677927B343342>

This review examines the health risks linked to reusing and recycling plastics, especially in food packaging, and highlights that recycled plastics may pose greater dangers than virgin plastics. It discusses how hazardous chemicals, including endocrine disruptors and carcinogens, can be released during reuse or accumulate during recycling, making recycled plastics potentially more toxic. The study draws on data from the FCCmigex database, which includes over 800 scientific publications on plastic food contact materials (FCMs). The findings raise significant concerns about the safety of recycled plastics in food contact applications.

Tisler, Selina, and Jan H. Christensen. "Non-Target Screening for the Identification of Migrating Compounds from Reusable Plastic Bottles into Drinking Water." *Journal of Hazardous Materials* 429 (2022): 128331. <https://doi.org/10.1016/j.jhazmat.2022.128331>.

*In this article in the peer-reviewed Journal of Hazardous Materials, researchers compared the migration of non-volatile chemicals from 16 reusable plastic bottles made of 12 different polymer types. They found that high-density polyethylene (HDPE), polypropylene (PP), and **silicones** released the highest number of chemicals.*

Many DRS (Deposit Return System) initiatives use plastic containers, and there's even an

EU project encouraging plastics in DRS called “reusable plastic packaging” (RPP). In addition to the microplastic pollution during repeated use, it's important to keep in mind that plastics have limited reuse cycles before it goes to “recycling” whose process we know pollutes which is unsustainable. See Brown, 2022.

<https://www.buddie-pack.com/deliverables>



BUDDIE-PACK
FIRST DELIVERABLES FOR THE PROJECT

The BUDDIE-PACK project focuses on [implementing a systemic approach](#) to large-scale reusable plastic packaging (RPP) through social, technological, and economic innovations. Two years into the project, they shared their first public deliverables and reports.

Deliverable topics include:

- Legislative Policy and Socio-Economic Framework: Analyzing European barriers and opportunities for RPP.
- Stakeholder Recommendations: Offering practical solutions for the entire value chain.
- Technical and Economic Specifications: Examining reusable packaging materials, designs, and cost factors.
- Life Cycle and Cost Analysis: Preliminary screenings of environmental, economic, and social impacts.

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Zimmerman, Lisa. “Chemical Profiling of Reusable Drinking Bottles – Silicon, PE, and PP Deemed Most Hazardous.” *Food Packaging Forum*. November 21, 2024.
<https://foodpackagingforum.org/news/chemical-profiling-of-reusable-drinking-bottles-silicone-pe-and-pp-deemed-most-hazardous>.

Plastic Recycling Failure

Beyond Plastics. “New Reports Reveals that U.S. Plastics Recycling Rate Has Fallen to 5%-6%.” May 4, 2022.
<https://www.beyondplastics.org/press-releases/the-real-truth-about-plastics-recycling>

Beyond Plastics. “The Real Truth About the U.S. Plastics Recycling Rate.” May 2022.
<https://www.beyondplastics.org/publications/us-plastics-recycling-rate>.

The Last Beach Clean Up and Beyond Plastics’ report “The Real Truth About the U.S. Plastics Recycling Rate” documents a recycling rate of just 5-6% for post-consumer

plastic waste in the U.S. for 2021. The report also reveals that while plastics recycling is on the decline, the per capita generation of plastic waste has increased by 263% since 1980.

Brooks, Tanya. "New Greenpeace Report: Plastic Recycling Is a Dead-End Street - Year After Year, Plastic Recycling Declines Even as Plastic Waste Increases." *Greenpeace USA*. October 24, 2022.
<https://www.greenpeace.org/usa/new-greenpeace-report-plastic-recycling-is-a-dead-end-street-year-after-year-plastic-recycling-declines-even-as-plastic-waste-increases/>.

Brown, Erina, Anna MacDonald, Steve Allen, Deonie Allen. "The Potential for a Plastic Recycling Facility to Release Microplastic Pollution and Possible Filtration Remediation Effectiveness." *Journal of Hazardous Materials Advances*. May 2023.
<https://doi.org/10.1016/j.hazadv.2023.100309>

***This study highlights that plastic recycling facilities can be a significant source of microplastic pollution, primarily through their wash water.** The research identifies that most microplastics released are smaller than 10 μm , which are not adequately captured by conventional filtration methods. Notably, the study found that the microplastics released into the water amounted to 13% of the total plastic processed. These findings underscore the urgent need for improved filtration technologies and regulatory measures to address microplastic discharge in recycling processes.*

Brock, Joe, Valerie Volcovici, and John Geddie. "The Recycling Myth: Big Oil's Solution for Plastic Waste Littered with Failure." *Reuters Investigates*, July 29, 2021.
<https://www.reuters.com/investigates/special-report/environment-plastic-oil-recycling/>

Carmona, Eric, Elisa Rojo-Nieto, Christoph D. Rummel, Martin Krauss, Kristian Syberg, Tiffany M. Ramos, Sara Brosche, Thomas Backhaus, and Bethanie Carney Almroth. "A Dataset of Organic Pollutants Identified and Quantified in **Recycled Polyethylene Pellets**." *Data in Brief* 51 (2023): 109740. <https://doi.org/10.1016/j.dib.2023.109740>.

*This study analyzes 28 samples of recycled high-density polyethylene (HDPE) pellets from the Global South, alongside virgin HDPE, to identify their chemical composition. Using advanced mass spectrometry methods, it detected 491 organic compounds and tentatively identified an additional 170, including pesticides, pharmaceuticals, and plastic additives. **The findings reveal the prevalence of hazardous chemicals, such as N-ethyl-o-toluenesulfonamide, used in HDPE processing, and highlight the lack of global regulations for monitoring and reporting chemicals in recycled plastics.** This dataset advances understanding of the complex chemical composition and potential risks associated with recycled plastics.*

Center for International Environmental Law (CIEL). "Plastic & Climate: The Hidden Costs of a Plastic Planet." May 2019. <https://www.ciel.org/plasticandclimate/>.

