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## IMPACT OF THE COVID-19 PANDEMIC ON WORLD OCEAN POLLUTION

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In 2010, the amount of plastic emissions was approximately 4.8-12.7 million tons, in 2015 this amount increased significantly. For example, the plastic waste of the USA has increased by 5 times, China by 8.1. Only about 9-12% of this plastic is recycled, the other 90% end up in rivers and oceans. Every year, the problem of

plastic pollution increasingly affects the lives of people, as well as animals and plants. The world community is trying to reduce the production of plastic products or propose ways to eliminate plastic pollution, but so far there are no significant results, because the number of tons of plastic in the ocean is only increasing. Many factors affect this. In 2020-2021, one of these factors was the Covid-19 pandemic.

The pandemic continues and its impact on the pollution of the world's oceans, and therefore on humans, is increasing. This topic has not been studied much, especially in Ukraine, and is also not widely spread among the population.

In 2019, the amount of plastic waste that entered the ocean amounted to approximately 400 million tons. And for the first seven months of Covid-19 (December 2019 - June 2020), the amount of waste is 530 million tons. Such a significant increase in plastic pollution arose as a result of the need to use disposable protective masks and other personal protective equipment (gloves, safety glasses). Since the end of 2019, about 3 billion masks have been thrown away every day around the world [1].

The masks contain polymer materials, namely polyurethane, polycarbonate, polypropylene, polystyrene, polyacrylonitrile, polyethylene and polyester [2]. The increase in the consumption of masks has forced an increase in the volume of their production, and all this has led to an increase in the amount of microplastics in the world's oceans [3]. Microplastics end up in freshwater and coastal saltwater. This threatens the lives of many animals, plants and even people. Microplastics get into marine organisms, causing them to become sick, destroyed or further involved in the food chain [4]. It is through seafood that various types of microplastics enter the human body, causing various problems with the endocrine system, or even provoking oncology and infertility [5].

Different types of plastic are distributed throughout the ocean. When Styrofoam breaks down into smaller pieces, the polystyrene components in it sink lower in the ocean, so the pollutant spreads throughout the water body. In fact, the toxins contained in plastic not only affect the ocean, but by acting as sponges, they absorb other toxins from external sources before entering the ocean. As these chemicals are absorbed by ocean dwellers, it affects the health of humans who consume contaminated fish and mammals.

There are different types of dangers of plastic for humans. Direct toxicity from plastics comes from lead, cadmium and mercury. These toxins have also been found in many fish in the ocean, which is very dangerous for humans. Bis(2-ethylhexyl) phthalate, contained in some plastics, is a toxic carcinogen. Other toxins in plastics are directly linked to cancer, birth defects, immune system problems, and developmental problems in children.

Another type of toxic plastic is bisphenol A (BPA), which is used in many things, including plastic bottles and food packaging materials. Over time, the

## 섹션 10.

### FIRE AND CIVIL SAFETY

polymer chains of BPA break down and can enter the human body in a variety of ways, from drinking contaminated water to eating fish exposed to broken down toxins. In particular, BPA is a known chemical that interferes with human hormonal function [6].

According to scientists' estimates, another 0.15-0.39 million tons of plastic waste (that is, masks and their parts) may enter the world ocean from only 46 six developed countries. Of course, different countries produce and use different amounts of masks, so they make different contributions to the pollution of the world's oceans. So, for example, in the countries of Asia, cosmetic waste amounts to 1.51 million tons, which is significantly higher than the European indicators – 0.48 million tons. Also, the amount of plastic waste in countries with an underdeveloped system of disposal and recycling is much larger [7].

Personal protective equipment must be disposed of in a certain way to avoid pollution, but due to the rapid increase in the amount of waste, recycling programs are overwhelmed, so most plastic was burned and disposed of in violation of the standards, which contributed to the spread of volatile toxins in the air, harmful to human life.

To reduce the negative impact of Covid-19 on plastic pollution of the ocean, it is necessary to implement a set of programs in which the governments of countries, consumers and producers would be jointly involved. It is necessary to ensure the collection and sorting of personal protective equipment to facilitate their further processing. For high-quality disposal, it is necessary to develop an effective integrated process of chemical and mechanical processing of waste. Hydrocracking could be one of the solutions to this problem [8].

Summarizing all of the above, we can conclude that it is necessary to achieve a balance between the processes of self-protection against the pandemic and the reduction of pollution of the world's oceans. The further development of plastic recycling methods and promotion of the policy of reducing its use is still a relevant issue.

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