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Press release

The replacement of bisphenol A by bisphenol S leads to increased exposure to a hormonally active substance

Published on July 17, 2019 in *Environmental Health Perspectives*, the study conducted by the Gestation and Endocrine Disruptors team of the Veterinary School of Toulouse and the Toxalim Research Unit (ENVT/Inra/Toulouse INP Purpan/UT3 Paul Sabatier), in collaboration with the Universities of Montreal and London, showed that bisphenol S (BPS) persists longer in the body and at much higher concentrations than bisphenol A (BPA). Due to the estrogenic-mimetic properties of BPS comparable to those of BPA, the replacement of BPA by BPS thus leads to a multiplication by approximately 250 of the concentrations in the blood of a hormonally active substance.

This result shows that exposure assessment is critical for the search for alternatives to substances of concern and could help to avoid regrettable substitution.

Due to measures restricting its use in a large number of countries, including France, manufacturers have gradually replaced bisphénol A (BPA) with structural analogues, mainly bisphénol S (BPS). Research conducted in piglets by the team shows that the amount of ingested BPS that reaches the general bloodstream is about 100 times higher than that of BPA. The resulting much higher oral bioavailability of BPS (57%) compared to BPA (0.50%), associated with its slower elimination from the bloodstream (about 3.5 times lower), leads to blood concentrations of BPS about 250 times higher than those of BPA.

Given the comparable gastrointestinal functions of pigs and humans, these results suggest that replacing BPA with BPS could lead to a very significant increase in human exposure to a hormonally active compound. Although toxicological data are still insufficient to assess the associated hazard, these results highlight the importance of exposure estimation in the human health risk analysis process related to the substitution of substances of concern.

Bisphenols are a family of synthetic organic chemicals that are overwhelmingly used in the manufacture of polycarbonate-type plastics as well as in the manufacture of epoxy resins (e. g. used in cans), or as developers for most thermal papers (e. g. till receipts).

There are more than twenty bisphenols, of which bisphenols A and S are the most commonly used. Due to their estrogen-mimetic properties, i.e. their ability to mimic the effects of estradiol and their applications (e.g. for the manufacture of food packaging and containers), the use of bisphenol A and bisphenol S is regulated.

In 2011, the European Union banned the use of bisphenol A in plastic baby bottles for infants and, in 2012, France adopted a more general law aimed at "suspending the manufacture, import, export and placing on the market of any packaging, containing or utensils containing bisphenol A and intended to come into direct contact with foodstuffs" (**Law No. 2012-1442 of 24 December 2012**).

In 2017, the classification of bisphenol A as a substance of very high concern by the European Chemicals Agency's (ECHA) reinforced the use of alternatives, mainly bisphenol S.

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Link to the paper : <https://ehp.niehs.nih.gov/ehp4599>

About the ENVT

The National Veterinary School of Toulouse (ENVT) is a public institution of higher education and research under the supervision of the Ministry of Agriculture and Food.

Created in 1828, it is the oldest “Grande école” of Toulouse.

It participates in the training of a quarter of French veterinarians, who are called upon to take up animal health and welfare issues but also the major public health challenges of today and tomorrow.

ENVT's research is based on eleven units in partnership with two public scientific and technological institutions: INRA and INSERM.

The quality of its teams and projects has given it a worldwide scientific reputation.

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