Geueke B, Phelps DW, Parkinson LV, Muncke J. Hazardous Chemicals in Recycled and Reusable Plastic Food Packaging. *Cambridge Prisms: Plastics*. May 22, 2023.
<https://www.cambridge.org/core/journals/cambridge-prisms-plastics/article/hazardous-chemicals-in-recycled-and-reusable-plastic-food-packaging/BBDE514AAFE9F1ABB3D677927B343342>

*This review examines **the health risks linked to reusing and recycling plastics**, especially in food packaging, and highlights that **recycled plastics may pose greater dangers than virgin plastics**. It discusses how hazardous chemicals, including endocrine disruptors and carcinogens, can be released during reuse or accumulate during recycling, making recycled plastics potentially more toxic. The study draws on data from the FCCmigex database, which includes over 800 scientific publications on plastic food contact materials (FCMs). Use of recycled plastics for artificial turf components as suggested by Ithaca Town Planning Board is highly problematic for this reason.*

Greenpeace. “Circular Claims Fall Flat: Comprehensive U.S. Survey of Plastics Recyclability.” February 18, 2020.
<https://www.greenpeace.org/usa/research/report-circular-claims-fall-flat/>

Greenpeace. “New Greenpeace Report Calls Out **Toxic Hazards of Recycled Plastic** as Global Plastics Treaty Negotiations Resume in Paris.” May 24, 2023.
<https://www.greenpeace.org/usa/news/new-greenpeace-report-calls-out-toxic-hazards-of-recycled-plastic-as-global-plastics-treaty-negotiations-resume-in-paris/>

Hahladakis, John N., Costas A. Velis, Roland Weber, Eleni Tacovidou, Phil Purnell. “An Overview of Chemical Additives Present in Plastics: Migration, Release, Fate and Environmental Impact During Their Use, Disposal and Recycling.” *Journal of Hazardous Materials*. February 15, 2018.
<https://www.sciencedirect.com/science/article/pii/S030438941730763X?via%3Dihub>

Hahn, Jennifer. “**Recycled Plastics Often Contain More Toxic Chemicals** Says Greenpeace.” *DeZeen*. May 26, 2023.
<https://www.dezeen.com/2023/05/26/recycled-plastics-greenpeace-report/>

John, Rebecca. “‘Maddening’ Proof Plastics Industry Knew Recycling Was False Solution in 1974, New Document Shows.” *DeSmog*, August 5, 2025.
<https://www.desmog.com/2025/08/05/maddening-proof-plastics-industry-knew-recycling-was-false-solution-in-1974-new-document-shows/>.

Investigative report revealing a newly uncovered 1974 letter from DuPont president and board chairman Charles Brelsford McCoy stating that recycling DuPont’s plastic products was “not feasible.” This document—[available here](#)—is the earliest known top-level admission that common plastic products could not be recycled due to complex chemical structures. The article situates this evidence within decades of industry promotion of recycling as a solution despite internal recognition of its impracticality, and amid ongoing lawsuits alleging public deception by U.S. plastic producers.

Karali, N., Khanna, N., and Shah, N. *Climate Impact of Primary Plastic Production*. Lawrence Berkeley National Laboratory, 2024. Report #LBNL-2001585.
<https://escholarship.org/uc/item/12s624vf>

Kaufman, Leslie. "The Warehouses of Plastic Behind TerraCycle's Recycling Dream." *Bloomberg*. October 27, 2022.
<https://www.bloomberg.com/features/2022-terracycle-tom-szaky/>

Laker, Barbara, and David Gambacorta. "Recycle Company's Bankruptcy Leaves Tons of Discarded Artificial Turf across the State." *The Philadelphia Inquirer*, September 30, 2025.
<https://www.inquirer.com/news/artificial-turf-recycling-re-match-bankruptcy-pfas-20250930.html>

The article reports on the bankruptcy of Re-Match, a Denmark-based turf recycling company that left 11,000 tons of PFAS-laden artificial turf stranded across Pennsylvania. It highlights the broader failure of synthetic turf recycling promises and the environmental risks posed by discarded turf, echoing concerns raised by independent scientists and environmental advocates.

Liu, Megan, Sicco H. Brandsma, and Erika Schreder. "From E-Waste to Living Space: Flame Retardants Contaminating Household Items Add to Concern About Plastic Recycling." *Chemosphere* 365 (2024): 143319. <https://doi.org/10.1016/j.chemosphere.2024.143319>.

*Brominated flame retardants (BFRs) and organophosphate flame retardants (OPFRs) are commonly used in electric and electronic products in high concentrations to prevent or retard fire. Health concerns related to flame retardants (FRs) include carcinogenicity, endocrine disruption, neurotoxicity, and reproductive and developmental toxicity. Globally, a lack of transparency related to chemicals in products and limited restrictions on use of FRs in electronics have led to widespread use and dissemination of harmful FRs. **Despite the lack of transparency and restrictions, plastics from electronics are often recycled and can be incorporated in household items that do not require flame retardancy, resulting in potentially high and unnecessary exposure.** This study sought to determine whether black plastic household products sold on the U.S. market contained emerging and phased-out FRs and whether polymer type was predictive of contamination. Use of recycled plastics for artificial turf components as suggested by Ithaca Town Planning Board is highly problematic for this reason.*

McVeigh, Karen. "Recycling Can Release Huge Quantities of Microplastics, Study Finds." *The Guardian*, May 23, 2023.
<https://www.theguardian.com/environment/2023/may/23/recycling-can-release-huge-quantities-of-microplastics-study-finds>

The study suggests the recycling plant discharged up to 2,933 metric tonnes of microplastics a year before the filtration system was introduced, and up to 1,366 metric

tonnes afterwards.

Recycling can release huge quantities of microplastics, study finds

Scientists find high levels of microplastics in wastewater from unnamed UK plant - and in air surrounding facility



📷 Researchers found the level of microplastics released in the water amounted to 13% of the plastic processed. Photograph: Maxshoto/Alamy

Recycling has been promoted by the plastics industry as a key solution to the growing problem of plastic waste. But a study has found recycling itself could be releasing huge quantities of microplastics.

NL Times. "Large Fire at Brabant Artificial Turf Company." October 12, 2018.
<https://nltimes.nl/2018/10/12/large-fire-brabant-artificial-turf-company>

This article highlights the fire hazards and regulatory violations associated with artificial turf recycling, particularly at TUF Recycling in Dongen, Noord-Brabant, Netherlands. The company, which has a history of environmental violations, stored more artificial grass mats than permitted and illegally transported turf abroad. Despite previous penalties, a massive fire broke out, releasing toxic substances and requiring significant firefighting resources. Artificial turf is made primarily from plastic polymers such as polyethylene and polypropylene, which are highly flammable despite the presence of flame retardants. Once temperatures exceed a certain threshold, synthetic turf can ignite and sustain combustion, producing hazardous byproducts such as carbon monoxide, dioxins, and other volatile organic compounds. This fire underscores the inherent risks of stockpiling synthetic turf waste, raising concerns about the safety, recyclability, and long-term environmental impact of artificial turf systems.

