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Bottled Water and Your Health



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One of the best ways to improve one's health is to drink more water. We also know that we are what we drink. Bottled water helps us drink more water while avoiding chemicals like chlorine but it also increases our day to day exposure to plastics. The quality and origin of bottled water has at times been suspect and perhaps not as pure as claimed. Tap water is adequate but can be made better by removing contaminants like chlorine, lead, protozoan cysts, fine particulate and VOCs like benzene and trihalomethanes. Elva water treatment systems effectively remove over 54 contaminants to a concentration less than or equal to NSF/ANSI permissible limits.

Regulations and Oversight

- After a damning 1999 report and petition to the FDA regarding bottled water, the National Resource Defense Council provided an update in 2013 stating "We are pleased to report recent regulatory action based on NRDC's advocacy. Since the publication date, the FDA has agreed to more stringently regulate bottled water safety to NRDC's standards. Our two main recommendations, to test for and ban water sources contaminated with E. coli and to regulate the level of di(2-ethylhexyl) phthalate (DEHP) consistent with EPA regulations, are now in place." (1)
- "The bottled water industry is largely unregulated in Canada, being monitored on a voluntary basis, overseen by the industry. Bottled water is not required to meet the Guidelines for Canadian Drinking Water Quality. Rather, it is considered a food product and is overseen by the CFIA, receiving inspections on average only once every three years. In 2002 and 2003, 125 bottling plants in Canada were inspected per year which represents two-thirds of bottling plants across Canada. This implies that bottled water plants are only inspected approximately once every three years. However, with cutbacks in the Canadian Food Inspection Agency, inspections may have even been reduced even further [Clarke, 2007]." (2)
- "Guidelines for the chemical content of bottled waters in Canada are much less stringent than they are for tap water. Bottled waters are not governed by the GCDWQ. In Canada, bottled waters are considered food products and fall within the purview of the Canadian Food and Drugs Act (FDA). Yet the Act does not specify the maximum allowable concentration of chemicals nor does it require manufacturers to list the chemical contents on the label. Instead, there are regulatory tolerances for lead (0.2 mg L⁻¹) and arsenic (0.1 mg L⁻¹), while other chemicals are regulated under a general safety clause stating 'no person shall sell any food . . . which has in or on it any poisonous or harmful substance' [Dabeka et al., 2002]." (2)
- "In 2002, the Canadian federal government called for input on a discussion paper called Making It Clear: Renewing the Federal Regulations on Bottled Water [Canadian Food Inspection Agency and Health Canada, 2002], wherein the need to update regulations concerning bottled water was acknowledged. The process of Regulation renewal became stalled in 2003, and as of 2013, no new or modified federal regulations on bottled waters have occurred." (14) Updates can be viewed at the following link:
 - http://www.hc-sc.gc.ca/fn-an/securit/facts-faits/bottle_water-eau_embouteillee-eng.php

Recalls and Independent Testing

- The BBC reported in 2004 that Coke recalled 500,000 bottles of Dasani from the UK market after they were found to have exceeded the allowable levels of bromate; a chemical that can have increased cancer risk with long term exposure. (3)
- August 24, 2006 - FDA to recall more bottled water in bromate scare. America's food safety watchdog is expected to announce the recall of several bottled water drinks, thought to contain cancer-causing bromate above the legal limit in the US, BeverageDaily.com has learned. (4)
- May 4, 2011 - Officials at the Arkansas Department of Health (ADH) announced today that test results on a sample taken from certain lots of Mountain Pure bottled drinking water show the presence of biological contamination. (5)
- March 16, 2012 - 1.6 Million Cases of Bottled Water Recalled for Plastic Fragments. "Two firms recalled large numbers of bottled drinking water recently for possibly containing bits of plastic inside the bottle, as announced this week in the U.S. Food and Drug Administration's Enforcement Report. Safeway recalled 1.6 million cases of Refresh Purified Drinking Water in California, Nevada, and Hawaii. Safeway alerted the FDA about the plastic fragments, up to 12mm in length, on Feb. 9. Additionally, 39,000 cases of bottled water were recalled nationwide and in Canada by AquaHydrate last December." (6)
- 29 recalls issued to 49 separate bottled water products since 2000 in Canada. These bottled water products were recalled for several different areas of concern which included microbiological contaminants, molds and coliform bacteria, chemical contaminants such as arsenic, and 'extraneous material,' including glass. (2)

