Case study on „Microplastics in food products and cosmetics“

Case study introduction

Microplastics are a group of plastic particles smaller than 5 mm. Most microplastics develop in the environment as a breakdown product from plastic pollution. These small pieces end up in food products, for example because sea animals such as mussels and prawns eat them. This causes humans to be exposed to microplastics, with unknown consequences. In addition to microplastics in foods, microplastics are intentionally added to cosmetic products, for example in toothpaste, where they function as a scrubbing material. Via the sewage system, these microplastic particles also end up in the environment and interfere with flora and fauna. Because microplastic particles stay in the environment for a very long time and in great quantities, this pollution is unwanted.

Relevance to the precautionary principle

The precautionary principle has the goal to regulate subjects in a situation of scientific uncertainty. Applying the precautionary principle to the issue of microplastics has shown to be complicated, for several reasons. First, there is no general definition of a microplastic and lots of variations regarding its material, shape and size exist. Second, no validated tool exists to measure the amount of microplastics in food products. This makes it difficult to check for compliance with rules and regulations, in case microplastics in food were to be prohibited. Still, expression of the precautionary principle can be seen in several regulations that deal with microplastics.

For several years, the EU Plastic Strategy has been active, with the aim to reduce plastic pollution altogether. A decline in the use of plastic will also lead to less microplastics in the environment and in food products. Although it is difficult to scientifically pinpoint harmful consequences of plastic pollution for the environment, it is known that its frequent presence is unwanted. Additionally, the European Commission is working on a regulation to prohibit microplastics in cosmetic products. This will be done via the REACH regulation, which is based on the precautionary principle, to protect the environment. This prohibition does not include any ending date and will not be changed because of new scientific evidence. This is because the intentional release of microplastics into the environment is unwanted in itself. The prohibition of microplastics can therefore be seen more as a prevention measure rather than a precautionary measure.

Potential impact

Microplastics in food and in cosmetics lead to various risks and benefits. Risks mostly relate to the high prevalence and long persistence of microplastic particles. The variation in materials, shapes and sizes can lead to a variation of potential hazardous effects, which are complicated to detect. Additionally, the chemical structure will not be stable under influence of the environment. It is likely that chemical substances, such as coloring substances and flame-retardants, leak from the plastic surface. This can happen to microplastics in an aquatic environment, but also inside the human body. This changing chemical structure, as well as the corresponding harmful effects, are very complicated to measure and lead to uncertain risks.

On the other hand, microplastics can have benefits. Microplastics in toothpaste or other cosmetic materials are a cheaper and stable alternative to salt or sand as scrubbing materials. Also, plastic packaging materials, which might end up as microplastics in food, are cheap and light-weight options in comparison with more traditional packaging materials, such as glass or cardboard. When using the precautionary principle, these risks and benefits need to be weighted.

Key uncertainties

Scientific uncertainties in the potential harmful effects of microplastics mostly relate to human health effects. We know for sure that microplastics occur in the human digestive tract, but it is unclear how the body deals with these particles. Science is not conclusive on the question if microplastic particles can pass through the intestine wall into the blood stream. It seems likely that most particles are excreted via the stool. However, there are laboratory and animal studies with high levels of microplastic exposure, which show relations between microplastic exposure and a variety of health outcomes. This includes different types of cancer and autoimmune diseases. Because of the methods used in this research, it is difficult to translate this evidence to the human level of exposure and make a realistic risk calculation about microplastics in food and human health effects.

Interesting links

- Single-use plastics: www.ec.europa.eu/environment/waste/plastic_waste.htm
- Microplastics - ECHA: www.echa.europa.eu/hot-topics/microplastics
- Presence of microplastics and nanoplastics in food, with particular focus on seafood: efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2016.4501
- A Scientific Perspective on Microplastics in Nature and Society: www.sapea.info/wp-content/uploads/report.pdf
- You're literally eating microplastics. How you can cut down exposure to them: www.washingtonpost.com/health/youre-literally-eating-microplastics-how-you-can-cut-down-exposure-to-them/2019/10/04/22ebdfb6-e17a-11e9-8dc8-498eabc129a0_story.html

Further information

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For the **references** used for the case study, please look into the full report available at: www.recipes-project.eu/results/case-study-9-microplastics-food-and-cosmetic-products

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