Noor, Dharna. "Plastic-Production Emissions Could Triple to One-Fifth of Earth's Carbon Budget – Report." *The Guardian*, 18 April 2024.
<https://www.theguardian.com/us-news/2024/apr/18/plastic-production-emission-climate-crisis>

Noor, Dharna. "California Sues ExxonMobil Over Alleged Role in Plastic Pollution Crisis." *The Guardian*, September 23, 2024.
https://www.theguardian.com/us-news/2024/sep/23/california-exxon-plastics-lawsuit?CMP=Share_iOSApp_Other.

In this article, Noor reports on California's groundbreaking lawsuit against ExxonMobil, accusing the company of contributing to the plastic pollution crisis and misleading the public about the environmental impact of plastics. The lawsuit represents a significant shift in holding fossil fuel companies accountable for their role in climate and pollution crises, with claims that plastic production and fossil fuel companies are deceiving the public about the sustainability of plastics. This case marks the first of its kind in addressing the intersection of fossil fuel production and plastic pollution. Here is a [link to the actual lawsuit filed](#) by the California AG.

Philips, Anna. "Toxic Air Explosions: Inside the Bitter Battle between Texas Residents and Exxon: Residents of Baytown Sued Exxon 13 Years Ago to Reduce Pollution that Wafts into Their Neighborhoods. A Key Legal Decision Looms, and the Case Could Have National Implications." *The Washington Post*. March 16, 2023.
<https://www.washingtonpost.com/climate-environment/2023/03/15/exxon-pollution-lawsuit-baytown-texas/>

The Exxon complex in the Baytown and Houston, TX area has [a new controversial chemical recycling plant](#) which processes plastics, [including artificial turfs, supplied by a recycling company Tencate](#). For more information, watch [Dr. Neil Carman's presentation in our webinar](#) held on 4/30/24. Dr. Carman served as the staff leader in [the lawsuit against Exxon Mobile complex in Baytown, TX](#) for twelve years.

Plastic Pollution Coalition. "What Really Happens to Your Plastic 'Recycling.'" May 16, 2022.
<https://www.plasticpollutioncoalition.org/blog/2022/5/16/what-really-happens-to-your-plastic-recycling>

Plastic Pollution Coalition. "PPC Webinar | Greenwashing 2.0: Debunking Recycling Myths." June 5, 2024. <https://www.plasticpollutioncoalition.org/event/ppc-webinar-060524>

Public Employees for Environmental Responsibility (PEER). *Complaint of Deceptive and Unfair Advertising of Artificial Turf*. Filed with Federal Trade Commission, February 28, 2022.
https://peer.org/wp-content/uploads/2022/03/3_7_22-Filed-FTC-Complaint-2.28.22.pdf.

This 31-page complaint filed by PEER with the Federal Trade Commission asserts that artificial turf manufacturers engage in deceptive and unfair advertising practices by making false claims about the recyclability of their products. It highlights the absence of

dedicated turf recycling facilities in the U.S. and raises concerns about environmental impacts, including microplastic pollution and waste mismanagement. This document provides a critical perspective on the industry's sustainability claims.

Public Employees for Environmental Responsibility. “False Artificial Turf Recycling Claims Ripped.” March 7, 2022. <https://peer.org/false-artificial-turf-recycling-claims-ripped/>.

Sullivan, Laura. “How Big Oil Misled the Public into Believing Plastic Would Be Recycled.” NPR, September 11, 2020. <https://www.npr.org/2020/09/11/897692090/how-big-oil-misled-the-public-into-believing-plastic-would-be-recycled>.

Investigative report revealing that the oil and plastics industries promoted plastic recycling despite knowing for decades it was economically and technically unfeasible. Based on internal documents and interviews with former industry insiders, the piece shows how public messaging was used to protect plastic production and deflect regulation rather than to solve waste problems.

Dangers of Chemical Recycling

Beyond Plastics. “Report: Chemical Recycling: A Dangerous Deception.” October 2023. <https://www.beyondplastics.org/publications/chemical-recycling>

Chemical recycling — or what the industry likes to call “advanced recycling” — is increasingly touted as a solution to the plastic waste problem, but a landmark new report from Beyond Plastics and IPEN shows this technology hasn’t worked for decades, it’s still failing, and it threatens the environment, the climate, human health, and environmental justice. This comprehensive report features an investigation of all 11 constructed chemical recycling facilities in the United States, their output, their financial backing, and their contribution to environmental pollution.

Bruggers, James. “In Houston, a City Council Member Questions ‘Advanced’ Recycling of Plastic and a City Collaboration with ExxonMobil.” *Inside Climate News*. December 13, 2024. <https://insideclimatenews.org/news/13122024/houston-city-council-member-questions-exxonmobil-plastic-recycling/>.

Fossil Fuels

In Houston, a City Council Member Questions 'Advanced' Recycling of Plastic and a City Collaboration with ExxonMobil

Councilmember Letitia Plummer said pyrolysis perpetuates fossil fuel extraction and pollution. Her conclusion: The most effective way to reduce plastic waste is to limit its production in the first place.



By James Bruggers
December 13, 2024



Letitia Plummer, at-large Houston City Council member, speaks during an election forum in Houston on Sept. 21, 2023. Credit: Karen Warren/Houston Chronicle via Getty Images

ExxonMobil. "ExxonMobil Starts Large Operations at Large-Scaled Advanced Recycling Facility." December 14, 2022.

https://corporate.exxonmobil.com/news/news-releases/2022/1214_exxonmobil-starts-operations-at-large-scale-advanced-recycling-facility.

Global Alliance for Incinerator Alternatives (GAIA). "5 Things Plastic Polluters Don't Want You to Know about Chemical Recycling." 2021.

<https://www.no-burn.org/resources/5-things-plastic-polluters-dont-want-you-to-know-about-chemical-recycling/>

Hutton, David. "Chemical Recycling Repurposes Synthetic Turf Waste." *Plastics Today*, July 31, 2025.

<https://www.plasticstoday.com/advanced-recycling/chemical-recycling-process-remakes-synthetic-turf-waste>.

This industry article promotes chemical recycling of synthetic turf as a \$5.9 billion sustainability opportunity, yet fails to address toxic residuals or closed-loop outcomes. The framing and industry affiliations suggest classic greenwashing—using circularity language to justify continued plastic production.

