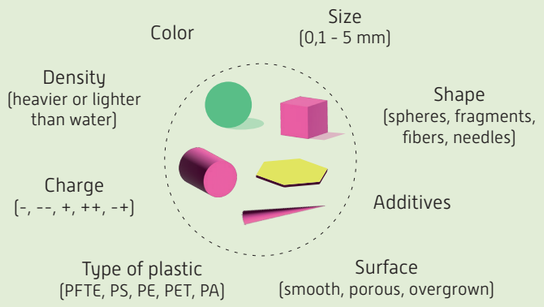
Are microplastics harmful?

The ecotoxicological assessment of microplastics in the environment is a complex task.

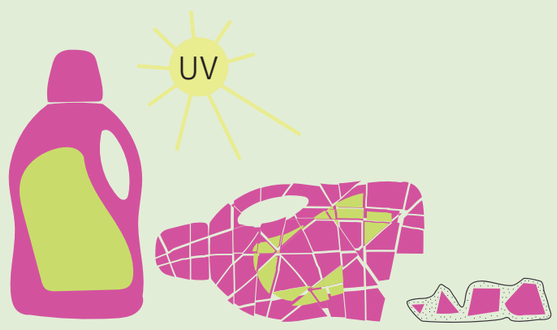
Whether or not microplastics have harmful effects on plants and animals has not yet been conclusively established. The different properties of microplastics determine whether and how the microplastics are absorbed by living organisms and whether they are harmful to them.

Compared to other pollutants in the environment (e.g. pesticides), microplastics do not have a uniform effect on living organisms. In addition, the effects of microplastics often cannot be distinguished from the harmful effects of other particles and substances found in the environment.

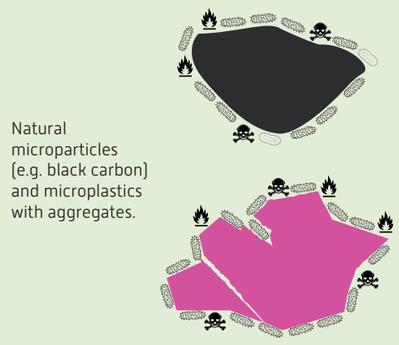
Microplastics occur in many forms



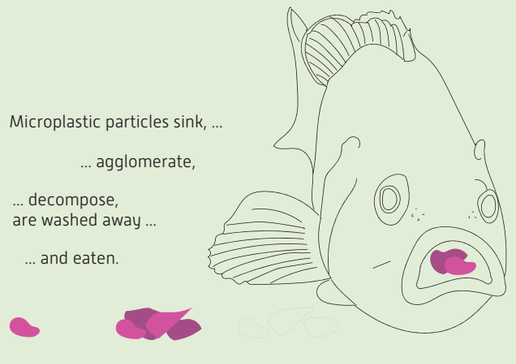
Microplastic particles are a very heterogeneous substance class (plastic type, size, shape, additives, etc.), which can be found in many different combinations of characteristics.



Forms and properties of microplastic particles change and expand in the environment, e.g. through weathering and biofilm growth.

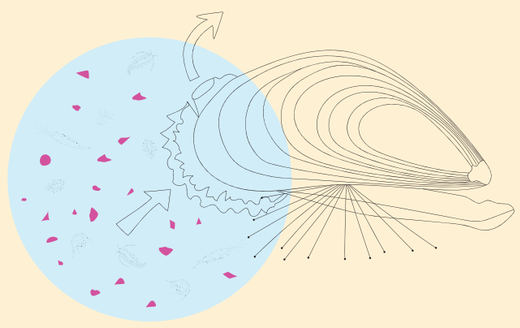


Similar to natural particles, microplastic particles provide a variety of surfaces for the accumulation of pollutants and pathogens.

