BPA-containing baby bottles have been banned for sale and import in several countries, including the United States, due to health concerns.
Image Source: Flick user nerissa's ring

Plastic was once hailed as a virtual miracle, offering an **affordable, durable alternative to traditional products**while facilitating the creation of new product types never before seen. While plastic remains invaluable in the production of both industrial and household goods, public concern regarding certain types of plastics—or, more specifically, **certain plastic additives**—has caused a shift in both policy and manufacturing practices.

One of the primary areas of controversy surrounds bisphenol A (BPA), an endocrine-disrupting industrial chemical used to harden polycarbonate plastics, such as those used to make plastic bottles and food containers. Once the food is in the polycarbonate packaging, BPA may leach from the plastic into the food product, a process so common that "more than 90% of us have BPA in our bodies right now," most of which of it comes from consuming foods or drinks packed in contains made with BPA.[1]

The human consumption of BPA presents major problems; studies have revealed that BPA "mimics estrogen and could harm brain and reproductive development in fetuses, infants, and children," as well as heightening risk for certain cancers, diabetes, and cardiovascular ailments.[2]

In response to public outcry and the growing body of research indicating a lack of safety, the United States and a handful of other countries have now banned the import and sale of baby bottles containing BPA. Meanwhile, plastics manufacturers are increasingly making voluntary efforts to remove BPA from other plastic products and countless plastics are now labeled "BPA-free", both as a shrewd marketing move and to assuage public fears. But are these labels reliable? How can plastics manufacturers, the food industry, and the public be assured that the plastics they make or use truly are BPA-free? The answer could be spectrophotometric BPA determination.

BPA may leach into all food products stored with polycarbonate plastics containing BPA even in trace amounts.
Image Source: Pexels user Pixabay

The Matter of Trace Amounts

Canada became the first country to ban polycarbonate baby bottles containing BPA in 2008. The CBC says, “The government’s 2008 edict was aimed at assuaging the fears of many concerned parents, who can now ostensibly rest assured that baby bottles labeled ‘BPA-free do not contain any amount of the contentious chemical.”[3] But a Health Canada study released in 2009 reveals that several non-polycarbonate baby bottles carrying the BPA-free label, in fact, contained detectable levels of BPA and “leached trace amounts of the chemical into their contents.” Although the Health Canada study did not identify the exact source of the BPA in the baby bottles, the ubiquitous nature of BPA in plastic manufacturing facilities makes unintentional cross-contamination a strong possibility. “There is often no such thing as absolute zero due to cross-contamination and prevalence of many substances in the natural environment,” noted the study.

While Health Canada and other major medical bodies contend that these trace amounts of BPA pose no safety risk, others are not so sure. “Unfortunately, the body operates at trace amounts,” says Dr. Richard Stahlhut of the University of Rochester’s Environmental Health Sciences Center. Furthermore, many experts and consumers alike believe that people looking to purchase truly BPA-free products should have the option of doing so, which would require updated guidelines for what qualifies as BPA-free. “I think what [the Health Canada study] is suggesting is that we need greater clarity in labeling,” says Dr. Tamara Galloway, a professor at University of Exeter. “If we’re going to say ‘BPA-free’, what we need to do is define [what is] below the limits of detection or on the limits of detection.” Although Galloway doesn’t believe that BPA needs to be banned, she does believe that people should take measures to limit their exposure and that is only possible if they know if and at what level they are being exposed in the first place.

Spectrophotometric BPA determination can help plastics manufacturers gain the insight they need to make accurate claims regarding BPA levels in their products, giving consumers the ability to make informed choices.
Image Source: Flickr user Rubbermaid Products

Spectrophotometric BPA Determination

Unfortunately, regulatory bodies like The U.S. Food and Drug Administration and Health Canada don't typically test plastics for trace amounts of BPA and currently have no developed standards for what level of BPA is acceptable within an ostensibly BPA-free product. As such, creating a comprehensive quality assurance program that quantifies BPA at even minute levels is a project that must be done privately by plastics manufacturers, allowing them to gain the insight needed to make accurate claims regarding their products and empower consumers to make informed choices.

Traditionally BPA determination has been performed via gas or liquid chromatography. A 2014 study published in the *Journal of Chemical and Pharmaceutical Research*, however, established a new UV-Vis spectrophotometric method of BPA determination based on "its inhibitory effect on acridine orange oxidation which is caused by hydroxyl radical from Fenton reaction in medium acid."[4] The researchers found that the UV-Vis spectrophotometric method allowed for the detection and measurement of even trace amounts of BPA in the plastics, giving plastics manufacturers the data needed to determine BPA levels faster and more economically than traditional methods. As noted by the authors, "The developed method was accurate, rapid, and cheaper, and its recovery results for the determined samples were satisfactory." This method offers new possibilities for BPA analysis by the plastics industry, allowing operators to easily identify and quantify BPA levels to determine safety and accurate labeling.

HunterLab Spectrophotometry

HunterLab has been at the forefront of spectrophotometric technologies for over 60 years and today we offer a comprehensive range of spectrophotometric instruments, including UV-Vis

spectrophotometers ideally suited for the plastics industry. Our instruments and customizable software packages are renowned for their accuracy and flexibility, allowing operators to develop a full picture of both product appearance and **product safety**. **Contact us**for more information about our spectrophotometers and world-class customer support services and let us help you select the perfect tools for your analytical needs.

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