Metzger, Luke. “Exxon Calls It a Recycling Collaboration. But It’s Not Real Recycling.” Environment Texas. May 9, 2024.
<https://environmentamerica.org/texas/articles/exxon-calls-it-a-recycling-collaboration-but-its-not-real-recycling/>

Möck, Alexandra, Winfried Bulach, and Johannes Betz. “Climate Impact of Pyrolysis of Waste Plastic Packaging in Comparison with Reuse and Mechanical Recycling.” Öko-Institut. Commissioned by Zero Waste Europe and the Rethink Plastic Alliance. September 23, 2022.
https://zerowasteurope.eu/wp-content/uploads/2022/09/zwe_2022_report_climat_impact_pyrolysis_plastic_packaging.pdf.

Research commissioned by Zero Waste Europe and Rethink Plastic Alliance indicates that greenhouse gas emissions from mechanical recycling are significantly lower than those from chemical recycling by a factor of nine. The study emphasizes that to align with the Paris Agreement, mechanical recycling of plastic packaging should be prioritized over pyrolysis.

Möck, Alexandra, and Johannes Klinge. “Mechanical Recycling Is More Climate-Compatible than Chemical Recycling.” Öko-Institut. October 22, 2022. Accessed January 6, 2025.
<https://www.oeko.de/en/news/latest-news/mechanical-recycling-is-more-climate-compatible-than-chemical-recycling/>.

Noor, Dharna. “Shell Quietly Backs Away from Pledge to Increase ‘Advanced Recycling’ of Plastics.” *The Guardian*. July 17, 2024
<https://www.theguardian.com/business/article/2024/jul/17/shell-recycling-plastic-pledge>

“Energy giant promised to turn 1m tonnes of plastic waste into oil each year, but now says the goal is unfeasible.”

NRCD. “New NRDC ‘Chemical Recycling’ Analysis: Process is Harmful, Misleading, Not Solving Plastic Pollution.” March 7, 2022.
<https://www.nrdc.org/press-releases/new-nrdc-chemical-recycling-analysis-process-harmful-misleading-not-solving-plastic>.

Plastic Pollution Coalition. ““Advanced Recycling” is Not a Solution to Plastic Pollution.” August 31, 2022.
<https://www.plasticpollutioncoalition.org/blog/2022/8/31/advanced-recycling-truths>

Song, Lisa. “Selling a Mirage: The Delusion of Advanced Plastic Recycling Using Pyrolysis.” *ProPublica*. June 20, 2024.

<https://www.propublica.org/article/delusion-advanced-chemical-plastic-recycling-pyrolysis>

Tullo, Alexander H. "ExxonMobil Will Recycle Synthetic Turf." *Chemical & Engineering News*, October 1, 2022.
<https://cen.acs.org/environment/recycling/ExxonMobil-recycle-synthetic-turf/100/i35>.

The article discusses a recycling initiative between TenCate Grass, ExxonMobil, and Cyclyx International, aiming to process synthetic turf waste through pyrolysis at an ExxonMobil facility in Baytown, Texas. This effort is part of broader industry attempts to justify artificial turf's environmental impact through chemical recycling, a method widely criticized for inefficiency and high emissions.

Zero Waste Europe. "Still Fifty Years to Commercially Scale Pyrolysis Technologies, New Paper Finds." November 21, 2024.
<https://zerowasteurope.eu/press-release/still-fifty-years-to-commercially-scale-pyrolysis-technologies-new-paper-finds/>.

While the petrochemical industry touts chemical recycling as a solution to the plastic waste crisis, insiders acknowledge the technology won't be commercially viable for another fifty years, a new paper reveals. This new industry landscape overview published by Zero Waste Europe, "Fifty years: chemical recycling's fading promise", calls for a reduction in virgin plastic production to prioritise upstream solutions to single-use plastic that, ultimately, reduce plastic consumption at large. These include waste prevention, reuse, and then recycling. In the paper, contacted experts, including former Shell scientist Prof. Jean-Paul Lange, warn that pyrolysis relies on continued virgin plastic production. According to Lange, it will take fifty years to "successfully ramp up chemical recycling." Even if scaled up, pyrolysis can only process a fraction of the plastic waste produced, and cannot be considered fully circular.

Safety of Reusables

Ira, Sanjidah Ahmed, Brooke Sherry, Ruhana Amin, Ma-sum Abdul-Hamid, Timothy Roberts, Sarah Hochman, and Cassandra L. Thiel. "Do Reusables Pose Greater Infectious Risks than Disposables for Consumer Goods? A Systematic Literature Review." *International Journal of Infection Control* 20 (2024): 23758. <https://doi.org/10.3396/ijic.v20.23758>.

Increased concern over climate change and the emergence of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus resulted in a clash of political directives around reusable and disposable food serviceware. After reviewing 122 studies, the authors found limited evidence to suggest that either reusable or disposable food

*serviceware is inherently safer in terms of minimizing infectious risks. Pathogens can survive on various surfaces, with increased viability on more porous materials and under higher humidity levels. **The study concludes that there are no significant differences in pathogen viability between different types of surfaces, indicating that reusable containers are not major sources of pathogen transmission. Consequently, the authors suggest that banning reusable items may be an inappropriate response, particularly concerning pathogens like SARS-CoV-2, which are rarely spread through surface contact.** They recommend establishing protocols and guidelines for the general public to maintain health and safety as the adoption of reusable serviceware increases.*

Schrank, Nina. "Reusables Can Be Used Safely: Over 125 Health Experts Fire Back at the Plastic Industry." Greenpeace Canada. Last modified June 22, 2020. Accessed January 28, 2020.
<http://www.greenpeace.org/canada/en/story/40172/reusables-can-be-used-safely-over-125-health-experts-fire-back-at-the-plastic-industry/>.

The link to the statement by 125 scientists is available here:
<https://storage.googleapis.com/planet4-international-stateless/2020/06/26618dd6-health-expert-statement-reusables-safety.pdf> and
<https://www.dropbox.com/scl/fi/4lga4w76sq5bvhnwi9p4w/26618dd6-health-expert-statement-reusables-safety.pdf?rlkey=g58aw09z3tee466576nr44vg2&st=swnu48jq&dl=0>

Health Impacts of Plastic Pollution

Beyond Plastics. "Plastics' Impact on Human Health." YouTube video. January 13, 2023.
https://www.youtube.com/watch?v=utUFl4gqiYc&ab_channel=BeyondPlastics.

Beyond Plastics. "Plastics and Health." Accessed February 4, 2025.
<https://www.beyondplastics.org/plastics-and-health#researchpapers>.

