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ENVIRONMENTAL IMPACT OF INCREASED WASTE DURING THE COVID-19 PANDEMIC

Abstract. In the face of the global problems caused by COVID-19, plastics undoubtedly play a large role, and among their many strengths is the ability to protect against the rapidly spreading virus. Unfortunately, the massive use of plastic measures to protect against the spread of the SARS-CoV-2 virus was reflected in the amount of waste generated from them, and the way to manage them has become a challenge for the whole world.

In March 2020, the COVID-19 disease was declared a global pandemic caused by the SARS-CoV-2 coronavirus [1]. Mass application of means of protection against infection influenced the amount of generated waste [2]. The obligation to wear a mask over the mouth and nose resulted in the production of a large amount of waste: surgical masks, dust masks, cloth masks. The need to use plastic measures to protect against the spread of SARS-CoV-2 virus was reflected in the amount of waste generated from them, and the way of their management has become a challenge for the whole world. The properties of plastics in the pandemic era meant that a particular increase in demand for products made of them took place in the medical and food industries. Plastic gloves, goggles, aprons and helmets have become a necessary element of medical personnel's equipment, and the need to protect some food products has increased the demand for plastic packaging. In Poland, the rules for dealing with waste generated during COVID-19 are regulated by the guidelines of the Minister of Climate and the Chief Sanitary Inspector. According to general guidelines, waste from preventive measures in the form of masks or gloves used at work or while shopping by healthy people should be disposed of as mixed waste. What is particularly worrying in the context of the increased consumption of plastic products during COVID-19 is the systematic infiltration of the waste generated from them into the environment. Until now, the catastrophic effects of polluting ecosystems by used plastic have led many countries around the world, including the EU, to take steps to reduce the amount of plastic waste, while increasing the level of their recycling [1,3].

The SARS-CoV-2 coronavirus that causes COVID-19, like many other viruses, can be found in wastewater. Municipal wastewater, due to the fact that it is generated in households, public facilities, hospitals, schools, shops, service facilities, etc., carries millions of viruses, bacteria, parasites, toxic and poisonous substances. Any virus in the waste water is largely removed by waste water treatment. Coronaviruses are characterized by low resistance to UV radiation and disinfectants commonly used in technological water treatment processes, such as chlorine, sodium hypochlorite or chlorine dioxide. In addition, viruses of this type, like other suspended particles of this size, are removed from the water by coagulation (a process that destabilizes colloidal particles by the addition of chemical reagents called coagulants).

However, water intended for human consumption provided by the collective water supply system is safe for both consumption and economic purposes [2,3].

Seismologists said quarantine, blockade and other measures to alleviate COVID-19 have resulted in an average global reduction of 50% of high-frequency seismic noise. The results of the research in their evaluation may be helpful for better monitoring and detection of natural seismic sources such as earthquakes and volcanic activity. Obviously, along with the reduction of transport and tourism, there has been a lower noise level in many parts of the world. For example, noise levels in Delhi, the capital of India, dropped drastically by around 40-50% during the recent blockade. Due to the reduction in vehicle traffic during the standstill period, the noise level of the Govindpuri metro station (Delhi) drops by 50-60 dB from 100 dB. It is worth noting that the obtained noise level corresponds to that emitted by singing birds, thus giving the opportunity for given residents to enjoy their presence for the first time in history. Also in Europe, significant differences have been noted in this respect, which mainly contribute to the quieting down of places that are popular tourist attractions, but also the vicinity of airports. Only passenger aircraft traffic within the EU decreased by 90% in the first period of the pandemic [2,3].

In October 2020, scientists, based on near real-time activity data, reported a sudden 8.8% drop in global CO₂ emissions in the first half of 2020. Compared to the same period in 2019, which is greater than in the previous economic downturns in the 20th century. According to data from the Ministry of Ecology and Environment in China, from January to March 2020, an increase in the number of days with good air quality was observed by about 85% in over 300 cities. The European Environment Agency (EEA) predicted that NO₂ emissions fell by around 50% in many European cities, including Barcelona, Madrid, Milan, Rome and Paris due to the COVID-19 blockade. In the US, nitrogen dioxide decreased by 25.5% over the COVID-19 period compared to previous years. Similar declines were seen in Ontario, Canada, and Sao Paulo, Brazil. NO₂ and PM_{2.5} levels were also found to have dropped by almost 70% in Delhi, India's capital. Overall, India saw a 46% and 50% reduction in PM_{2.5} and PM₁₀ during the nationwide lockdown, respectively. It is worth adding that not all effects and changes can be presented in numbers. For example, it is the first time modern humans have been able to observe the Himalayan ranges from some areas in northern India, which became visible again for the first time in decades, as air quality improved due to a decrease in pollution [2,3].

These types of results are not surprising, and regardless of their scale and credibility, they seem to be the obvious consequence of a sudden reduction in industry and transport in the world. However, an important question arises about their long-term effect. Will a sharp decline in pollution values turn into a sharp rise to pre-pandemic levels when it comes to an end one day? Many studies show that there is a trend of widespread remote work in many industries and the use of virtual conferencing technology. Contrary to the temporary improvement in air quality scores, the nature of this change appears to have a more lasting effect on improving air quality. Scientists estimate that such behavioral changes during an isolation could permanently reduce 15% of all transport CO₂ emissions [3,4].

Summary

The outbreak of the coronavirus epidemic has led to a significant increase in the consumption of single-use plastic products, such as gloves and masks, and food packaging. According to WHO estimates, the world currently uses about 89 million masks and 76 million gloves per month. The need to prevent the spread of the coronavirus means tons of medical

waste are produced. Courier shipments are also thrown away in an unprecedented amount. Analyzing the above result, it is certainly difficult to clearly define the impact of the Covid-19 pandemic on the environment. Certainly the impact on the environment is not only negative or positive. It seems to be a collection of both interactions. It is also likely that many of the effects mentioned are of a short-term nature. For this reason, special attention should be paid to those elements that may have long-term effects, such as the dissemination of remote work in the world, limiting the usable areas of companies as well as everyday transport or limiting uncontrolled tourism. Regardless of what effects the pandemic will ultimately have, man has received a clear signal from nature that there is still time to change something in relation to the environment [4,5].

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