



CHEMTrust
Protecting humans and wildlife
from harmful chemicals

Parliamentary Response

CHEM Trust response to the UK Environmental Audit Committee Inquiry

“Environmental impact of microplastics”¹

April 2016

Introduction

CHEM Trust welcomes the opportunity to comment on this important, and inadequately understood, issue.

CHEM Trust is a charity that works at UK, European and International level in order to prevent man-made chemicals from causing long term damage to wildlife and humans, by ensuring that harmful chemicals are substituted with safer alternatives.

The microplastics issue is relevant to CHEM Trust’s work because research so far has found that microplastics can concentrate various problem chemicals and hence increase exposure of organisms (potentially including humans) to these chemicals. However, more research needs to be done to better understand these processes, and the full range of chemicals involved.

Our responses to the Committee’s questions

How do microplastics impact on marine plants and animals? What economic consequences could result from increased microplastic pollution in the ocean?

The research so far suggests that microplastics could lead to increased chemical contamination of marine organisms, which could result in problems with their breeding and general health. Moreover, in order to protect human health, this contamination could also result in the need to restrict human consumption of certain marine species, with knock on economic effects for those who are fishing for them.

¹ <http://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news-parliament-2015/environmental-impact-of-microplastics-launch-15-16/>

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How do the main sources of microplastics differ in (a) scale of output and (b) the importance of their environmental impacts? How should these relative impacts direct policy priorities?

Both Swedish and Danish authorities have recently produced substantial reports looking at sources of microplastics:

- “*Microplastics: Occurrence, effects and sources of releases to the environment in Denmark*”, Danish Environmental Protection Agency 2015
<http://www2.mst.dk/Udgiv/publications/2015/10/978-87-93352-80-3.pdf>
- “*Swedish sources and pathways for microplastics to the marine environment*”, IVL Swedish Environmental Research Institute for Swedish EPA, March 2016
<https://naturvardsverket.se/upload/miljoarbete-i-samhallet/miljoarbete-i-sverige/regeringsuppdrag/2016/mikroplaster/swedish-sources-and-pathways-for-microplastics-to-marine%20environment-ivl-c183.pdf>

Both of these reports emphasise the very diverse sources of microplastics in the environment, so it is important not to limit consideration to obvious, deliberate, products such as microbeads. Microplastics arise from progressive fragmentation of larger plastic items, or may be manufactured to be of a small size, for use in a variety of situations, including personal care products, medicines, and industry.

It is clear from studies that microplastics are a problem, though more research is needed in order to understand the issue in more depth. However, this need for more research should not delay the development and implementation of regulatory measures to reduce contamination by microplastic and their emissions.

What impact could microplastics have on human health? Are there knock-on impacts for Government policies, on e.g. food standards?

There is an increasing amount of research on the accumulation of chemicals by microplastics, and the transfer of these chemicals into organisms after ingestion of these microplastics. For example:

- Researchers have found that microplastics can concentrate various polluting chemicals (in this case PCBs, PAHs and brominated flame retardant PDBEs), and that ingestion of these plastics by fish then leads to contamination of their tissues².
- Research on amphipods and microplastics contaminated with PDBEs has found similar results³, with the amphipods eating the contaminated microplastics.
- Microbeads have also been found to concentrate chemicals⁴.

² Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress, Rochman, C. M., Hoh, E., Kurobe, T., & Teh, S. J. (2013). *Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress*. *Scientific Reports*, 3, 3263-3263. <http://www.nature.com/articles/srep03263>

³ Chua, E. M., Shimeta, J., Nugegoda, D., Morrison, P. D., & Clarke, B. O. (2014). *Assimilation of polybrominated diphenyl ethers from microplastics by the marine amphipod, Allorchestes compressa*. *Environmental science & technology*, 48(14), 8127-8134. <http://pubs.acs.org/doi/pdf/10.1021/es405717z>

⁴ Napper, I. E., Bakir, A., Rowland, S. J., & Thompson, R. C. (2015). *Characterisation, quantity and sorptive properties of microplastics extracted from cosmetics*. *Marine pollution bulletin*, 99(1), 178-185. <http://www.sciencedirect.com/science/article/pii/S0025326X1500449X>

Clearly, more research is needed but there is nothing particularly surprising, from a scientific point of view, about the idea that plastics could enhance bioconcentration of chemicals. This then has implications for chemical contamination of food.

Other countries, including the USA, have taken action against microbeads in personal care products. What kind of impact would a similar ban in the UK have on the environmental situation around microplastics?

In our view a UK ban on microbeads would be a start, but EU-wide action would be more effective. The UK government should be pushing the European Commission to propose regulation in this area.

However, in parallel, more work must be done to better understand the other sources of microplastics and identify what measures are available to prevent them. The UK should also be pushing for European Commission action in this area, and should take a leadership role in identifying suitable measures.

To what extent do larger pieces of plastic in the ocean contribute to microplastic pollution, and how can this be dealt with?

See Swedish and Danish studies mentioned earlier.

Effectively managed recycling programmes, based on best practice approaches, will be one part of the solution.

How comprehensive and certain is our knowledge about the scale of microplastics and their effects on the natural environment? What should research priorities be, and who should fund this research?

Currently this area is insufficiently researched, however we know enough to start acting to reduce the scale of this problem.

Research priorities include:

- The full diversity of sources of microplastics
- The role of microplastics in chemical transport and bioconcentration
- The effectiveness of different approaches to reducing microplastic reduction.

The main funding in this area needs to come through governments or multinational public bodies such as the EU. Some of this funding could, though, come through a levy on manufacturers, as part of the polluter pays principle.

We would be concerned about the effectiveness and independence of any industry-led programme, given the economic importance of plastics.

How effective is international cooperation around these issues, and what more can be done?

Currently insufficient, and it will be challenging.

The EU is well placed to take a leading role, with responsibilities covering product policy, chemicals management, waste management and nature protection. The current EU

Commission is already committed to produce a strategy on plastics in the Circular Economy⁵. The UK Government should be encouraging EU action in this area, as well as providing leadership in research and policy.

At international level, UNEP would probably best placed to provide leadership.

Conclusions

It is clear that microplastics are a problem, though more research is needed in order to understand the issue in more depth. However, this need for more research should not delay the development and implementation of regulatory measures to reduce microplastic emissions.

From a chemicals policy point of view, it is important to understand more about the behaviour of chemicals in microplastics, as this may impact on regulatory measures on chemicals.

For more information on CHEM Trust's work:

- <http://www.chemtrust.org.uk/>
- [@CHEMTrust](https://twitter.com/CHEMTrust) on twitter

⁵ *Closing the loop - An EU action plan for the Circular Economy*, European Commission, December 2015, <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1453384154337&uri=CELEX:52015DC0614>