This section of Beyond Plastics' Plastics and Health page lists recent research papers that make a strong case for the harm of plastics on human health. The selected peer-reviewed studies cover a range of topics, including microplastic accumulation in human tissues, endocrine disruption, cardiovascular impacts, and neurotoxicity, highlighting the growing body of evidence on the health risks associated with plastic exposure.

[RESEARCH PAPERS](#) | [FACT SHEETS](#) | [REPORTS](#) | [VIDEOS](#)

RECENT RESEARCH PAPERS

- [Bioaccumulation of microplastics in decedent human brains](#) | *Nature Medicine* | February 2025
- [Microplastics in the bloodstream can induce cerebral thrombosis by causing cell obstruction and lead to neurobehavioral abnormalities](#) | *Science Advances* | January 2025
- [From the ocean to our kitchen table: anthropogenic particles in the edible tissue of U.S. West Coast seafood species](#) | *Frontiers* | December 2024
- [Effects of leachate from disposable plastic takeout containers on the cardiovascular system after thermal contact](#) | *Ecotoxicology and Environmental Safety* | December 2024
- [Effects of Microplastic Exposure on Human Digestive, Reproductive, and Respiratory Health: A Rapid Systematic Review](#) | *Environmental Science & Technology* | December 2024
- [The benefits of removing toxic chemicals from plastics](#) | *Proceedings of the National Academy of Sciences (PNAS)* | December 2024
- [Combined toxicity of perfluoroalkyl substances and microplastics on the sentinel species *Daphnia magna*: Implications for freshwater ecosystems](#) | *Environmental Pollution* | December 2024
- [First identification of microplastics in human uterine fibroids and myometrium](#) | *Environmental Pollution* | November 2024
- [Twenty years of microplastic pollution research—what have we learned?](#) | *Science* | September 2024
- [Male autism spectrum disorder is linked to brain aromatase disruption by prenatal BPA in multimodal investigations and 10HDA ameliorates the related mouse phenotype](#) | *Nature Communications* | August 2024
- [Microplastic presence in dog and human testis and its potential association with sperm count and weights of testis and epididymis](#) | *Toxicological Sciences* | August 2024
- [Plastic Induced Urinary Tract Disease and Dysfunction: A Scoping Review](#) | *Journal of Exposure Science & Environmental Epidemiology* | August 2024
- [Detection of Microplastics in Human Breast Milk and Its Association with Changes in Human Milk Bacterial Microbiota](#) | *Journal of Clinical Medicine* | July 2024
- [Microplastics and Oxidative Stress—Current Problems and Prospects](#) | *MDPA Antioxidants* | May 2024
- [Bioaccumulation of Microplastics in Decedent Human Brains Assessed by Pyrolysis Gas Chromatography-Mass Spectrometry](#) | *Preprint* | May 2024
- [Microplastic Human Dietary Uptake from 1990 to 2018 Grew across 109 Major Developing and Industrialized Countries but Can Be Halved by Plastic Debris Removal](#) | *Environmental Science & Technology* | April 2024
- [Tissue accumulation of microplastics and potential health risks in human](#) | *The Science of the Total Environment* | March 2024
- [Obesogenic polystyrene microplastic exposures disrupt the gut-liver-adipose axis](#) | *Toxicological Sciences* | March 2024
- [State of the Science On Plastic Chemicals](#) | *Plastchem Project* | March 2024
- [Maternal nanoplastic ingestion induces an increase in offspring body weight through altered lipid species and microbiota](#) | *Environment International* | March 2024
- [MicroRaman spectroscopy detects the presence of microplastics in human urine and kidney tissue](#) | *Environment International* | January 2024
- [Effect of microplastics deposition on human lung airways: A review with computational benefits and challenges](#) | *Heliyon* | January 2024
- [Assessing the contribution of plastic-associated obesogenic compounds to cardiometabolic diseases](#) | *Current Opinion in Endocrinology, Diabetes & Obesity* | December 2023
- [Anionic nanoplastic contaminants promote Parkinson's disease-associated \$\alpha\$ -synuclein aggregation](#) | *Science Advances* | November 2023
- [Acute Exposure to Microplastics Induced Changes in Behavior and Inflammation in Young and Old Mice](#) | *International Journal of Molecular Sciences* | July 2023
- [Effects of microplastic and engineered nanomaterials on inflammatory bowel disease: A review](#) | *Chemosphere* | June 2023

Cropper, Maureen, Sarah Dunlop, Hudson Hinshaw, Philip Landrigan, Yongjoon Park, and Christos Symeonides. "The Benefits of Removing Toxic Chemicals from Plastics." *Proceedings of the National Academy of Sciences of the United States of America* 121, no. 52 (December 24, 2024): e2412714121. <https://doi.org/10.1073/pnas.2412714121>.

Landrigan, Philip J., et al. "The Minderoo-Monaco Commission on Plastics and Human Health." *Annals of Global Health* 89, no. 1 (2023): 23. <https://doi.org/10.5334/aogh.4056>.

Philip J. Landrigan et al., "The Lancet Countdown on Health and Plastics," *The Lancet*, published online August 3, 2025, [https://doi.org/10.1016/S0140-6736\(25\)01447-3](https://doi.org/10.1016/S0140-6736(25)01447-3).

This Lancet policy report frames plastics as a major, under-recognized health hazard, causing diseases and deaths worldwide and driving annual health-related economic losses of over \$1 trillion. It underscores how these harms fall disproportionately on low-income and at-risk communities while less than 10% of plastic is recycled. The authors situate plastic pollution alongside other global hazards like air pollution, stressing that worsening impacts are not inevitable if governments adopt evidence-based, transparently tracked policies. To that end, they launch the "Lancet Countdown on health and plastics," a global monitoring system designed to track exposures, health outcomes, and policy responses. The report argues that plastics' harms can be mitigated cost-effectively through binding international agreements and coordinated action across the full life cycle of plastic.

Tyc, Hanna J., Karolina Kłodnicka, Barbara Teresińska, Robert Karpiński, Jolanta Flieger, and Jacek Baj. "Micro- and Nanoplastics as Disruptors of the Endocrine System—A Review of the Threats and Consequences Associated with Plastic Exposure." *International Journal of Molecular Sciences* 26, no. 13 (2025): 6156. <https://doi.org/10.3390/ijms26136156>.

