

# Plasma-based green disinfectants can limit spread of infectious diseases like COVID 19

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Researchers have developed a plasma-based disinfectant generated with the help of cold atmospheric pressure plasma (CAP) which could act as a green decontaminant for COVID 19.

The COVID 19 pandemic had brought forth the urgent need for decontaminants that can limit the spread of infectious diseases through contact. However, most decontaminants consisted of chemicals which are hazardous for the environment. This encouraged researchers to work towards greener alternatives.

A team of scientists Dr. Kamatchi Sankaranarayanan, Dr. Mojibur R. Khan, and Dr. H. Bailung from the Life Sciences and Physical Sciences divisions from the Institute of the Advanced Study in Science and Technology (IASST), an autonomous research Institute of the Department of Science and Technology (DST), Govt. of India, Guwahati, Assam has demonstrated that the plasma generated by cold atmospheric pressure (CAP) has the potential to deactivate SARS-CoV-2 spike protein, which binds to human ACE2 receptor for inducing viral infection and subsequent Covid-19.

Plasma, the fourth state of matter which makes up most of the universe when produced in controlled conditions in the lab and are termed as Cold Atmospheric Pressure Plasma (CAP). The scientists passed plasma forming gases such as Helium, Argon, and Air through a high voltage electric field which led to the formation of a stable plasma with a mixture of ions, and electrons emitting a pink glow of CAP inside the reaction chamber.

This research recently published in the international journal of the RSC (Royal Society of Chemistry) Advances shows that short-lived highly reactive oxygen and nitrogen species (ROS/RNS) generated in the plasma led to complete deactivation of the SARS-CoV-2 Spike protein occurs within 2 min of CAP treatment. The RT-PCR analysis has also established that CAP can deactivate the RNA of the SARS-CoV-2 virus.

The researchers showed that the CAP, a plasma-based disinfection method is a better alternative to environmentally hazardous chemical-based decontamination methods. “The cold atmospheric plasma is environmentally safe since, during the entire decontamination process by plasma treatment, no chemical waste is produced.

The lead authors Dr. Kamatchi Sankaranarayanan and Dr. H. Bailung said that the disinfection method could further be extended for various bacterial or fungal infections.

The research was conducted at the Covid-19 testing and research facility of IASST which according to Director Prof. Ashis K. Mukherjee has carried out more than 1.54 lakhs tests till date.

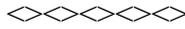
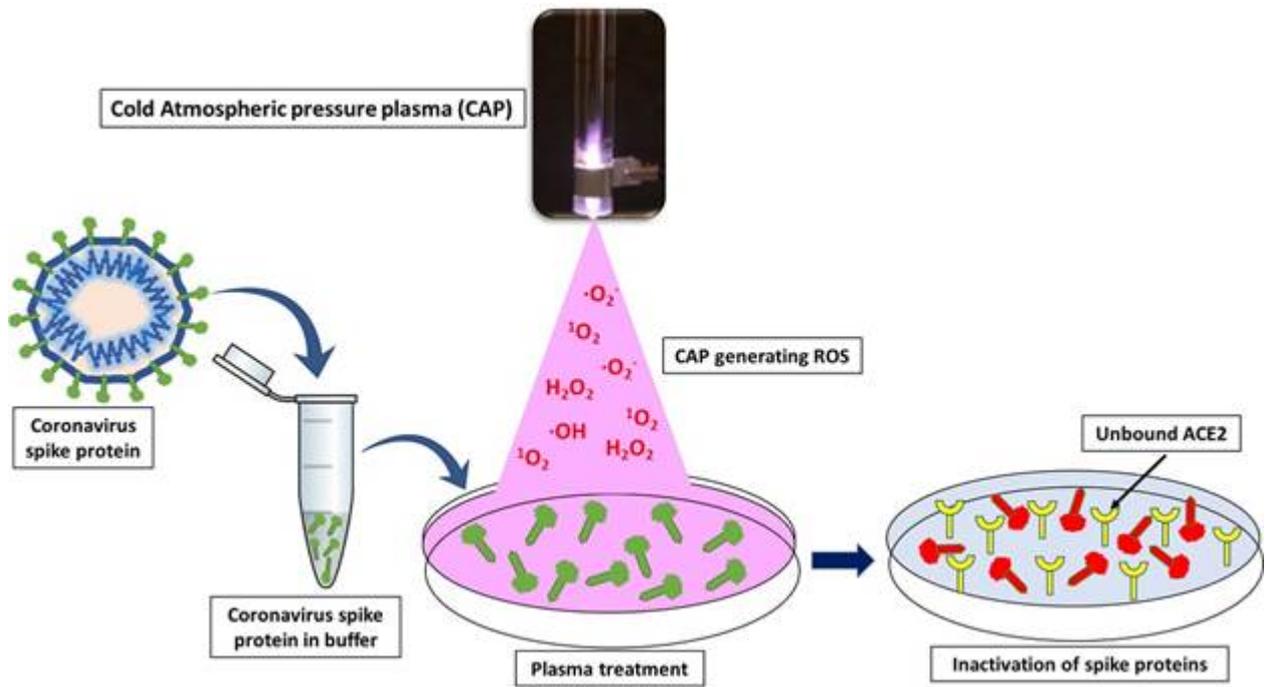
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Cold Atmospheric Pressure Plasma for attenuation of SARS-CoV-2 Spike protein binding to ACE2 protein and the RNA deactivation

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