Project Details

Title: Large-scale synthesis of anti-viral nanoparticles and their coatings on personal protective equipment using an industrially scalable spray technique

Project Summary:

The novel coronavirus is a new type of respiratory virus which spreads primarily through droplets generated when an infected person coughs or sneezes, or through droplets of saliva or discharge from the nose. Apart from that, some preliminary studies suggest that coronaviruses may persist on surfaces for a few hours or up to several days risking healthy people who are not in direct contact with an infected person. In this scenario, it becomes of utmost importance to sanitize the surfaces.

In this project, we would be working on a metal nanoparticle (NP) based coating which can be applied to a surface of any shape and size for protection against COVID-19. Initially, the project would be targeting personal protective equipment (PPE) and would be scaled gradually to other surfaces as well. The coating would be designed in such a way that it neutralizes or kills the virus whenever exposed to it. The projects aim to develop and study NP based coating for their effectiveness against COVID-19, reproducibility of the neutralization of the virus under repeated exposure, and robustness against temperature and humidity.

Keywords: COVID-19, Ag nanoparticles, surface coatings, antiviral

Objectives:

- Nanoparticle synthesis on a large scale with reproducibility.
- Dispersing the NPs in a suitable medium, like water, alcohol, etc. for making antiviral solutions.
- Further modifying these solutions with additives to make them suitable for coating on clothing materials.
- Using techniques like spray coating, to deposit the antiviral coatings on surfaces like metals, plastics, personal protective equipment (PPE).
- Developing water-based sanitizers containing Ag nanoparticles.

Expected output and outcome of the proposal:

1. Aqueous sanitizer containing Ag nanoparticles.
2. Antiviral surface coatings based on metal nanoparticles for personal protective equipment (PPE) and metal/plastic surfaces.
3. Spray technique suitably adapted for rapid deposition of antiviral coatings.

Budget:

Budget head	**Amount (in lakhs)**
Equipment (laboratory centrifuge, spray nozzles, gas cylinder, hot-plate stirrer, other related minor equipment)	2.5
Consumables (large-sized glassware, chemicals)	2
Contingency (items not covered above but required to achieve the project goals, repairing of equipment if required, getting work done from external agencies, honorarium etc.)	0.9
Overhead	0.6
Total	6.0