

FPF dossier: Can coatings

Dr. Birgit Geueke

Scientific Officer, Food Packaging Forum

7 February 2017

CAN COATINGS

Food Packaging Forum summarizes latest news and background information on coatings of food and beverage cans

[Read more](#)

LATEST NEWS

JANUARY 20, 2017

Bioplastics not a solution to plastic pollution

NGOs publish position paper on bioplastics in circular economy, conclude bioplastics not able to solve problems with conventional plastics, call to reduce use of all plastics

JANUARY 20, 2017

EU to monitor mineral oil hydrocarbons in food

EU Commission adopts recommendation to monitor mineral oil hydrocarbons in food and in materials and articles intended for food contact; 2017-2018 monitoring data to be submitted to EFSA by February 2019

JANUARY 19, 2017

EFSA reevaluation of BPA: 2nd meeting

EFSA's CEF Panel Working Group on BPA assessment protocol holds second meeting on the safety reevaluation of BPA; meeting minutes available online



FOOD PACKAGING & HEALTH



EU Parliament Report on FCMs

In October 2016, the European Parliament adopted a resolution on...



Can coatings

Epoxy-based can coatings are currently being replaced by alternatives because...



Adverse outcome pathways

Adverse outcome pathway (AOP) describes the sequence of events linking...



Per- and polyfluoroalkyl substances (PFASs)

While few perfluorinated compounds have been phased out due to...



Silicones

Silicones are an exclusive class of polymers broadly used in...



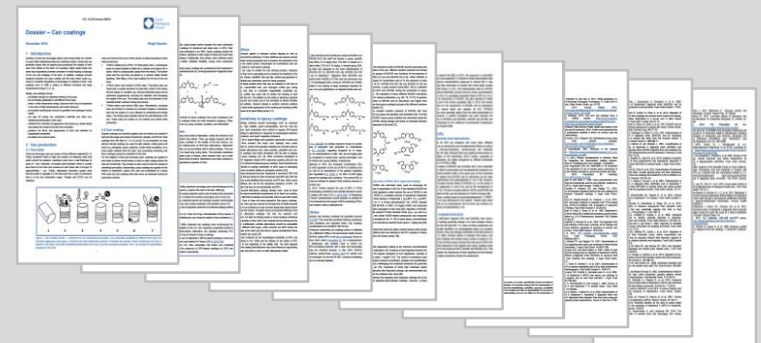
Food
Packaging
Forum

FPF dossiers

TOPICS

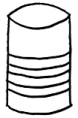
1. Bisphenol A
2. Melamine
3. Non-intentionally added substances
4. Threshold of Toxicological Concern
5. Bisphenol S
6. Bioplastics
7. Biocides
8. Plastic recycling
9. Silicones
10. Per- and polyfluoroalkyl substances
11. Can coatings

CONTENT

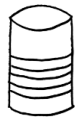


Definitions, nomenclature,
chemistry, use, production,
market data, regulations,
migration, toxicity, exposure,
biomonitoring, risk assessment,
environmental aspects,...
REFERENCES

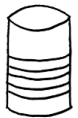
Why a dossier on can coatings?



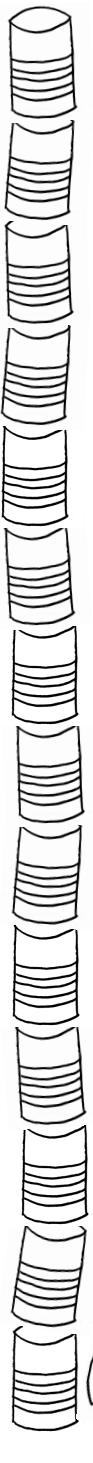
Cans **preserve food** for many years.



Coatings protect the cans from effects of the food and **prevent reactions** between the cans' metal and the food.



Bisphenol A-based **epoxy coatings** are increasingly being **replaced** due to toxicological evidence, public discussions and/or regulatory decisions.



