

The never-ending plastic story

Microplastics are pieces made of plastic material smaller than five millimeters. These pieces come from a wide variety of sources such as tyres, cosmetics, cleaning supplies, clothes, industrial processes...

Since 1950, it is estimated by Iberdrola (a Spanish multinational electric utility), that human beings have produced 8,300 millions of metric tons of plastic from which only 9% are properly recycled. The rest of them end up in dumping sites and in Nature, decomposed in microparticles that finally reach the environment and pollute water, air and damage fauna and flora. And last, but not least, they finish off being ingested by human beings and other land animals. These particles are stored in their bodies and tissues, particularly in the bloodstream, the lymphatic system or the liver, leading to a process known as bioaccumulation. Microplastics can be distinguished between primary and secondary. The first ones are those that reach the environment in the same state in which they were synthesized, such as industrial particles that are not filtered during the purifying process in STPs (sewage treatment plants). The second ones are those that arise from the degradation of bigger size plastics.

There are around 51,000 millions of microplastic particles in the seas, which are ingested by marine animals, and following the food chain links, they end up in other living organisms. Furthermore, these particles have been found in drinking water, eating salt and other foods and drinks.

Worried about the discoveries, some scientists have started to study the effects of microplastics in human organisms. Plastic particles most frequently found are polypropylene and polyethylene terephthalate, used in manufacturing and in the composition of plastic bottles and containers. Even though damages have not been proved yet, microplastics can cause some changes in animals, such as alterations in their reproductive system, in their growth and development, appetite and feeding, they can produce tissues and liver swelling, among other negative consequences to the natural well-being.

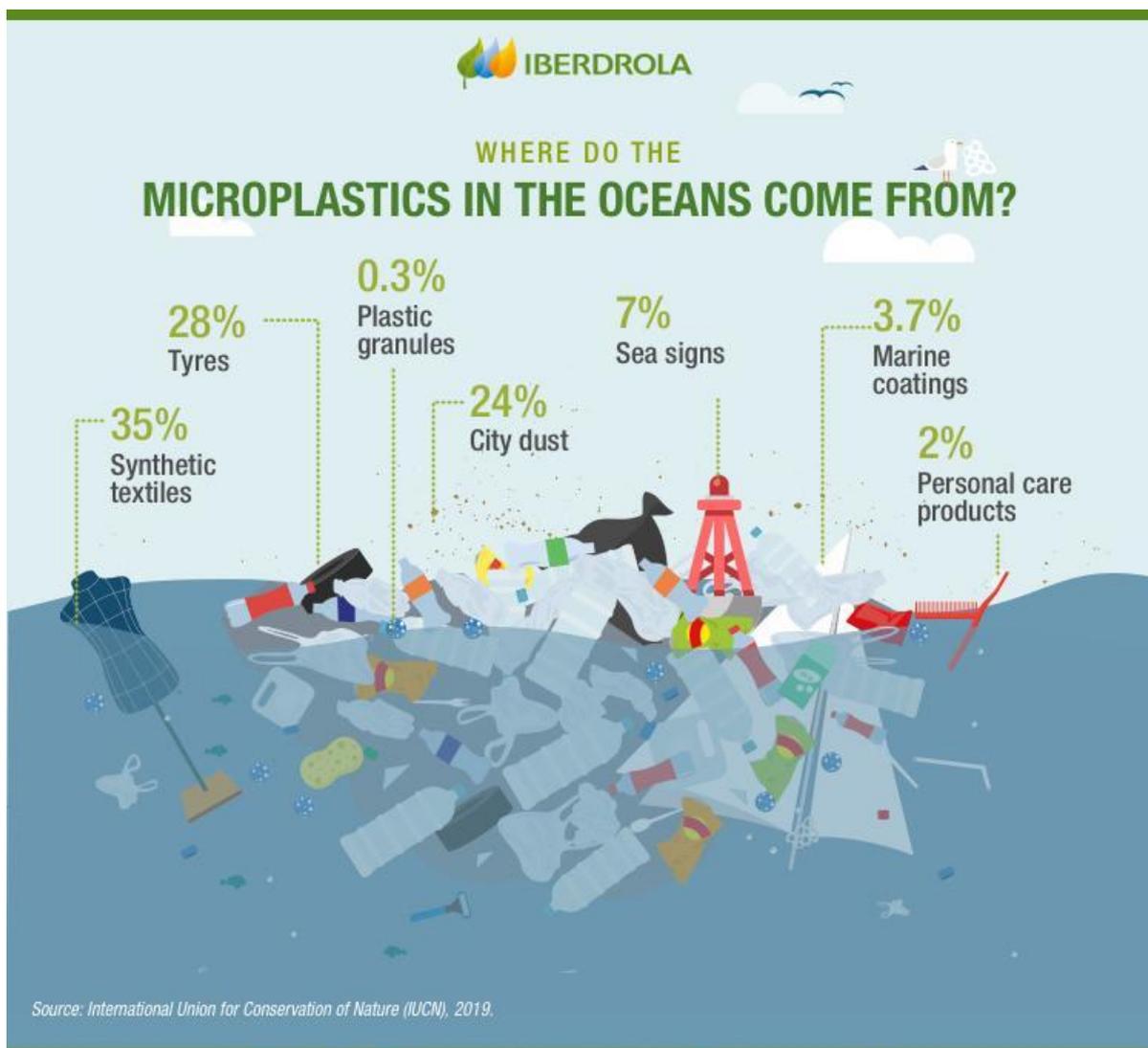
That's not all. Focusing on fishes, microplastics can even cause three main effects: internal blocks, intestinal canal injuries and polluting chemists exposure.

