

The Invisible Plastic Particles in Our Drinking Water

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Plastic pollution is a pervasive problem that has negative impacts felt around the globe. In addition to the deleterious effects on marine life, the decreased cleanliness of our living environment, and contribution to climate change, the production, use, and disposal of plastics is now impacting our water systems.

One of the more recent developments in the understanding of the problem of plastic pollution is the existence of microplastics. These tiny plastic particles are either produced intentionally for use in other consumer products or are created when larger plastic debris is broken down by erosion and sunlight into increasingly smaller pieces. One of the most pervasive forms of microplastic is known as microfiber: small strands of plastic used to produce synthetic fabrics such as polyester and nylon. When clothing made from these fabrics is washed, some of the microscopic fibers are shed. A recent inquiry (http://brenmicroplastics.weebly.com/uploads/5/1/7/0/51702815/bren-patagonia_final_report.pdf) into the phenomenon revealed that as many as 250 thousand fibers can be released within a single wash.

So what do all these microplastics do? Their impact comes from their size and their resulting ability to evade most filters and even enter the bloodstreams of organisms by which they are consumed. Recent studies into water contamination have found microplastics in 83% of tap water samples from major cities (https://orbmedia.org/stories/Invisibles_plastics) around the world and in 93% of samples from the world's top 11 bottled water brands (<http://www.fredonia.edu/news/ArchivesSearch/tabid/1101/ctl/ArticleView/mid/1878/articleId/6>)

It is inherently difficult to establish a definitive causal link between a contaminant and the potential health impacts of exposure; to do so would require intentionally exposing humans to potentially harmful chemicals and observing the response. However, we can and have shown (<https://www.mayoclinic.org/healthy-lifestyle/nutrition-and-healthy-eating/expert-answers/bpa/faq-20058331>) that there is an observable correlation between the presence of plastic substances in the blood (specifically BPA and phthalates) and




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higher rates of certain health issues. Some of these health issues  (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3299092/) chromosomal and reproductive abnormalities, early puberty, childhood obesity, and increased blood pressure. The result of this lack of hard causal evidence is part of the reason there remains no FDA regulation setting a limit of microplastic contamination in bottled water.

The lack of government and policy action in this realm is frankly appalling. We have shown that our drinking water supply is heavily contaminated with microplastics. We have shown that those who have been exposed to certain forms of plastic contamination have a higher likelihood of developing certain serious health issues. We have even shown that these plastic chemicals directly cause these health impacts in lab animals. Given all this circumstantial evidence, the lack of proof for direct causation seems to be a pretty weak argument for delaying regulation. Certain countries, especially in Europe, have banned the use of certain plastics in packaging that comes in contact with food and drink, so why have so few other governments taken the step? Policies have been created to reduce the distribution and consumption of several single-use plastics, so why haven't policies been passed to call for stronger water treatment systems that ensure fewer particles of microplastic make it into our drinking water? Why hasn't more effort been put into removing existing microplastics from the streams and waterways that supply our water? People should know the potential risks their drinking water poses to them and governments, national and local, must do more to come up with solutions.



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From the perspective of improving the quality of our drinking water, we need to focus on three things: prevention – limiting the amount of plastic that reaches any body of water; innovation – finding new ways to remove plastic that is already in our waterways and water supply; and activism – making citizens part of the solution by building a culture in which people actively think about and participate in reducing plastic consumption and contamination.

Microplastics in our water is a compelling problem and while systemic solutions are being developed, here are a few things we can do to reduce our own contribution to the problem of microplastic contamination of drinking water and to limit the risk of plastic related health issues:

- Prevent the creation of microplastics by properly disposing of plastic products and being careful not to toss plastic products near waterways, beaches or in open spaces.

- Pick up trash -especially plastics- whenever you see it, especially in ponds, streams, rivers, and beaches whenever possible.
- Participate in organized clean-up activities as much as you can.
- Look up products on the Internet (<http://www.beatthemicrobead.org/product-lists/>) and choose not to buy products containing microbeads. Choose products that have natural exfoliators instead.
- Consider changing the way you wash your clothing (<http://www.plasticpollutioncoalition.org/pft/2017/3/2/15-ways-to-stop-microfiber-pollution-now>) to reduce the number of microfibers that are released:
 - Wash synthetic clothes less frequently;
 - Use front loading washing machines as they produce fewer fibers than top loading washing machines;
 - Consider using a fiber filter whenever you wash synthetic clothes;
 - Consider switching to liquid laundry soap. Powder soaps loosen more microfibers;
 - There are also bags and other devices you can use in your washing machine collect the fibers;
 - Do not wash lint from your dryer down the drain. Dispose of it in the trash.
- Consider purchasing items made of natural fibers, when possible.
- Avoid consuming bottled water, which is also a way to reduce your consumption of single-use
- Look for a filter that you can use at home that can eliminate all microfibers and other microplastics from your drinking water.



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