Water Coolers and the 5 gallon-Polycarbonate water jug

- Most five-gallon water jugs are made of polycarbonate, which leaches BPA, especially when they are stored at warm temperatures or for prolonged periods of time. BPA is a Hormone-Disrupting Chemical Linked to Reproductive and Developmental Harm BPA is a very common chemical found in plastics, food and beverage can linings, and other consumer products. BPA is known to mimic estrogen and, in animal studies, researchers have linked early life EXPOSURE to reproductive harm, increased cancer susceptibility, and abnormalities in brain development and fat metabolism. (7)
- March 30, 2012 - "The Food and Drug Administration said today it would allow bisphenol A (BPA) to remain in food packaging, an action that keeps the hormone-disrupting chemical linked to cancer, obesity and a host of other health problems in the food supply. In rejecting a petition today from the Natural Resources Defense Council, the agency emphasized it was not making a final determination of BPA's safety and instead will continue to examine the ongoing research of BPA's effects on health. The following is a statement from Dr. Sarah Janssen, senior scientist in the public health program at the Natural Resources Defense Council: "BPA is a toxic chemical that has no place in our food supply. We believe FDA made the wrong call. "The agency has failed to protect our health and safety - in the face of scientific studies that continue to raise disturbing questions about the long-term effects of BPA exposures, especially in fetuses, babies and young children. "The FDA is out-of-

step with scientific and medical research. This illustrates the need for a major overhaul of how the government protects us against dangerous chemicals.” (8)

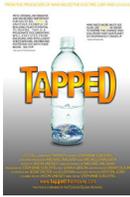
The PET Plastic Bottle

- “Our findings provide first evidence for a broad contamination of mineral water with xenoestrogens, typically in the range of 2–40 ng/l EEQ with maximum values of 75 ng/l EEQ. Consumption of commercially bottled mineral water may therefore contribute to the overall exposure of humans with endocrine disruptors. Moreover, it is probable that this estrogenic contamination originates from plastic food packaging materials because mineral water bottled in PET and Tetra Pak is more estrogenic than water bottled in glass. (9)
- “An Environmental Working Group investigation found that the recycling code 1 PET plastics contain numerous chemical additives, numerous manufacturing impurities and degradation byproducts, with 90 potential contaminants that can leach into bottled water. (10)
- In 14 brands of bottled water from Canada, Antimony concentrations increased on average 19% during 6 months storage at room temperature, but 48 brands of water from 11 European countries increased on average 90% under identical conditions. (11)
- The US Environmental Protection Agency (USEPA), the Ontario ministry of environment, and health Canada regulate antimony in municipal drinking water at a maximum contaminant level (MCL) of 6 µg/L. The European Union, the German Federal Ministry of Environment, Japan, and World Health Organization (WHO) also have drinking water standards for antimony at level 5 µg/L, 5 µg/L, 2 µg/L and 20 µg/L, respectively. Antimony is regulated as a drinking water contaminant because it can cause health effects, such as nausea, vomiting, and diarrhea, when exposure exceeds the MCL for relatively short periods. Long-term exposure can lead to increase blood cholesterol and decreased blood sugar. The USEPA has not classified antimony as a human carcinogen in water due to lack of studies. However, research shows that antimony and arsenic, a proven carcinogen, are similarly toxic. (12)
- “Westerhoff et al. (2008) found that raising the ambient temperature significantly increases the leaching of antimony into nine brands of PET-bottled water purchased in the United States. At room temperature (22°C) they found no significant change in the concentration of antimony over time: The average antimony concentration from nine brands of PET-bottled waters was 0.195 ± 0.116 ppb at the beginning of the study and 0.226 ± 160 ppb after 3 months indoors at 22°C. When the bottles were incubated at 70°C, however, the concentration reached 6 ppb in just 12 days; at 80°C, in just 2.3 days. After 7 days at 80°C, the antimony concentration reached 14.4 ppb. Noting that temperatures within a closed-container truck may easily exceed 60°C in Arizona, where this study was conducted, Westerhoff et al. (2008) concluded that “short duration exposure to elevated temperatures during transit or storage by the seller or consumer could yield antimony concentrations that approach or exceed the 6 ppb MCL.” (13)
- “In brief, 18 different bottled waters (coded as samples 1–18) produced by 13 different companies in France, Germany, and Italy were purchased in local supermarkets... Using an optimized extraction procedure, we detected antiestrogens and antiandrogens in the majority of analyzed bottled water products. Moreover, the antagonist activity was very potent. An equivalent of 3.75 mL bottled water inhibited estrogen and androgen receptor by up to 60 and 90%, respectively... From a broader perspective, bottled water from six different countries has been found to contain estrogenic [12], [13], [14], [15], [17], antiestrogenic, and antiandrogenic (this study), as well as androgenic, progestagenic, and glucocorticoid-like chemicals [16]. This demonstrates that a popular beverage is

contaminated with diverse-acting EDCs.” (15)

Want to Learn More?

Want to learn more about the environmental impact of bottled water? Check out the following documentaries and books.



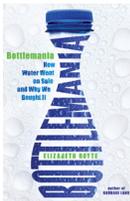
Tapped - the Movie

Tapped examines the role of the bottled water industry and its' effects on our health, climate change, pollution, and our reliance on oil.



