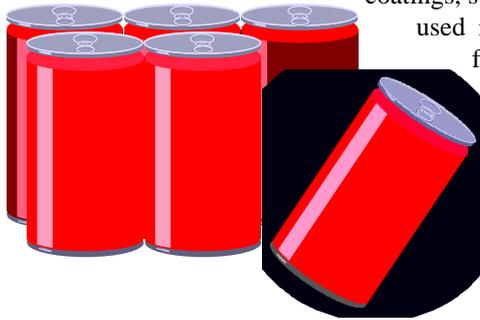


Bisphenol A

Use

Bisphenol A (BPA) is a plastic monomer which is used extensively in the production of polycarbonate, epoxy and other plastics. It can also be found in a diverse range of products including adhesives, reinforced pipes, interior coatings of tins and drums, flooring, artificial teeth, electronic goods, powder paints, headlights, lenses, helmets and paper coatings, such as that used in thermal fax paper.



BPA can mimic the female hormone oestrogen. Concerns focussed on the potential for BPA to be a factor in the increasing incidence of breast cancer in women and decreasing sperm counts in men.

Widespread human exposure can be expected largely through the use of BPA in resins and in food-can linings, from where it can leach into foods, and through its use as a sealant used in dentistry.

The total annual European production is over 500,000 tonnes with global production over one million tonnes.

Toxicity

BPA is moderately toxic. However unless spills occur, there are unlikely to be examples of acute BPA toxicity. BPA has shown to be oestrogenic in human breast cancer cell cultures at concentrations as low as 2 - 5 micrograms per litre and has been reported to cause reduced testicular size and decreased sperm count in male offspring of pregnant rats.

For information, contact:

Stephan Lutter

WWF North-East Atlantic Programme

Am Güthpol 11 · D-28757 Bremen · Germany

Tel: +49 421 65846-22 · Fax: +49 421 65846-12

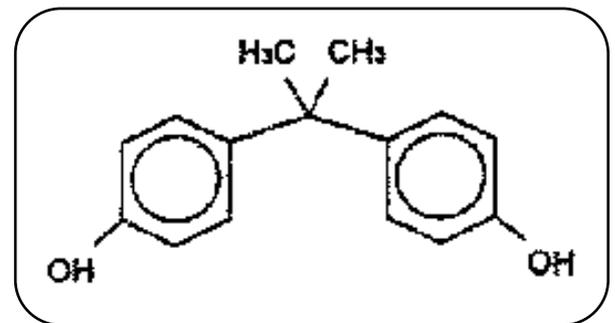
E-mail: lutter@wwf.de

Human exposure

BPA has been found in liquor from tins of peas at 23 micrograms/litre and also in liquor from tins of artichokes, beans, mixed vegetables, corn and mushrooms purchased in Spain and the USA. These liquors were found to be oestrogenic while liquors from tins with no detectable BPA showed no oestrogenic effect.

Which canned products do or do not contain BPA cannot be determined from this study, since it will depend on the particular brand of product tested. The cans for this study were purchased in Spain and the USA, but came from a variety of countries of origin.

BPA has also been found in saliva from dental patients after treatment with BPA-containing sealants.



Bisphenol A

Wildlife exposure

Although BPA is often not detectable in rivers, predicted concentrations in US rivers can reach 14 micrograms/litre. Bioaccumulation and persistence of BPA are key factors in wildlife exposure. Although biodegradable and with potentially short half-lives, BPA may survive long enough for organisms near outfalls for example to receive regular exposure. Bioconcentration factors in fish range from 5 to 68.

North-East Atlantic and International Action

The EC limit for content in food is set at 3mg/kg and the tolerable daily intake for BPA is set at 0.05mg/kg bodyweight. However neither of these limits take account of the oestrogenicity of BPA.

The 1995 Ministerial Declaration on the Protection of the North Sea at Esbjerg specifically highlighted endocrine-disrupting chemicals (EDCs) and requested the Oslo and Paris Commissions (OSPAR) and the European Commission to "adopt necessary measures" by the year 2000.

UK Action

It is reasonable to assume that several tonnes of BPA are released into the environment each year.

In January 1998, the Environment Agency for England and Wales called for unilateral action from industry to minimise the entry of known or potential endocrine disrupters to the environment by phasing out the use of existing products and developing substitutes. The Agency specifically cites BPA. The Agency suggested identifying potential EDCs, developing a complete set of environmental quality standards which take into account endocrine disrupting activity, using Integrated Pollution Control and the new Integrated Pollution Prevention and Control (IPPC) Directive to minimise the discharge of EDCs by industry and carrying out further research to look at the effects of EDCs on wildlife.

In February 1998, the House of Commons Environment Sub-Committee called on the water industry in particular to carry out more research as "*a matter of highest priority*" to establish which substances within effluents are responsible for hormone disruption. Also in February 1998, the UK Government Panel on Sustainable Development reported on EDCs stating that "*the most pressing requirement is the validation of test methods in order to identify these chemicals (endocrine disruptors)*". The Panel also raises the question of synergistic and dose-related effects of these chemicals and asks whether some EDCs "*should be phased out as a precautionary measure as safer substitutes become available*".

The UK Department of Environment, Transport and the Regions has recently established an Interdepartmental Group on Endocrine Disrupters (IGED) focussing on risk assessment of chemicals, prioritising and testing of chemicals, human health effects research, effects on wildlife, regulatory action and consultation.

In 1997, the United Nations Economic Commission for Europe (UNECE) negotiated a Protocol on Persistent Organic Pollutants (POPs) to focus initially on 15 or so groups or substances, some of which are EDCs. However by no means all identified EDCs are to be covered by this Protocol. BPA will not be covered.

- An international task force needs to be set up to assess the potential effects of hormone disrupting chemicals and opportunities to reduce their use;

- The European Commission should establish a unit or working group on endocrine disrupting chemicals.

Reduction of Inputs

WWF recommends that human exposure to and the amount of BPA released into the environment should both be reduced in line with the precautionary principle, with a view to phasing out its use at least in the manufacture of certain products. Industrial uses of BPA should be controlled under the EC Integrated Pollution Prevention and Control (IPPC) Directive. The use of BPA in pesticide formulations should be prohibited. Where substitutes are available they should be used. Additionally WWF is concerned at the possibility of drinking water contamination by BPA used in water main liners.

Text prepared by Guy Linley-Adams

References/Further Reading

Brotans J.A et al. (1995) Xeno-oestrogens Released from Lacquer Coatings in Food Cans. *Environ. Health Persp.* 103: 608-612

Environment Agency for England and Wales (1998) Endocrine disrupting substances in the environment: what should be done? Consultative Report. Environmental Issues Series.

WWF UK (1996) Bisphenol A (BPA). A briefing for WWF United Kingdom by Gwynne Lyons.

In relation to all EDCs, WWF believes that

- The OSPAR Commission should take immediate action to phase out and eliminate already identified endocrine disruptors. Furthermore endocrine disrupting properties should rank high under the prioritisation process for hazardous substances to be considered for such measures;

- Current toxicity tests need to be improved with re-testing of substances undertaken;

- Research needs to be adequately funded, prioritised and co-ordinated;