

## Bacteriophages as Surrogate Marker for Inactivation of SARS-CoV-2 by Ultraviolet Radiation to Prevent COVID-19 Transmission

Sir,

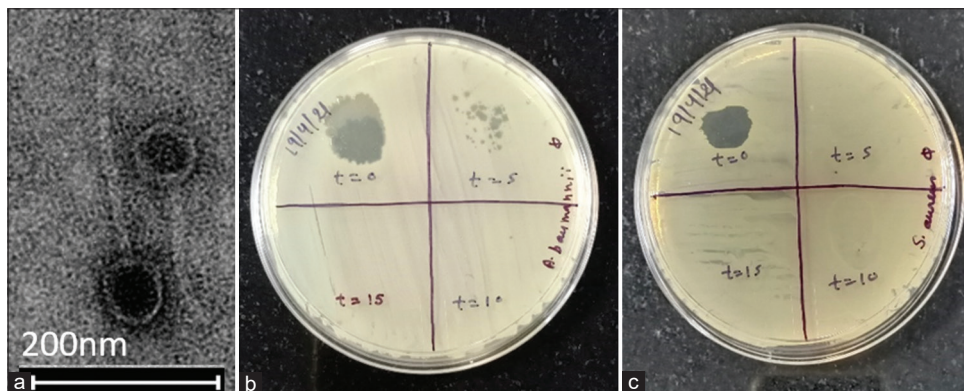
Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), the etiological agent of COVID-19 transmits through aerosols, body fluid or by the fomites present around the infected individuals.<sup>[1]</sup> The ultraviolet (UV) radiation may be effectively used to limit the transmission of COVID-19. However, it must be maintained and monitored regularly to provide sufficient lethal dose. The bacteriophages may be used as indicator to monitor the lethal intensity of UV source for viruses.

In the present study, *Acinetobacter* phage AIIMS-Ab6 [Figure 1a] active against multidrug-resistant *Acinetobacter baumannii* and *Staphylococcus* phage BHU-22, active against methicillin-resistant *Staphylococcus aureus* were used. These

phages ( $10^6$  plaque-forming units/ml) were exposed to UV of 254 wavelength, 400 mW/m<sup>2</sup> intensity for 0, 5, 10, and 15 min and spotted on their respective bacterial lawn, and incubated overnight at 37°C to observe the lytic zones. The AIIMS-Ab6 and BHU-22 phages showed inactivation on 10 min and 5 min of UV exposure, respectively [Figure 1b and c].

The UV radiation does not produce any physical or chemical damage to the objects.<sup>[2]</sup> The combined UVA and UVC exposure completely inactivated the SARS-CoV-2 viral stock,<sup>[3]</sup> and UV light was also found suitable to disinfect the high touch area of the hospital surfaces.<sup>[4]</sup>

Therefore, we conclude that UV radiation is an effective mean to deactivate the model viruses; bacteriophage and strongly propose to apply the UV radiation of 254 wavelength,



**Figure 1:** (a) The *Acinetobacter* phage AIIMS-Ab6. (b) Multidrug-resistant *Acinetobacter baumannii* bacterial lawn showing inactivation of phage on 10 and 15 min of ultraviolet exposure. (c) Methicillin-resistant *Staphylococcus aureus* bacterial lawn showing no lysis by bacteriophage after 5, 10, and 15 min of ultraviolet exposure

400 mW/m<sup>2</sup> intensity for 15 min, as disinfectant over COVID-19 exposed surfaces, hospital records, equipment, reusable personal protective equipment, handheld devices, and mobile phones to reduce the transmission of this deadly disease and to use the bacteriophages as surrogate marker to monitor the effective UV dose.

### Research Quality and Ethics Statement

The authors followed applicable EQUATOR Network (<http://www.equator-network.org/>) guidelines, notably the CARE guideline, during the conduct of this report.

### Acknowledgment

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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