

# Safer Alternatives to Bisphenol A (BPA)



Bisphenol A (BPA), a chemical that is produced in excess of 2 billion pounds a year in the United States, is widely used in certain kinds of plastics and epoxy resins, including those commonly found in baby bottles and used to line metal food containers. Research has shown that BPA, a hormone-disrupting chemical, leaches into food and drink from those containers and is ingested by individuals. According to the U.S. Centers for Disease Control and Prevention, 93 percent of Americans have detectable levels of BPA in their bodies. More than 200 independent scientific studies show that exposures to low doses of BPA are associated with a wide range of adverse health effects in later life. These effects include increased risk of breast and prostate cancer, genital abnormalities in male babies, infertility in men and women, early puberty in girls, metabolic disorders such as type-2 diabetes and obesity, and neurobehavioral problems such as attention deficit hyperactivity disorder (ADHD).

Due to growing scientific and public concern about BPA, leading U.S. retailers as well as chemical manufacturers have created safer, cost-effective alternatives to this toxic chemical. Below are the descriptions and uses of those alternatives.

## ***BPA-Polycarbonate Plastic Alternatives (Bottles and Containers)***

### **Glass and Stainless Steel**

Many alternatives entering the market are simple materials that have been used safely for decades, including glass and stainless steel. Glass baby bottles and stainless steel water bottles like those made by Dr. Brown's and Klean Kanteen are BPA-free, reusable and environmentally friendly alternatives.

### **Aluminum**

Aluminum water bottles have entered the marketplace as an alternative to polycarbonate bottles, although they cannot be used without a resin or liner on the inside of the aluminum bottle. Manufacturers such as SIGG and Gaiam advertised that the liners used in their aluminum bottles were safe, although studies recently uncovered that liners in these bottles contained BPA. Therefore, aluminum water bottles being advertised as an alternative to BPA-polycarbonate plastics must be paired with a BPA-free epoxy liner to serve as a safe alternative to polycarbonate plastics.

### **Tritan Copolyester™ (Eastman Chemical)**

Tritan is one of the newest alternatives released on the market and is now used in many products, including Nalgene bottles, Weil-Baby Bottles and Camelback, as an alternative to BPA-polycarbonate plastics. Eastman Chemical states that the product is not carcinogenic. Toxicological studies conducted by the company confirm that the monomers used in Tritan do not demonstrate an affinity to bind to hormone receptors, nor a potential to induce endocrine disruptive effects. In addition, no other chemicals utilized in its production are known or suspected endocrine-disrupting compounds (EDCs).<sup>i</sup> While initial research done by Eastman Chemical has not shown potential for endocrine-disruptive effects, further independent studies must be completed to confirm these results.

### **High Density Polyethylene (HDPE)**

HDPE or #2 plastics are primarily used for non-reusable containers that hold milk, juice, water and other beverages. HDPE is a non-carcinogenic plastic and was approved for use in food-contact applications in 1998 by the FDA.<sup>ii iii iv</sup> Currently, HDPE is largely used in single-use food and beverage containers, but has been used by Nalgene and other companies to produce water bottles that have a "cloudy" appearance.

*The Breast Cancer Fund works to identify and eliminate the environmental causes of the disease.*  
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## **Polypropylene (PP)**

Polypropylene or #5 plastics are used in most reusable food storage containers and have recently been applied to baby bottles.<sup>v</sup> Polypropylene is non-carcinogenic. Baby bottle manufacturers, including Dr. Brown's and Ameda, are using polypropylene as a safer alternative to BPA-polycarbonate bottles.

## **Polyethylene Terephthalate (PET)**

Polyethylene terephthalate or #1 plastics are commonly used in soda and water bottles. PET plastics are recyclable and are a non-carcinogenic plastic, but are generally applied to single-use applications.<sup>vi</sup> Increased efficacy testing and innovation may produce a viable reusable PET alternative to polycarbonate plastic bottles.

## **Grilamid TR-90**

An alternative that is being used in Germany, this is a thermoplastic nylon or polyamide made from cyclododecalactam, the same material that is used to make Nylon 12.<sup>vii</sup> <sup>viii</sup> Grilamid TR 90 is a clear plastic exhibiting good toughness and resistance to hot-water sterilization and chemical cleaners.<sup>ix</sup> It has been adopted by a Japanese company for production of nylon-based reusable baby bottles, but has not hit the U.S. market yet.

