

# Researchers complete the first UK study of synthetic chemicals found in food

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The first comprehensive assessment of common synthetic chemicals found in UK foods has been completed by researchers at the University of Birmingham.

In the study, nearly 400 food samples were tested for evidence of

organophosphate esters (OPEs)—chemicals used as flame retardants in furnishings and textiles, building, food packaging materials and decorating materials, as well in various other consumer products.

While the levels found in all the samples were at levels below those currently deemed to be a risk to health, the researchers say this baseline survey should be a wake-up call to industrial users of OPEs to check their use of these chemicals and start exploring alternatives. Food producers should also investigate supply chains to better understand where [contaminants](#) might be introduced.

"Organophosphates are toxic to human health at high levels, or with long term exposure, and their use is increasing worldwide," says lead author Muideen Gbadamosi. "Although we found that current levels in food products are not dangerous, these chemicals build up in the body's fatty tissues over time and we need to have a clearer picture of the different sources of contaminants.

"We can also ingest OPEs from dust, or just from the air we breathe. There are data on these sources of contamination, but not yet on food products, so our research fills a really important gap in our knowledge."

In the study, published in *Science of the Total Environment*, the team divided sample products into 15 food groups, that were either animal-derived products or plant-derived products and tested for eight different OPEs. They found concentrations were highest in milk and milk products, followed by those in cereal and cereal products. Concentrations were lowest in chickens' eggs.

The chemicals triphenyl phosphate (TPHP) and 2-ethylhexyl diphenyl phosphate (EHDPP) were most common, being found in all food samples except egg and egg products.

Levels of the chemicals varied across the different samples, but overall, the concentrations in animal-derived foods were statistically indistinguishable from those in plant-derived.

The team also estimated daily dietary intakes across four age groups: toddlers; children; elderly people; and adults. Baby food contributed 39 percent of OPE intake for toddlers, while non-alcoholic beverages were the main contributor for children (27 percent). In adults and the elderly, cereal products (25 percent) and fruit (22 percent) were the main contributors.

Overall, the study found that the levels of these contaminants in UK foods was broadly similar to those reported in other countries.

Finally, the researchers also combined their data on dietary exposure with available data on the same chemicals ingested via indoor dust in UK. They found that for adults, exposure to OPEs remained well below levels considered dangerous to health in comparison to the health-based limit values (HBLVs) for individual OPEs.

For children and toddlers, however, the safety margins were much narrower under high-end exposure scenarios for some OPEs, specifically EHDPP, tris(2-butoxyethyl) phosphate (TBOEP, tris(2-chloroisopropyl) phosphate (TCIPP) and tris(1,3-dichloro-2-propyl) phosphate (TDCIPP).

For EHDPP, TBOEP, TCIPP and TDCIPP the high-end exposure data was about 56%, 52%, 37% and 10% (respectively) of the health-based limit value—the guideline value for evaluating risk to health— for toddlers, and 88%, 30%, 22% and 14% (respectively) of the health-based limit value for children.

Mr. Gbadamosi said, "It's clear that food is a significant source of

human exposure to OPEs in the UK and that more work is urgently needed to fully understand the risks of continuing to increase our use of OPEs."

**More information:** Organophosphate Esters in UK Diet; Exposure and Risk Assessment., *Science of The Total Environment* (2022).

Provided by University of Birmingham

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