Numbers

300 000 000 000 beverage cans per year

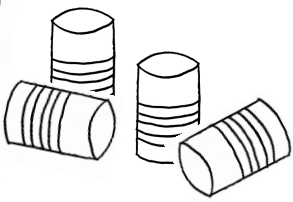
- 40 cans per person and year
- 90% aluminum, 10% steel

75 000 000 000 food cans per year

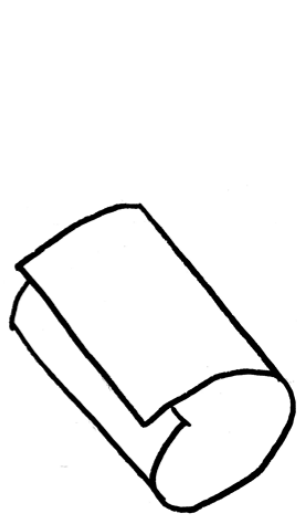
- 10 cans per person and year

Global market estimates

- Metal food packaging: US \$64 billion (2014)
- Coatings: €2.8 billion (2011)



Requirements: Can coatings should...



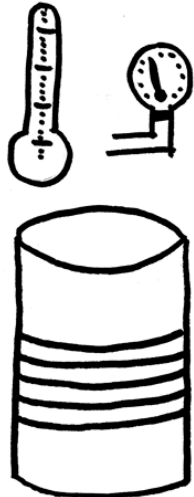
1

withstand
the can
manufac-
turing
process



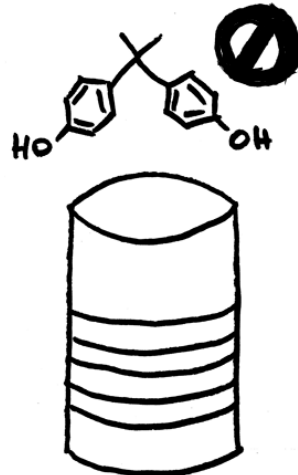
2

be
universally
applicable



3

withstand
the
sterilization
process



4

minimize
the release
of their
constituents



5

adhere to
the metal



6

prevent
corrosion



7

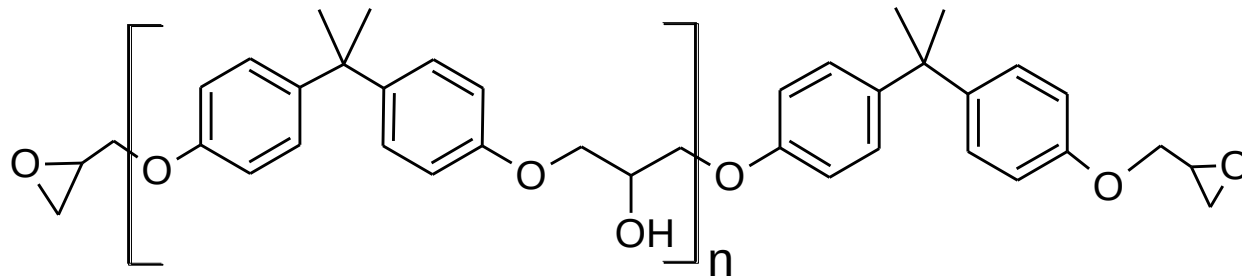
not change
the
organoleptic
properties
of the food



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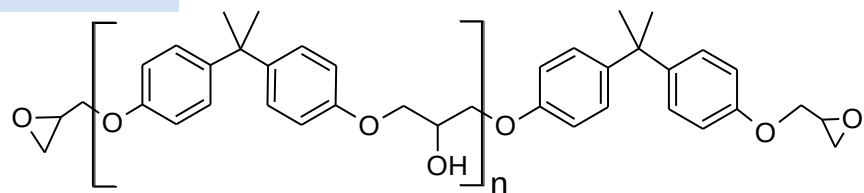
Epoxy coatings

- In use since the 1950s
- Most commonly used type of can coating
- Generally based on bisphenol A
- High stability and protective function, good processability
- Low cost
- Many blends available

