



Opinion

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Micro and Nanoplastics Threaten Our Lives: What is to Be Done?

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Abstract

We all know that there is contamination of the environment on this earth with plastic and its degradation products. Especially nanoplastics are highly dangerous. This trend has long since affected animals and humans. Diseases and deaths are the result. And this, although there are natural alternatives. Clear decisions and new ways are needed if humanity is not to remain exposed to this unnecessary risk. Possible solutions are the production of flax and hemp.

Keywords: Plastics pollution, Nanoplastics, Nanoplastics induced diseases, Health prevention

Introduction

Global plastic consumption will nearly double by 2050, according to a new study. Researchers are now calling for a legally binding agreement to reduce plastic consumption [1]. Plastic consumption in the leading industrialized and emerging economies (G20) will nearly double by the middle of this century if no countermeasures are taken. Existing programs for recycling or reducing plastic consumption are not enough, according to a study by Back to Blue [2], a research group of the Economist Impact think tank and the Nippon Foundation, two Organisations that share a common understanding of the need to improve evidence-based approaches and solutions to the pressing issues faced by the ocean, and to restoring ocean health and promoting sustainability. The United Nations had begun negotiations in Uruguay in November 2022 on an agreement to combat plastic pollution, with the goal of drafting a legally binding treaty by the end of next year. As many as 175 countries have joined the talks [3]. If the negotiations fail, annual plastic production in G20 countries could rise to 451 million tons by 2050 at current growth rates, back to blue estimates. That would be an increase of nearly three-quarters compared to 2019.

Microplastics and Nanoplastics

Plastic waste in the oceans includes the remnants of plastic products that collect in the world's oceans, where they accumulate in various places. According to a study published in early 2015 in the scientific journal *Science*, about 8 million tons of this trash entered the oceans in 2010, with a confidence interval of 4.8 to 12.7 million tons per year [4].

Plastic debris is made up of plastic pieces, with larger pieces able to break down into microplastics and even smaller nano plastic. In particular, the constituents accumulate in some ocean drift current eddies, leading to significant compaction in some ocean regions; this phenomenon earned the North Pacific Gyre the epithet Great Pacific Garbage Patch 'Great Pacific Garbage Patch', first described in 1997 [5]. In mid-2014, it was reported that geologists had discovered formations of melted plastics, volcanic rocks, coral fragments, and sand grains on the coast of Hawaii Island, which they called a separate type of "rock" due to its strength, a "plasti-glomerate" [6]. Plastic inclusions in rocks are also observed in the so-called beachrock, among other phenomena.

A higher waste floating in the oceans is crushed over time by wave action and UV light, whereby an ever-higher degree of fineness can be achieved up to pulverization. At a high degree of fineness, the plastic powder is ingested by various marine life as well as plankton, among others, instead of or with the usual food. Starting with the plankton, the plastic particles, to which toxic and carcinogenic chemicals such as DDT, xenoestrogens, and polychlorinated biphenyls may also adhere [7], continue to rise the food chain. In this way, the plastic waste with the toxic substances it accumulates also finds its way into the food intended for human consumption. In 2012, the scientific journal *Environmental Science & Technology* reported on an investigation at many beaches on all six continents that detected microplastic particles everywhere; this probably includes fibers from fleece and other garments made of synthetic materials: up to 1900 tiny plastic particles per wash cycle were found in the wastewater from washing machines [8] [securvital]. Nanoparticles can cross cell membranes, penetrate organs, and accumulate in living organisms through bioaccumulation [9]. It is now clear (as of 2022) that micro- and nanoplastics impact soils and soil-dwelling microorganisms and plants, and reach animals and humans through plant food.

Chances of Failure “Considerable”

“One should not be under the illusion that the treaty negotiations will be anything but difficult and treacherous,” the research group shared. “The chances for failure - not only that no treaty will be reached, but one that is too weak to reverse the plastic tide - are considerable.” The group is calling for a stronger ban on single-use plastic along with higher production taxes and mandatory regulations that hold companies accountable for the entire life cycle of their products, including recycling and disposal. These measures could limit annual consumption to 325 million tons by 2050, according to Back to Blue. However, that would still be a quarter increase from 2019 and would be equivalent to 238 million filled garbage trucks. G20 countries that have not yet introduced a national ban on single-use plastic products include Brazil, the United States, Indonesia and Turkey. In the EU, many single-use plastic products such as drinking straws and disposable tableware have been banned since July 2021.

What are the Priorities?

The world is currently in the process of combating climate change by any means necessary, with the goal of limiting the rise in average temperature to 1.5 degrees. To this end, far-reaching restrictions are being imposed and laws produced that limit people's freedoms. All this is based on the theory that the increase in CO₂ is causing the warming of the earth. However, it could be argued that the correlation of the rising curves of CO₂ and the earth's temperature is a coincidence, not a causality. There could well be a non-man-made causation involving solar radiation. Moreover, it has not yet been proven that all efforts to limit climate change have been successful. Logically, the most important measure would have

to be the planting of millions of CO₂-consuming trees. Instead, we find large-scale deforestation in several tropical countries, which is completely counterproductive. It would be very worthwhile to consider whether efforts against climate change, which come with high costs and loss of freedom, should not be replaced by the fight against the devastation of the earth by plastic products such as the toxin-generating Styrofoam/Polystyrol. This would be realistically feasible.

According to all studies, the most important source of nano plastics is the abrasion of tires of vehicles. Therefore, it is a central demand to reduce individual traffic and to transfer it-as far as possible-to the railways. The disease-causing effects of nano plastics and chemical-toxic degradation products can no longer be doubted, which can be considered as triggers of many chronic diseases. In 2006, 870,000 tons of polystyrene plates and cups and 590,000 tons from other products were sent to landfills in the U.S [10]. Since polystyrene does not biodegrade in the absence of light,[65] it remains in landfills [11]. The lymphatic system is so burdened by Nano plastics and the increasing technical electro smog that it can hardly fulfill its task of detoxification.

A Solution

The chemical industry will of course object that it is systemically important and that there is no equivalent substitute. This is wrong. There are at least two types of plants that could be considered as substitutes for plastic. They are flax and hemp. They can be used to build houses, make clothes and almost all household products. Disposal is not a problem, since they are organic materials and there are several bacteria that break down this waste. These plants would also convert a lot of CO₂ into oxygen. When will we move to prioritize the health of humanity and the purity of the earth and our oceans over the plastic industry?

Conclusion

The excessive production and consumption of plastic poses a significant risk to the oceans, the earth, and the health of humanity. All international efforts have had little effect so far. However, compared to other risks such as pandemics, this problem could be well addressed. Natural substitutes are available and would only need to be grown and used. People's convenience and industry's interest should not take precedence over health.

Acknowledgments

None.

Conflicts of Interest

None.

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