



Single-use surgical mask: Human lifesaver or Biodiversity destroyer

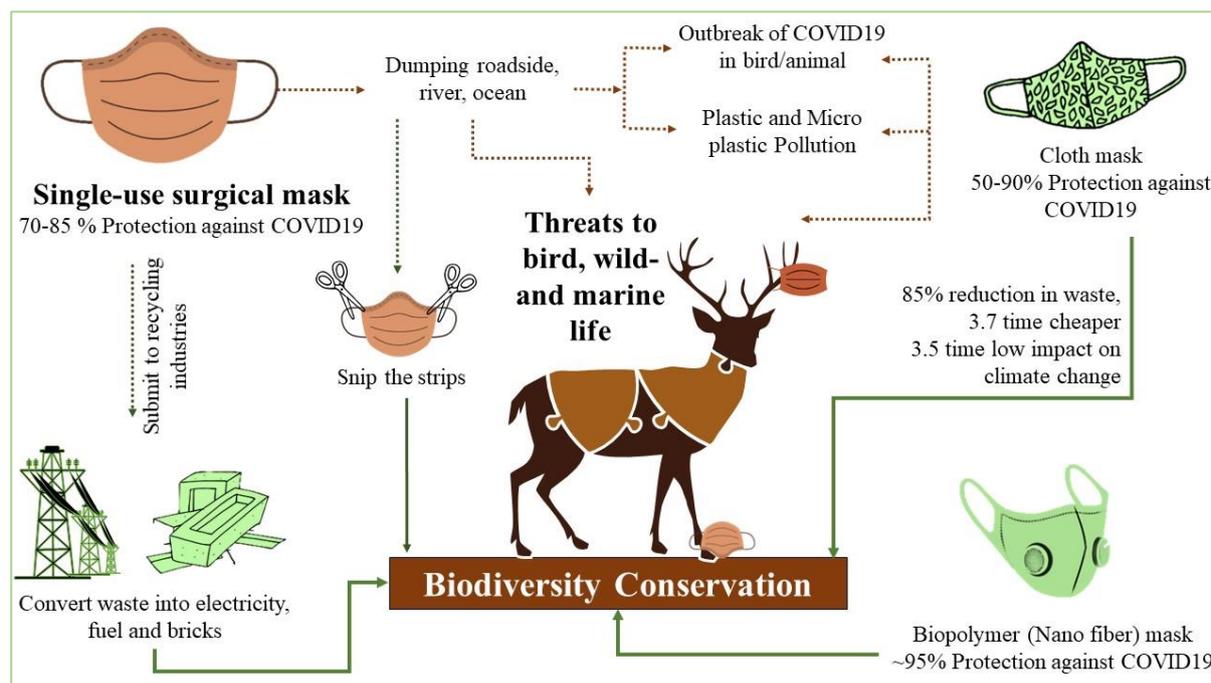
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The green lines represent sustainable and biodiversity conservation ways. The dark brown lines represent possible threats of single-use surgical mask to the biodiversity.

Key Words: Disposable mask; Plastic and micro plastic pollution; Conservation; Threats

The COVID-19 is transmitted by respiratory droplets or aerosols and can survive in the air for more than 24 hrs, which was detected and momentarily created a pandemic situation, globally. The only way to stop the transmission is to wear face mask, washing hands frequently and to maintain social distance. Wearing a mask is declared as one of the important precautionary measures by the World Health Organization (WHO) and policymakers in every country, because masks help in the significant reduction of infection caused by touching the face/mouth/nose with contaminated hands (Schmutz et al. 2020). The virus, COVID19 has increased the demand for the surgical single-used mask in the healthcare professionals as well as among the community. Such masks are made up of polypropylene or



high-density polyethylene (HDPE), a fossil-derived plastic which has a very high half-life (Dharmaraj et al. 2021). The mask production to the disposal statistics is presented in Table 1. Based on the reusability, the mask is divided into two major groups' disposable (made up of polymers) and reusable mask (made up of cloth material) in terms of production. In present study, the details of only disposable mask is presented.

Table 1: Global mask production, usage and disposable statistics

| No | Statistics | Reference |
|----|---|------------------------|
| 1 | Estimated worldwide usage of disposable mask: 129 billion/month | Prata et al. 2020 |
| 2 | Production in China as on Feb. 2020: 116 million/day | Adyel 2020 |
| 3 | Order of mask in Japan as of April 2020: over 600 million/month | Fadare and Okoffo 2020 |
| 4 | Mask disposal in the UK: 53 million/day | Website URL 1 |
| 5 | Gloves and mask entered into the environment: 200 million/month | Website URL 2 |
| 6 | Mask reached to oceans: 1.5 billion Marine plastic pollution increased in last year: 6200 tonnes | Website URL 3 |
| 7 | Mask waste generation in India: Minimum: 928/week; Maximum: 4640/week | Selvaranjan et al 2021 |
| 8 | *Plastic footprint in the environment due to mask and gloves: 4.5×10^5 Kg/Month | Present Study |

*Calculated based on the global entries of masks and gloves mentioned (200 million/month). The average of one mask and single glove weight is 2.25 ± 0.01 .

Mask: a threat to the ecosystem:

In current situation, recycling of any household medical waste is not a feasible and advisable solution, as there is a chance that it may be exposed to infectious particles. There are no particular laws or guidelines for separation and segregation, which might involve several issues. Globally, the dumping of masks was observed in areas such as, roadside, river, oceans and several open areas. Usually, such masks sustain in the environment for a longer period of time (more than 400 years)(Hasan et al., 2021). The misconception of masks to various birds, animals and marine creatures, considering as a food and leads to trapping and entangling in the strips of masks. The single-use surgical mask not only adds litter to the environment, but



also hurting and killing a wide range of terrestrial and marine living organisms. Moreover, the production process of such masks also releases greenhouse gases (Prata et al. 2021). The disposal of mask also reported as a novel source of micro plastic pollution in the environment and entry point of the food chain (Hasan et al. 2021). The single-use surgical masks are also noted as a major causative agent of secondary disease outbreaks in all life forms, including humans (Fadare and Okoffo 2020). India does not have any sufficient resources for the household medical waste management (Prata et al. 2021). Every minute 10 kg of disposed masks and gloves entered into the environment (Table 1). Hence, it is very important to deal with the mentioned issues and look into more sustainable sources at individual level. Herewith, we suggest some measures by which we can protect the environment without compromising human health in current pandemic situation.

- Snip the strips of the masks before the disposal to avoid the entangling and entrapping issues.
- Dispose masks as a separate medical waste and submit it to plastic recycling companies.
- Moving towards the development of biopolymer mask (Torres and Torre 2021). Biopolymer mask were made up of gluten and nanofibers having 95% efficiency.
- A reusable mask could be applied in routine life for the general community. Regular cloth masks having multi-layer of high thread-count and textiles are moderately effective and reported to block 50-70 % fine droplets and particles. Reusable masks help in the reduction of waste production (85 %). Moreover, economically viable option in a country like India as it is 3.7 times cheaper than other masks (Prata et al. 2021).

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