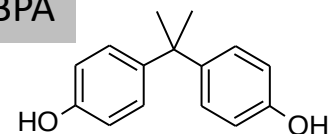


Migrants from epoxy coatings

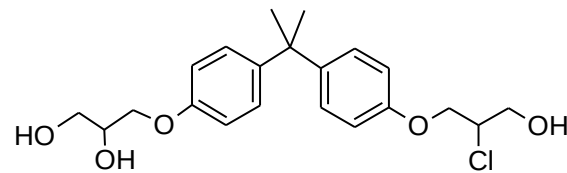
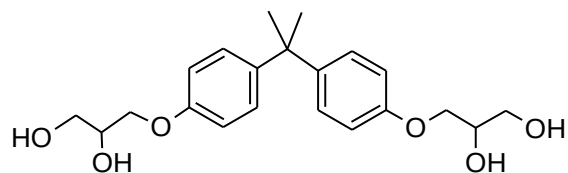
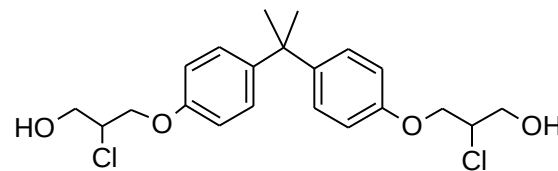
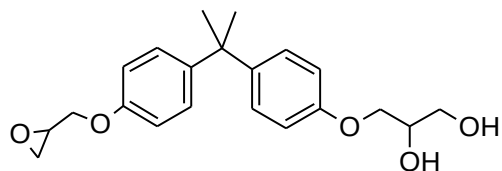
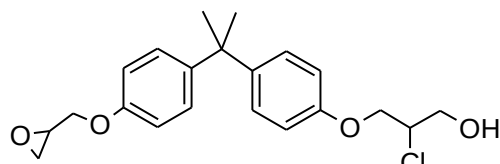
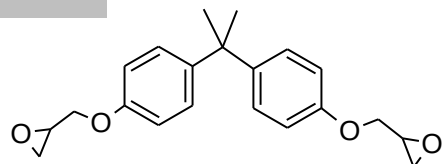
epoxy resin



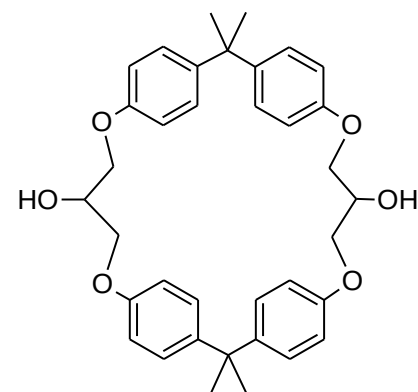
BPA



BADGE



cyclo-di-BA



... and its hydrolyzed and chlorinated derivatives

BPA

(Ongoing) risk assessments



EFSA Journal 2015;13(1):3978

SCIENTIFIC OPINION

Scientific Opinion on the risks to public health related to the presence of bisphenol A (BPA) in foodstuffs: Executive summary¹

EFSA Panel on Food Contact Materials, Enzymes, Flavourings and Processing Aids (CEF)^{2,3}

European Food Safety Authority (EFSA), Parma, Italy

This Executive Summary of the Scientific Opinion, published on 25 March 2015, replaces the earlier version published on 21 January 2015.*

ABSTRACT

This opinion describes the assessment of the risks to public health associated with bisphenol A (BPA) exposure. Exposure was assessed for various groups of the human population in three different ways: (1) external (by diet,



FOOD INGREDIENTS AND PACKAGING UNIT

Scientific Panel on Food Contact Materials, Enzymes, Flavourings and Processing Aids (CEF)

Minutes of the 2nd meeting of the Working Group on BPA assessment protocol

Held by TELE-conference, 12th December 2016

(Agreed on 11 January 2017)¹

Reproductive Toxicology 58 (2015) 33–44



Contents lists available at ScienceDirect

Reproductive Toxicology

Journal homepage: www.elsevier.com/locate/reprotox



Review

NIEHS/FDA CLARITY-BPA research program update

Jerrold J. Heindel^{a,*}, Retha R. Newbold^b, John R. Bucher^b, Luisa Camacho^c, K. Barry Delclos^c, Sherry M. Lewis^d, Michelle Vanlandingham^e, Mona I. Churchwell^c, Nathan C. Twaddle^c, Michelle McLellen^c, Mani Chidambaram^d, Matthew Bryant^c, Kellie Woodling^c, Gonçalo Gamboa da Costa^c, Sherry A. Ferguson^d, Jodi Flaws^c, Paul C. Howard^d, Nigel J. Walker^b, R. Thomas Zoeller^d, Jennifer Foster^b, Carolyn Favaro^b, Thaddeus T. Schug^d



Regulatory measures

Bisphenol-A

CAS Number

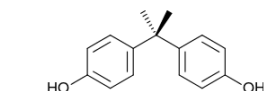
80-05-7

Synonym(s)

4,4'-(propane-2,2-diyl)diphenol, BPA, p,p'-isopropylidenebisphenol, 2,2-bis(4-hydroxyphenyl)propane

Occurrence(s)/Use(s)

Used to make certain plastics and epoxy resins. BPA-based plastic is made into a variety of common consumer goods, such as water bottles, sports equipment, CDs, and DVDs. Epoxy resins containing BPA are used as coatings on the inside of many food and beverage cans and in making thermal paper such as that used in sales receipts.