This review synthesizes current knowledge on how micro- and nanoplastics (MNPs) interfere with human endocrine function, particularly impacting fertility, thyroid health, and hormone regulation through disruption of the HPG, HPT, and HPA axes. It underscores the systemic toxicity of plastic-associated endocrine-disrupting chemicals (EDCs) and calls for biomonitoring and regulatory action. For a journalistic summary, see this article from U.S. Right to Know: https://usrtk.org/healthwire/micropastics-wreaking-havoc-on-human-hormones-fertility/?mc_cid=aa92e82d97&mc_eid=55a112411f.

Wagner, M., L. Monclús, H. P. H. Arp, K. J. Groh, M. E. Løseth, J. Muncke, Z. Wang, R. Wolf, and L. Zimmermann. "State of the Science on Plastic Chemicals: Identifying and Addressing Chemicals and Polymers of Concern." Zenodo, 2024. <https://doi.org/10.5281/zenodo.10701706>.

The PlastChem report identifies over 16,000 chemicals in plastic products, including more than 4,000 that are hazardous due to their persistent, bioaccumulative, and toxic nature. Specific chemicals of concern include bisphenols, phthalates, and per- and polyfluoroalkyl substances (PFAS), which are used as stabilizers, plasticizers, and water-resistant additives, respectively. These compounds pose significant risks to human health and the environment, contributing to endocrine disruption, carcinogenic effects, and ecological toxicity. The report offers a foundational framework for policymakers to

address plastic chemical management and informs international negotiations on global plastic pollution.

Vidyya, Vismal, Meihezan Yao, Elena Colicino, Dinesh Barupal, Xiangping Lin, Chris Gennings, et al. “Exposure to Per- and Poly-Fluoroalkyl Substances in Association to Later Occurrence of Type 2 Diabetes and Metabolic Pathway Dysregulation in a Multiethnic US Population.” *eBioMedicine* 118 (August 2025): 105838.
<https://doi.org/10.1016/j.ebiom.2025.105838>

This case-control study found that PFAS mixtures were associated with increased odds of developing type 2 diabetes, particularly through disruptions in amino acid and drug metabolism. The findings received coverage in Medscape, which highlighted the study’s warning that “forever chemicals” may raise diabetes risk:

https://www.medscape.com/viewarticle/forever-chemicals-tied-higher-diabetes-risk-what-know-2025a1000nw5?ecd=mkm_ret_250914_mscpmrk_MOB_e47_C2_etid7712561&uac=373108SV&impID=7712561

Climate Impacts

Beyond Plastics. *The New Coal: Plastics and Climate Change*. October 2021.
<https://www.beyondplastics.org/publications/the-new-coal>.

The report The New Coal: Plastics and Climate Change highlights the U.S. plastics industry’s significant contributions to greenhouse gas emissions, equating its impact to that of coal-fired power plants. It examines ten stages of the plastics lifecycle, from production to disposal, emphasizing the industry’s under-acknowledged role in exacerbating the climate crisis.

Beyond Plastics and The Last Beach Cleanup. “Recycle” By Mail Is a Major Climate Fail. June 2021.
<https://www.beyondplastics.org/publications/recycle-by-mail-is-a-major-climate-fail>.

This fact sheet critiques the environmental inefficiencies of mail-back “recycling” programs such as Terracycle for single-use plastics, highlighting their contribution to carbon emissions and waste. It warns that scaling such programs would worsen climate impacts by increasing transportation emissions and reliance on plastic products rather than reducing them.

Busse, Heidi L., Devaka Dharmapriya Ariyasena, Jessica Orris, and Miriam Arak Freedman. “Pristine and Aged Microplastics Can Nucleate Ice through Immersion Freezing.” *ACS ES&T Air* 1, no. 12 (2024): 1579–88. <https://doi.org/10.1021/acsestair.4c00146>.

Penn State. “Startling New Research Reveals That Microplastics Could Be Changing Earth’s Climate.” *SciTechDaily*. November 11, 2024.

<https://scitechdaily.com/startling-new-research-reveals-that-microplastics-could-be-changing-earths-climate/>.

Sibai-Al, Noor. “Microplastics are Infesting Clouds, Affecting Weather: They Could Be Making Rainstorms Fewer and Worse, Too.” *The Byte*. November 11, 2024.

<https://futurism.com/the-byte/microplastics-clouds-affecting-weather>.

Economic Benefits and Cost Savings of ReUse

Solis, Nathan. “Getting Takeout? You Have to Ask for Plastic Utensils and Napkins in L.A. Now.” *LA Times*. November 15, 2021.

<https://www.latimes.com/california/story/2021-11-15/you-have-to-ask-for-plastic-utensils-and-napkins-in-l-a-now>.

This [LA Times article](#) focusing on their legislation back in 2021 noted the following:
“Councilman Paul Koretz, who joined Krekorian in the proposal, said the switch to providing plastic utensils only on demand has saved businesses from \$3,000 to \$21,000 a year, according to figures his office cited when the ordinance was introduced to the [City Council in April](#).”

Rethink Disposable. 2018. "Cost Savings." B.Y.O. – U.S. Reduces. Accessed February 1, 2025.

<https://usreduces.org/savings/>.

Links to all Case Studis by ReThink Disposables

<https://cleanwater.org/campaign/rethink-disposable>

Among them, Here is the link to the studies for CT (scroll down to publications):

<https://cleanwater.org/campaign/rethink-disposable-connecticut>

And for the MA case study:

<https://cleanwater.org/publications/rethink-disposable-case-study-truro-community-kitchen>

Single-Use Foodwares as a Solid Waste Problem: Failure of Plastic Recycling, including “Advanced” Chemical Recycling

Beyond Plastics. “New Reports Reveals that U.S. Plastics Recycling Rate Has Fallen to 5%-6%.” May 4, 2022.
<https://www.beyondplastics.org/press-releases/the-real-truth-about-plastics-recycling>

Beyond Plastics. “Report: Chemical Recycling: A Dangerous Deception.” October 2023.
<https://www.beyondplastics.org/publications/chemical-recycling>

Brown, Erina, Anna MacDonald, Steve Allen, Deonie Allen. “The Potential for a Plastic Recycling Facility to Release Microplastic Pollution and Possible Filtration Remediation Effectiveness.” *Journal of Hazardous Materials Advances*. May 2023.
<https://doi.org/10.1016/j.hazadv.2023.100309>

*The study shows that the filtration system installed at the plastic recycling facility is effective at removing the majority of microplastics larger than 5µm, with particularly high removal efficiencies for those larger than 40µm. **However, the filtration is ineffective at removing microplastics smaller than 5µm**, which are subsequently discharged into the environment. The recommendation for additional filtration indicates that the current system does not adequately address all microplastic pollution, particularly the smaller particles.*

Brock, Joe, Valerie Volcovici, and John Geddie. “The Recycling Myth: Big Oil’s Solution for Plastic Waste Littered with Failure.” *Reuters Investigates*, July 29, 2021.
<https://www.reuters.com/investigates/special-report/environment-plastic-oil-recycling/>

ExxonMobil. “ExxonMobil Starts Large Operations at Large-Scaled Advanced Recycling Facility.” December 14, 2022.
https://corporate.exxonmobil.com/news/news-releases/2022/1214_exxonmobil-starts-operations-at-large-scale-advanced-recycling-facility.

