

current research evidence shows that endocrine disruptors pose a serious public health risk? While defenders of plastics that have been in use for some time claim there have been no apparent health problems from use of these in the past, in particular BPA, epidemiological data indicates a link with the global diabetes epidemic as well as implicating them in declining human fertility.

Last year the Canadian government responded by declaring BPA a toxic substance, and the European Food Safety Authority that BPA is safe in food contact. This in turn stimulated the editorial above criticizing these bodies' poor science. Now the FDA has taken note of criticism, and on 18 August announced a review of the latest research on BPA. It is expected to rule in November on whether or not it will declare BPA toxic.

Even before the Canadians and Americans began official re-evaluation of the science around BPA, packaging companies in Europe and the United States were taking note of the increasing scientific evidence as consumer concern provided potential for widespread boycotts of their products. On 1 September Californian company Hydrapak, which specialises in water bottles for athletes, launched the first plastic water bottle for the US market that claims to be endocrine-disruptor free. The technology for these bottles was provided by PlastiPure, a Texas-based company that has been developing safe plastics for almost a decade.

"PlastiPure's partnership with Hydrapak ... is a model we will continue to follow as we work with plastic suppliers and product manufacturers to deliver the safe and ecologically-friendly products consumers demand," said Mike Usey, CEO of PlastiPure at the time of the release.

Food and drink processors who use plastic seals in cans, wine and spirit bottle screwcaps, beer caps and water bottles will have a very anxious Christmas if the FDA declares BPA a no-go zone for food. If it does, expect some strappy customers this summer, who may just be demanding that there wine has never touched plastic. ■

References:

- 1) Vom Saal and Myers Bisphenol A and Risk of Metabolic Disorders. Editorial, Journal of the American Medical Association, Sept 16th 2008.
- 2) Grandjean et al. The Faroes Statement: Human Health Effects of Developmental Exposure to Chemicals in Our Environment. Nordic Pharmacological Society, Basic & Clinical Pharmacology & Toxicology, June 15th 2007.

embarrassing for Nestle as it had boldly claimed its quality controls were too staunch for contamination to get passed its systems, but it was a mere PR glitch compared with the recall of two million litres of infant formula in four European countries in 2005. While Nestle was quick to claim there was no health risk involved, its milk contained traces of a chemical used in the printing process of the milk packs. Nobody died, but it was an expensive exercise for Nestle, and a clear example of the decrepit science behind food regulators' efforts to police the latest food-packaging technologies.

That problem for Nestle was a dramatic example of just how dangerous modern chemistry is for food safety. The problem was caused by a photoactive molecule, smaller than imaginable, that was a catalyst for new, high definition printing techniques.

Nestle's nightmare was isopropyl thioxanthone (ITX), one of a group of active chemicals that are implicated in a whole raft of health issues, from cancer to diabetes and including fertility disturbances, which have seen Western men's sperm counts drop dramatically and undetermined women's fertility worldwide. Medical researchers are finding signs that many of these chemicals, often used in plastics and, as in the case of ITX, in various processes from printing to food production, are having a potentially profound influence on human and animal metabolisms.

These troublesome chemicals are known as endocrine disruptors, because they influence the endocrine system, which makes and releases hormones. Hormones are signalling molecules that deliver biochemical messages around our bodies. These messages prompt most of the critical developments in our bodies, including cell activity, growth, reproduction, mood and metabolic functions like digestion and muscular activity. The disruptors get into our bodies through the food chain, often through packaging, and interfere with our most fundamental body functions by sending false messages (telling male reproductive organs they are female, for example), or slowing down the body's messaging system causing all sorts of nasty malfunctions.

The problem for food safety officials forced to cope with these risks is that the science of toxicology has not embraced the molecular scale of contemporary developments in biophysics. A recent editorial in the *Journal of the American Medical Association* on the latest evidence of risk of metabolic disorders from bisphenol A (BPA), a common component in plastic food packaging and can liners, comments: "Despite decades of published observations by endocrinologists... the core assumption used by the FDA [US Food and Drug Administration], the Environmental Protection Agency, and the European Food Safety Authority... is still based on a concept first articulated in the 16th century: 'The dose makes the poison'."

What this comment makes clear is that the overwhelming weight of