Proposition 65

Chemical Status

Reproductive Toxicity: Currently listed

Four new substances of very high concern added to the Candidate List

ECHA/PR/17/02

The Candidate List of substances of very high concern (SVHCs) for authorisation now contains 173 substances.

Helsinki, 12 January 2017 – ECHA has added four new SVHCs to the Candidate List based on proposals by France, Sweden, Germany and Austria, following the SVHC identification process with involvement of the Member State Committee.

Substances included in the Candidate List for authorisation on 12 January 2017 and their SVHC properties:

#	Substance name	EC number	CAS number	Reason for inclusion	Examples of use(s)
1	4,4'-isopropylidenediphenol (bisphenol A; BPA)	201-245-8	80-05-7	Toxic for reproduction (Article 57c)	Manufacture of polycarbonate, epoxy resins and chemicals; hardener in epoxy resins

Le 23 janvier 2017

LOI n° 2010-729 du 30 juin 2010 tendant à suspendre la commercialisation de tout conditionnement comportant du bisphénol A et destiné à recevoir des produits alimentaires

NOR: SASX1008554L

Version consolidée au 23 janvier 2017

L'Assemblée nationale et le Sénat ont adopté,

Le Président de la République promulgue la loi dont la teneur suit :

Article 1

Modifié par DÉCISION n°2015-480 QPC du 17 septembre 2015 - art. 1, v. init.
L'importation et la mise sur le marché à titre gratuit ou onéreux de tout conditionnement, comportant ou susceptible de comporter du bisphénol A et destiné à recevoir des produits alimentaires,

BPA

Toxicological evidence



CHAPTER FIVE

Low-Dose Effects of Hormones and Endocrine Disruptors

Laura N. Vandenberg¹

Department of Public Health, Division of Environmental Health Sciences, University of Massachusetts • Amherst, Amherst, Massachusetts, USA

¹Corresponding author; e-mail address: lvandenberg@schoolph.umass.edu

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Critical Reviews in Food Science and Nutrition, 55:769–777 (2015)
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ISSN: 1040-8398 / 1540-7852 online
DOI: 10.1080/10408398.2015.1040839



BPA, an Energy Balance Disruptor

L. LE CORRE, P. BESNARD, and M.-C. CHAGNON

Laboratoire de Toxicologie Alimentaire, INSERM U866, NUTOX, Dertech Packtox, University of Burgundy, Dijon, France

Bisphenol A (BPA) is used extensively in the world and is present in a diverse range of manufactured articles including dental resins, polycarbonate plastics, and the inner coating of food cans. It is a high volume chemical, with global production at



Endocrine disruptors in the etiology of type 2 diabetes mellitus

Paloma Alonso-Magdalena, Ivan Quesada and Angel Nadal

Abstract | The etiology of type 2 diabetes mellitus involves the induction of insulin resistance along with the disruption of pancreatic β -cell function and the loss of β -cell mass. In addition to a genetic predisposition, lifestyle factors seem to have an important role. Epidemiological studies indicate that the increased presence of endocrine disrupting chemicals (EDCs) in the environment may also play an important part in the incidence of metabolic diseases. Widespread EDCs, such as dioxins, pesticides and bisphenol A, cause insulin resistance and alter β -cell function in animal models. These EDCs are present in human blood and can accumulate in and be released from adipocytes. After binding to cellular receptors and other targets, EDCs

Headlines

Facing Consumer Pressure, Companies Start to Seek Safe Alternatives to BPA

By RACHEL ABRAMS JUNE 15, 2015



The New York Times

MailOnline



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The plastic plague: Hormone-disrupting chemicals in everyday things like water bottles DO cause cancer, diabetes, ADHD and autism - and cost US \$340 BILLION a year

- Endocrine-disrupting chemicals (EDCs) are in thousands of products
- Products range from plastic water bottles to cheap toys and cosmetics
- Study warns they cause neurological damage and behavioral problems

Canned foods linked to BPA risk in new study

By Jacqueline Howard, CNN

Updated 19:35 GMT (13:35 HKT) June 29, 2016



Photos: Products that contain BPA or phthalates

Canned food: BPA epoxy resins can leach into your food from the lining of metal food cans. In one CDC study, researchers found traces of BPA in the urine of nearly all 2,517 participants.