Geueke B, Phelps DW, Parkinson LV, Muncke J. Hazardous Chemicals in Recycled and Reusable Plastic Food Packaging. *Cambridge Prisms: Plastics*. May 22, 2023.
<https://www.cambridge.org/core/journals/cambridge-prisms-plastics/article/hazardous-chemicals-in-recycled-and-reusable-plastic-food-packaging/BBDE514AAFE9F1ABB3D677927B343342>

This review examines the health risks linked to reusing and recycling plastics, especially in food packaging, and highlights that recycled plastics may pose greater dangers than virgin plastics. It discusses how hazardous chemicals, including endocrine disruptors and carcinogens, can be released during reuse or accumulate during recycling, making recycled plastics potentially more toxic. The study draws on data from the FCCmigex database, which includes over 800 scientific publications on plastic food contact materials (FCMs). The findings raise significant concerns about the safety of recycled plastics in food contact applications.

Global Alliance for Incinerator Alternatives. “5 Things Plastic Polluters Don’t Want You to Know about Chemical Recycling.” 2021.

<https://www.no-burn.org/resources/5-things-plastic-polluters-dont-want-you-to-know-about-chemical-recycling/>

Greenpeace. "Circular Claims Fall Flat: Comprehensive U.S. Survey of Plastics Recyclability." February 18, 2020.

<https://www.greenpeace.org/usa/research/report-circular-claims-fall-flat/>

Greenpeace. "New Greenpeace Report Calls Out Toxic Hazards of Recycled Plastic as Global Plastics Treaty Negotiations Resume in Paris." May 24, 2023.

<https://www.greenpeace.org/usa/news/new-greenpeace-report-calls-out-toxic-hazards-of-recycled-plastic-as-global-plastics-treaty-negotiations-resume-in-paris/>

Hahladakis, John N., Costas A. Velis, Roland Weber, Eleni Tacovidou, Phil Purnell. "An Overview of Chemical Additives Present in Plastics: Migration, Release, Fate and Environmental Impact During Their Use, Disposal and Recycling." *Journal of Hazardous Materials*. February 15, 2018.

<https://www.sciencedirect.com/science/article/pii/S030438941730763X?via%3Dihub>

Hahn, Jennifer. "Recycled Plastics Often Contain More Toxic Chemicals Says Greenpeace." *DeZeen*. May 26, 2023.

<https://www.dezeen.com/2023/05/26/recycled-plastics-greenpeace-report/>

John, Rebecca. "'Maddening' Proof Plastics Industry Knew Recycling Was False Solution in 1974, New Document Shows." *DeSmog*, August 5, 2025.

<https://www.desmog.com/2025/08/05/maddening-proof-plastics-industry-knew-recycling-was-false-solution-in-1974-new-document-shows/>.

Investigative report revealing a newly uncovered 1974 letter from DuPont president and board chairman Charles Brelsford McCoy stating that recycling DuPont's plastic products was "not feasible." This document—[available here](#)—is the earliest known top-level admission that common plastic products could not be recycled due to complex chemical structures. The article situates this evidence within decades of industry promotion of recycling as a solution despite internal recognition of its impracticality, and amid ongoing lawsuits alleging public deception by U.S. plastic producers.

Kaufman, Leslie. "The Warehouses of Plastic Behind TerraCycle's Recycling Dream." *Bloomberg*. October 27, 2022.

<https://www.bloomberg.com/features/2022-terracycle-tom-szaky/>

Liu, Megan, Sicco H. Brandsma, and Erika Schreder. "From E-Waste to Living Space: Flame Retardants Contaminating Household Items Add to Concern About Plastic Recycling." *Chemosphere* 365 (2024): 143319. <https://doi.org/10.1016/j.chemosphere.2024.143319>.

Brominated flame retardants (BFRs) and organophosphate flame retardants (OPFRs) are commonly used in electric and electronic products in high concentrations to prevent or

retard fire. Health concerns related to flame retardants (FRs) include carcinogenicity, endocrine disruption, neurotoxicity, and reproductive and developmental toxicity. Globally, a lack of transparency related to chemicals in products and limited restrictions on use of FRs in electronics have led to widespread use and dissemination of harmful FRs. Despite the lack of transparency and restrictions, plastics from electronics are often recycled and can be incorporated in household items that do not require flame retardancy, resulting in potentially high and unnecessary exposure. This study sought to determine whether black plastic household products sold on the U.S. market contained emerging and phased-out FRs and whether polymer type was predictive of contamination.

Metzger, Luke. "Exxon Calls It a Recycling Collaboration. But It's Not Real Recycling." Environment Texas. May 9, 2024.
<https://environmentamerica.org/texas/articles/exxon-calls-it-a-recycling-collaboration-but-its-not-real-recycling/>

McVeigh, Karen. "Recycling Can Release Huge Quantities of Microplastics, Study Finds." *The Guardian*, May 23, 2023.
<https://www.theguardian.com/environment/2023/may/23/recycling-can-release-huge-quantities-of-microplastics-study-finds>

The study suggests the recycling plant discharged up to 2,933 metric tonnes of microplastics a year before the filtration system was introduced, and up to 1,366 metric tonnes afterwards.

NL Times. "Large Fire at Brabant Artificial Turf Company." October 12, 2018.
<https://nltimes.nl/2018/10/12/large-fire-brabant-artificial-turf-company>

Noor, Dharna. "Shell Quietly Backs Away from Pledge to Increase 'Advanced Recycling' of Plastics." *The Guardian*. July 17, 2024
<https://www.theguardian.com/business/article/2024/jul/17/shell-recycling-plastic-pledge>

"Energy giant promised to turn 1m tonnes of plastic waste into oil each year, but now says the goal is unfeasible."

