Nano-based Masks, Disinfectants and Sanitizers Effectively Combat Covid-19

COVID-19 is an infectious viral disease caused by novel coronavirus to SARS-CoV-2 which emerged from Wuhan, China at the end of year 2019. The World Health Organization (WHO) declared COVID-19 a global pandemic due to highly contagious nature of SARS-CoV-2. Till date COVID-19 has infected and claimed lives of millions of people around the world. The virus is mainly transmitted through droplets from symptomatic patients; however, there are many cases of infection from asymptomatic people, wherein the virus is transmitted even before the symptoms appear. Therefore, it has been strategized to control the spread of virus from one person to another. Moreover, inadequate medical facilities, high cost of treatment and lack of effective medication against novel COVID-19, non-pharmacological interventions (NPIs) can help mitigate the transmission such as wearing face masks, face shields, protective clothing and practicing social distancing. However, these standard protective equipment (PE) are not effective in preventing the spread of coronavirus. Meanwhile, nano-based products are of huge help in effectively preventing COVID-19 outbreak.

Face-mask is a cost effective first line of defense against COVID-19 as mask helps prevent the entry of small sized particles. However, commonly used facial masks are incapable of preventing the entry of small sized corona virus, which gets stuck in mask and can live on it for up to 9 days. Moreover, if such mask worn for longer period of time, virus can enter inside the body via mouth and nasal passage. Therefore, masks should be designed such that they are effective, antiviral and comfortable to use. Recently a research showed that nanoceutical N95 mask made with Zinc Oxide nanoflower cotton fabrics were comfortable, washable, porous and light-weight which solved the common problem of carbon dioxide rebreathing and prevented the spread of virus through the pores.

Nanotechnology also offers a lot of opportunities for the development of more effective and promising disinfectant systems. In Prague, nano-polymer disinfectants were sprayed on few public vehicles to check its efficiency. It was found that Nano-polymer disinfectant can work for almost 21 days as compared to traditional disinfectants. Moreover, it was also found that copper nanoparticles incorporated disinfectants could be really effective against COVID-19. Coronavirus estimated half-life on stainless steel is 5.6h and on plastics 6.8h therefore copper can be used to inactivate virus. Additionally, the efficiency of hand sanitizers could also be enhanced by introducing nanoparticles like copper, silver, gold, and quaternary ammonium cations (QUATs) due to their antiviral properties. These metals and metal oxides can be used to create a surface coating to protect the body against the covid-19 because they possess the ability to stops the binding of viral proteins with human epithelial cells and leads to the viral protein denaturation. Scaling-up these for commercial use could help in effectively preventing COVID-19 spread. These various available nano-based products help equip people for combating COVID-19.

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