## **Epoxy Resin Alternatives (Can Liners)**

### **Polyester Coatings (DAREX Polyester, PET Film)**

Polyester coatings have been used instead of BPA in can linings since the 1990s, when Japanese can manufacturers voluntarily reformulated their can coating process due to public concern about BPA. Polyester coatings can be used in place of BPA liners or as an overlay on BPA undercoating, which reduces leaching capabilities of BPA by up to 95 percent into food and beverages.<sup>x</sup>

### **Baked-on Resins (Oleoresin)**

Natural oils and resins can be used as an alternative to BPA linings. Oleoresin is a natural mixture of an oil and a resin extracted from various plants, such as pine or balsam fir.<sup>xi</sup> While these cans cost 14 percent more than the industry standard BPA-lined cans, the cost will likely decrease as more companies make the switch and these alternative technologies achieve economies of scale. Oleoresin only works for low-acid canned foods such as beans and vegetables. Currently no viable alternative has been identified for use in packaging of highly acidic foods such as tomatoes, although major companies like Heinz and Hain Celestial are actively researching safe alternatives for all canned food. Eden Foods, a subsidiary of Hain Celestial, is already using oleoresin linings for its bean products.

### **Tetra Pak**

Tetra Paks are a packaging alternative to aluminum or steel cans. Tetra Pak is made of 70 percent paperboard combined with thin layers of LDPE (low density polyethylene) and aluminum foil.<sup>xii</sup> Tetra Paks are used widely throughout Europe and have been utilized in the United States for juice, soups, liquid dairy products and even wine.

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<sup>i</sup> Eastman Chemical Company (2008). "Endocrine disruption potential of monomers used in Eastman Tritan™ copolyester." Retrieved November 11, 2009 from [http://www.greendepot.com/greendepot/assets/images/docs/KOR\\_WATER\\_EndocrineSpecSheet.pdf](http://www.greendepot.com/greendepot/assets/images/docs/KOR_WATER_EndocrineSpecSheet.pdf).

<sup>ii</sup> Institute for Agriculture and Trade Policy (September 2008). "Smart Plastics Guide: Healthier Food Uses of Plastics." Retrieved November 12, 2009 from <http://www.healthobservatory.org/library.cfm?refid=102202>.

<sup>iii</sup> International Plastics Task Force (2000). "High-Density (low-pressure) Polyethylene." Retrieved November 12, 2009 from [http://www.ecologycenter.org/iptf/plastic\\_types/HDPE/SCIENCE.html](http://www.ecologycenter.org/iptf/plastic_types/HDPE/SCIENCE.html).

<sup>iv</sup> Lyondell Basell Polymers (2009). "Bottles for Consumer Goods." Retrieved November 13, 2009 from [https://polymers.lyondellbasell.com/portal/site/basell/menuitem.81bd1022b7c8ec5bbaabbd10e5548a0c/?VCMChannelID=1dc7b1594f9d5110VgnVCM100000646f3c14\\_\\_&productQueryText=&filterType=application&application=1600&resin=18&region=](https://polymers.lyondellbasell.com/portal/site/basell/menuitem.81bd1022b7c8ec5bbaabbd10e5548a0c/?VCMChannelID=1dc7b1594f9d5110VgnVCM100000646f3c14__&productQueryText=&filterType=application&application=1600&resin=18&region=).

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<sup>v</sup> Institute for Agriculture and Trade Policy (September 2008). "Smart Plastics Guide: Healthier Food Uses of Plastics." Retrieved November 12, 2009 from <http://www.healthobservatory.org/library.cfm?refid=102202>.

<sup>vi</sup> Institute for Agriculture and Trade Policy (September 2008). "Smart Plastics Guide: Healthier Food Uses of Plastics." Retrieved November 12, 2009 from <http://www.healthobservatory.org/library.cfm?refid=102202>.

<sup>vii</sup> Brenntag Canada Inc (2007). "Fiche Signalétique: Grilamid Polyamide Polymer." Retrieved November 13, 2009 from <http://candmz04.brenntag.ca/MSDS/Fr/00066502.pdf>.

<sup>viii</sup> Grilamid ERS (2001). "Technical Data Sheet, Grilamid TR-90." Retrieved November 16, 2009 from [http://www.emsgrivory.com/mytools/datenblaetter/datenblaetter/grilamid\\_tr/TR\\_90\\_E.pdf](http://www.emsgrivory.com/mytools/datenblaetter/datenblaetter/grilamid_tr/TR_90_E.pdf).

<sup>ix</sup> Plastics Technology (December 2001). "Keeping Up with Blow Molding Nylon Baby Bottles Can Replace Polycarbonate." Retrieved November 16, 2009 from: <http://www.ptonline.com/articles/kuw/13819.html>.

<sup>x</sup> As You Sow (2009). "Seeking Safer Packaging: Ranking Food Packaged Food Companies on BPA." Retrieved November 16, 2009 from <http://www.asyousow.org/publications/2009/bpa-scorecard-2009.pdf>.

<sup>xi</sup> Eden Foods (2009). "Eden Foods: Environment." Retrieved November 16, 2009 from <http://www.edenfoods.com/about/environment.php>.

<sup>xii</sup> Tetra Pak Corporation (2009). "Carton Structure and Purpose." Retrieved November 16, 2009 from [http://www.tetrapakrecycling.co.uk/tp\\_structure.asp](http://www.tetrapakrecycling.co.uk/tp_structure.asp).