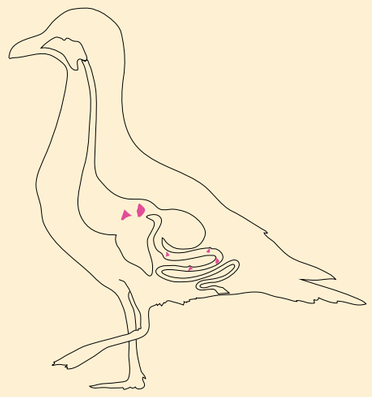


The diverse microplastic particles can exhibit a wide range of behaviors in the environment and be taken up by organisms.

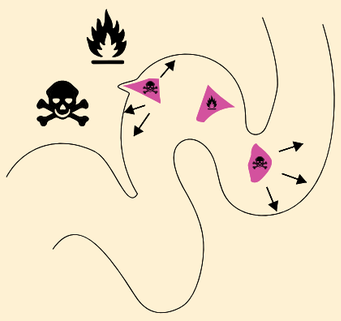
Microplastics can have very different effects



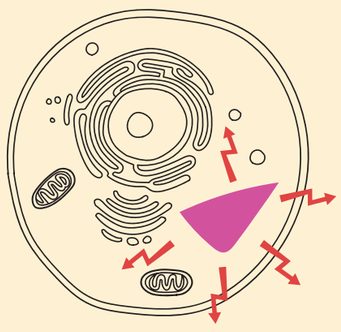
When living creatures mistake microplastics for with their food, this can lead to malnutrition. Microplastics can also be passed on in the food web.



Microplastic particles can cause physical injury in the intestines of living creatures or alter the intestinal flora.

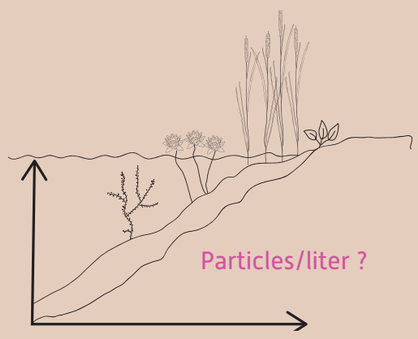


After ingesting the microplastics, toxic additives such as plasticizers or flame retardants may be dissolved from the plastic particle and released into the body.

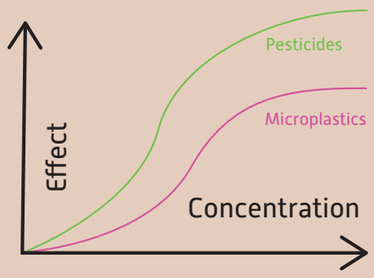


The smallest plastic particles can penetrate into the tissue cells of a living organism where they can cause inflammatory reactions.

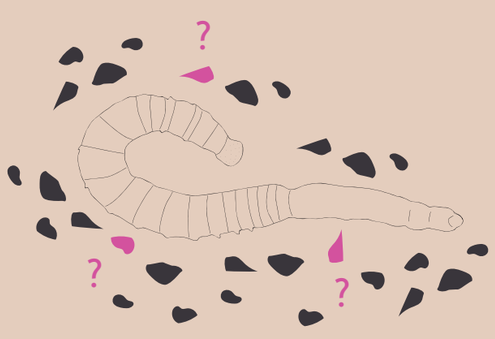
The risk to environmental organisms cannot be unambiguously assessed



Accurate figures on environmental concentrations of microplastics are scarce, making risk assessment based on laboratory results difficult.



In the natural environment, weak effects of microplastics are often masked by stronger effects of other environmental pollutants.



It is not yet known whether the physical and chemical properties of microplastics constitute an additional burden to the effect of the numerous natural particles.

It is not yet clear whether microplastics can accumulate in the food web and whether this has long-term effects on organisms.

It is currently virtually impossible to make generally valid statements concerning the harmfulness of microplastics.

An Initiative of the German Federal Ministry of Education and Research
Plastics in the Environment
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