A study made by Greenpeace in collaboration with other NGOs and scientific societies proved the microplastics impact on commercial fishes in some American areas such as the Gulf of California, the Gulf of Mexico or the Mexican Caribbean. A 20% out of the 755 fishes



tasted contained plastic envases in their stomachs. A vast majority of them presented at least one plastic piece, but there were cases in which there were found 45 pieces in just a single one. This inner accumulation generates obstructions in their digestive system, hindering food circulation and waste expulsion. It must be noted that females contained more plastic due to the higher energy claim they require for reproduction and healthy ova production. Since the organism can't degrade those particles, females especially aren't properly nourished, which directly affects their offspring. All this leads to a lack of certain crucial factors for the embrions development, meaning it can be born unnourished or smaller, for example.

We must not take off relevance of this situation just because it has appeared in navy fauna and not in human beings. The problem of microplastics has already reached us as species, as an Italian study made in human placentas with Raman michrospectomy demonstrates.



Microplastics end up in the oceans, but where do they come from? "Iberdrola: International Union for Conservation of Nature (UCN), 2019."

After a rigorous selection process, six pregnant women were chosen, all of them without any kind of pathology which could conditionate the experiment. Following a free plastic protocol, samples from the fetal and maternal area, and the chorioamniotic membrane from the future mothers were taken. After the analysis of the samples, 12 microplastics fragments were found in four of the six women that took part in the study. Among the different microplastics found, there were particles from textile products, dyes, hairsprays, perfumes, air fresheners and cosmetics such as creams, mascara, lipsticks, etc.

The study cannot establish how the particles were introduced either from the respiratory system or the gastrointestinal system, and it also ignores the path they took until the placenta was reached. However, it did demonstrate the microplastics presence in human beings, a fact that could cause toxicity in our organism and disrupt immunity systems and the mechanisms for obtaining and using energy at a cellular level speaking.

There already exists several solutions to this increasing plastic problem. Countries such as the UK, USA, Canada or New Zealand have recently forbidden the manufacture of personal care products containing microplastics. Others, such as Kenya or Rwanda don't allow the production, sell, importation or use of plastic bags. And, in 2021, the European Union will forbid the one-use plastics like cordon swabs, plates, cutlery, glasses or straws, like Costa Rica already does, given that those items can take 500 years to disappear from Nature.

Regarding the Sustainable Development Goals proposed by the United Nations, the end of the microplastics era would allow reaching health and well-being, clean water and sanitation, sustainable communities and cities and the care of submarine life.

In short, nowadays, the microplastics threat is not a faraway nightmare anymore, it's a real and considerable fact. Even though it is quite impossible to completely put an end to them, in the short run we can reduce their impact on the environment. If we don't do it we, humans, will be the next victims in this never-ending plastic loop.

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