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Perspective

COVID-19 Face Mask: Pollution Effect on the Environment

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PERSPECTIVE

Because there are no clinically established medicines or vaccines for COVID-19, face masks are currently part of a comprehensive package of prevention and control strategies that can limit its spread. Face masks are typically constructed of non-renewable petroleum-based polymers that are non-biodegradable, toxic to the environment, and cause health problems. Many researches have been conducted on microplastic contamination, as well as the influence and control mechanisms of various plastic items. Microplastic pollution's potential for harm to the environment has been verified. With the outbreak and spread of COVID-19 over the world, disposable surgical masks have become popular among the general people as an effective and inexpensive form of protective medical equipment. Disposable masks have become the new societal standard, but they must be environmentally conscious. Masks constructed of polymer materials would emit microplastics after entering the environment, therefore discarding them at random could result in new and increased microplastic contamination. According to recent findings, masks are a possible source of environmental microplastics that is often disregarded. One mask released 360 pieces of microplastics into static water, and when the vibration rate increased, the release amount increased as well when organic solvents (detergent and alcohol) are mixed with water, the release of microplastics from masks increases.

The potential to discharge microplastic fibres into the environment was considerably improved when the mask fragmented due to the increased exposure area. The masks become highly brittle fragments and microplastics after two months of natural weathering. Once these delicate bits enter the water, a fully worn mask could discharge several billions of microplastic fibres into the aquatic ecosystem. The alarming rise in mask manufacture and consumption, as well as incorrect disposal, is concerning. It is critical to comprehend the potential environmental hazards and need of masks. The COVID-19 disease has recently spread as a worldwide pandemic, posing serious hazards to humanity. The World Health Organization (WHO) has issued suggestions to assist countries in limiting the transmission of the virus to the general public, including the use of masks, hand cleanliness, social distancing, and the shutdown of all forms of public transportation. These circumstances resulted in a significant drop in global economic activity, but there were also indirect environmental advantages such as improved global air quality and reduced water contamination.

Viruses are disseminated primarily through airborne transmission via droplets and aerosols. Face masks are a common preventive measure, but their effectiveness in preventing SARS-CoV-2 transmission is still up for discussion. Variations in mask efficacy are linked to population-average infection probability and reproduction nuclei, and can be explained by varying viral abundance regimes, according to our findings. Surgical masks were found to be effective in reducing virus dissemination in the majority of settings and contacts where virus load is low (virus-limited). More contemporary masks and other protective equipment are required in possibly virus-infested interior areas, such as medical facilities and hospitals. When used in conjunction with other preventive measures, such as wearing a mask, they are most effective. Disposable face masks have seen a considerable increase in use as a result of the COVID-19 epidemic. The ecosystem has already been contaminated by the inappropriate disposal of used face masks.

Disposable face masks, which are constructed of plastic nonwoven fabrics, could be a source of microplastics in the environment. We tested the ability of new and used disposable face masks of various sorts to release microplastics into the water in this study. The used masks' microplastic release capacity increased dramatically, from 183.00 78.42 particles/piece for the new masks to 1246.62 403.50 particles/piece for the used masks. The majority of the microplastics discharged from the face masks were medium-sized transparent polypropylene fibres from nonwoven fabrics. Since the increase of medium size and blue microplastics, abrasion and ageing during the use of face masks increased the release of microplastics. During use, the face masks may collect airborne microplastics. Our findings suggested that used disposable masks that are not properly disposed of could be a major source of microplastics in the environment. Not only is it advantageous to pandemic control to allocate masking resources efficiently, but it is also beneficial to environmental safety to properly dispose of unused masks.

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