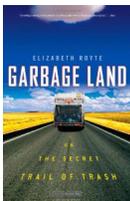
The Story of Bottled Water

The Story of Bottled Water tells the story of manufactured demand—how you get Americans to buy more than half a billion bottles of water every week when it already flows from the tap.



Bottlemania

Bottlemania examines the state of tap water today (you may be surprised), and the social impact of water-hungry multinationals sinking ever more pumps into tiny rural towns.



Garbage Land: On the Secret Trail of Trash

In Garbage Land, acclaimed science writer Elizabeth Royte leads us on the wild adventure that begins once our trash hits the bottom of the can.



Bottled and Sold

A world-renowned scientist and freshwater expert, Peter Gleick is a MacArthur Foundation “genius,” and according to the BBC, an environmental visionary. And he drinks from the tap. Why don't the rest of us?

References

1. NRDC, "Bottled Water – Pure Drink or Just Hype (2013 Update)
<http://www.nrdc.org/water/drinking/bw/bwinx.asp>
2. Trottier, C. Ferfusion, P. Cook, V. Maggio, Z. Cressy, J. "Murky Waters: The Urgent Need for Health and Environmental Regulations of the Bottled Water Industry", The Polaris Institute
<http://www.polarisinstitute.org/files/Murky%20Waters%20-%20The%20Urgent%20Need%20for%20Health%20and%20Environmental%20Regulations%20of%20the%20Bottled%20Water%20Industry.pdf>
3. BBC news: "Coke recalls controversial water."
<http://news.bbc.co.uk/1/hi/business/3550063.stm>
4. Beveragedaily.com - FDA to recall more bottled water in bromate scare
<http://www.beveragedaily.com/Markets/FDA-to-recall-more-bottled-water-in-bromate-scare>
5. USFDA - Bottled Water Recall Recalled Lots Include Water Distributed During Recovery Effort in Clinton
<http://www.fda.gov/Safety/Recalls/ucm254580.htm>
6. Consumerbell.com - 1.6 Million Cases of Bottled Water Recalled for Plastic Fragments
<http://blog.consumerbell.com/2012/03/16/1-6-million-cases-of-bottled-water-recalled-for-plastic-fragments/>
7. Congress Must Protect Children from a Developmental Toxic: Bisphenol A (BPA). For more information, please contact: Sarah Janssen, M.D., Ph.D., MPH, Natural Resources Defense Council
<http://www.nrdc.org/health/toxics/files/bpa.pdf>
8. FDA Rejects NRDC Call to Eliminate BPA from Food Packaging, Natural Resource Defense Council
<http://www.nrdc.org/media/2012/120330.asp>
9. Endocrine disruptors in bottled mineral water: total estrogenic burden and migration from plastic bottles Martin Wagner & Jörg Oehlmann Environ Sci Pollut Res
http://www.clubsportif.de/tl_files/downloads/PDF/fulltext%20hormone%20water.pdf
10. Chemical Additives In Bottled Water Plastics, Environmental Working Group
<http://www.ewg.org/news/news-releases/2010/01/26/press-release-chemical-additives-bottled-water-plastics>
11. Contamination of Bottled Waters with Antimony Leaching from Polyethylene Terephthalate (PET) Increases upon Storage. Environmental Science and Technology William Shotyk * and Michael Krachler Institute of Environmental Geochemistry, University of Heidelberg, INF 236, D-69120 Heidelberg, Germany Environ. Sci. Technol., 2007, 41 (5), pp 1560–1563
<http://pubs.acs.org/doi/abs/10.1021/es061511%2B>
12. Antimony leaching from polyethylene terephthalate (PET) plastics used for beverage in Japan. Saowaluk Rungchanga, Phunsiri Suthilukb, Sonthaya Numthuama, Takaaki Satakea
<http://www.icef11.org/content/papers/fms/FMS615.pdf>
13. Polyethylene Terephthalate May Yield Endocrine Disruptors. Leonard Sax. Environ Health Perspect. 2010 April; 118(4): 445–448. Published online 2009 November 25
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2854718/>
14. Hirst, R "Bottled Water and Tap Water Just the Facts" Drinking Water Research Foundation, 2011

Alexandria, Virginia USA

<http://www.thefactsaboutwater.org/uploads/BW%20PWS%20Just%20the%20Facts%202011%20Final.pdf>

15. Identification of Putative Steroid Receptor Antagonists in Bottled Water: Combining Bioassays and High-Resolution Mass Spectrometry. Martin Wagner, Michael P. Schlüsener, Thomas A. Ternes, Jörg Oehlmann PLoS ONE 8(8): e72472. doi:10.1371/journal.pone.0072472

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0072472>



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