Noor, Dharna. "California Sues ExxonMobil Over Alleged Role in Plastic Pollution Crisis." *The Guardian*, September 23, 2024.
https://www.theguardian.com/us-news/2024/sep/23/california-exxon-plastics-lawsuit?CMP=Share_iOSApp_Other.

In this article, Noor reports on California's groundbreaking lawsuit against ExxonMobil, accusing the company of contributing to the plastic pollution crisis and misleading the public about the environmental impact of plastics. The lawsuit represents a significant shift in holding fossil fuel companies accountable for their role in climate and pollution

crises, with claims that plastic production and fossil fuel companies are deceiving the public about the sustainability of plastics. This case marks the first of its kind in addressing the intersection of fossil fuel production and plastic pollution. Here is a [link to the actual lawsuit filed](#) by the California AG.

Philips, Anna. “Toxic Air Explosions: Inside the Bitter Battle between Texas Residents and Exxon: Residents of Baytown Sued Exxon 13 Years Ago to Reduce Pollution that Wafts into Their Neighborhoods. A Key Legal Decision Looms, and the Case Could Have National Implications.” *The Washington Post*. March 16, 2023.
<https://www.washingtonpost.com/climate-environment/2023/03/15/exxon-pollution-lawsuit-baytown-texas/>

The Exxon complex in the Baytown and Houston, TX area has [a new controversial chemical recycling plant](#) which processes plastics, [including artificial turfs, supplied by a recycling company Tencate](#). For more information, watch [Dr. Neil Carman’s presentation in our webinar](#) held on 4/30/24. Dr. Carman served as the staff leader in [the lawsuit against Exxon Mobile complex in Baytown, TX](#) for twelve years.

Plastic Pollution Coalition. “What Really Happens to Your Plastic ‘Recycling.’” May 16, 2022.
<https://www.plasticpollutioncoalition.org/blog/2022/5/16/what-really-happens-to-your-plastic-recycling>

Plastic Pollution Coalition. ““Advanced Recycling” is Not a Solution to Plastic Pollution.” August 31, 2022.
<https://www.plasticpollutioncoalition.org/blog/2022/8/31/advanced-recycling-truths>

Plastic Pollution Coalition. “PPC Webinar | Greenwashing 2.0: Debunking Recycling Myths.” June 5, 2024. <https://www.plasticpollutioncoalition.org/event/ppc-webinar-060524>

Public Employees for Environmental Responsibility. “False Artificial Turf Recycling Claims Ripped.” March 7, 2022. <https://peer.org/false-artificial-turf-recycling-claims-ripped/>.

Song, Lisa. “Selling a Mirage: The Delusion of Advanced Plastic Recycling Using Pyrolysis.” *ProPublica*. June 20, 2024.
<https://www.propublica.org/article/delusion-advanced-chemical-plastic-recycling-pyrolysis>

Zero Waste Europe. “Still Fifty Years to Commercially Scale Pyrolysis Technologies, New Paper Finds.” November 21, 2024.
<https://zerowasteurope.eu/press-release/still-fifty-years-to-commercially-scale-pyrolysis-technologies-new-paper-finds/>.

While the petrochemical industry touts chemical recycling as a solution to the plastic waste crisis, insiders acknowledge the technology won’t be commercially viable for another fifty years, a new paper reveals. This new industry landscape overview published

by Zero Waste Europe, “Fifty years: chemical recycling’s fading promise”, calls for a reduction in virgin plastic production to prioritise upstream solutions to single-use plastic that, ultimately, reduce plastic consumption at large. These include waste prevention, reuse, and then recycling. In the paper, contacted experts, including former Shell scientist Prof. Jean-Paul Lange, warn that pyrolysis relies on continued virgin plastic production. According to Lange, it will take fifty years to “successfully ramp up chemical recycling.” Even if scaled up, pyrolysis can only process a fraction of the plastic waste produced, and cannot be considered fully circular.

Temperature Controlled Bars

Why BYO Should Be Allowed at Salad Bars and Hot Bars

1. The risk is no greater than store-supplied containers.

- Customers already handle utensils at salad and hot bars.
- Whether food goes into a disposable clamshell, a store-provided reusable, or a customer's BYO container, the transfer process is identical.
- The outside of a BYO container poses no more risk than a customer's hands, coat sleeve, or shopping bag already do.

2. The FDA “time/temperature control” concern is misplaced here.

- Salad bar/hot bar foods must be kept in compliance with 41°F/135°F rules regardless of the container used.
- BYO containers don't alter the temperature control requirements — that's managed by the store.

3. Hygiene safeguards are simple and practical.

- A rule that containers must not directly contact food pans or utensils (same as current practice with store clamshells).
- A visual check by staff for visibly dirty containers, just as already done with mugs in cafés.
- Liability protections ensure that stores aren't punished if a customer brings an unclean container.

4. Other jurisdictions show it's possible.

- In many European countries, staff will place prepared foods from temperature controlled bars into BYO containers on request.
- Oregon's new law (SB545, 2023) already allows BYO at grocery delis and cafés — salad/hot bar carve-outs are purely precautionary, not based on evidence of risk.
- California's law (AB 619, 2019) explicitly authorizes food facilities statewide — including grocery stores and delis — to accept BYO containers, as long as the facility's food-contact surfaces are sanitized or using isolation to avoid contact, or written procedures exist to prevent cross-contamination.
- Illinois's law (HB 2086, 2023) goes further, explicitly permitting BYO containers at both restaurants and retailers — including grocery stores — for ready-to-eat as well as dry bulk foods, provided containers are clean, cross-contamination safeguards are in place, and written procedures are maintained.

5. The prohibition undermines climate and public health goals.

- Salad and hot bars are among the largest single sources of disposable plastic clamshells.

- Banning BYO at these stations forces unnecessary waste, directly contradicting the Climate Leadership and Community Protection Act (CLCPA) targets and statewide plastic reduction commitments.
- *Beyond the environmental burden, **single-use containers also pose direct public health risks:** scientific studies show that PFAS and microplastics migrate from food packaging into meals, especially when hot foods are placed in plastic clamshells. These chemicals accumulate in the human body, contributing to endocrine disruption, cardiovascular disease, and reproductive harm.*
- Maintaining a prohibition that keeps customers locked into single-use plastics is not only environmentally irresponsible — it is also a preventable public health hazard.

6. Clear labeling and signage manage customer expectations.

- Simple posted signs: *“BYO containers welcome. Containers must not touch food pans or serving utensils.”*
- This both empowers customers and reassures regulators that cross-contamination is being actively prevented.