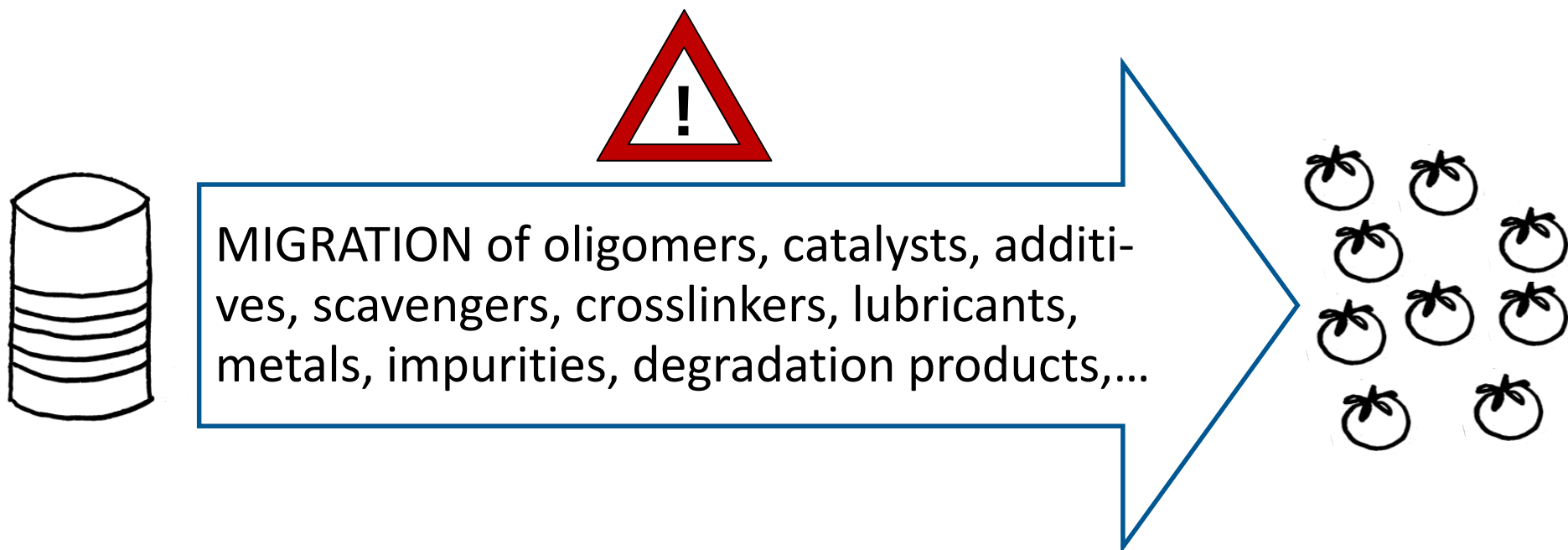
Alternative coating materials

- Oleoresins
- Vinyl coatings
- Phenolic
- Acrylic
- Polyester
- Polyolefins
- Non-BPA epoxy

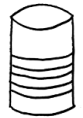
Different advantages and disadvantages (for more information: see [FPF dossier](#)).

None (?) of them fulfills all technical requirements as well as epoxy-based coatings.

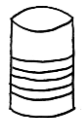
Alternative coating materials



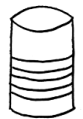
Conclusions and open questions



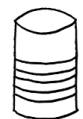
High pressure to develop alternative coating materials.



Demanding technical requirements.

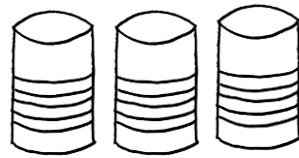


Favorable market opportunities.



How shall novel coatings be tested? Are they safer?

Thank you!



Please send questions to:

events@fp-forum.org