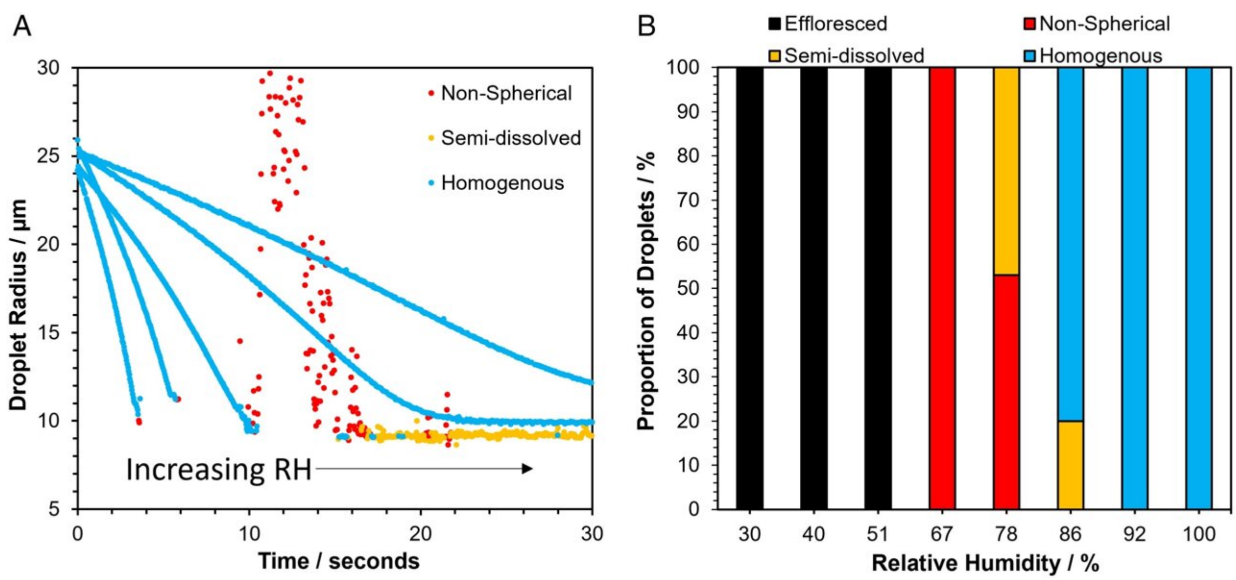
# Infectivity of airborne SARS-CoV-2 could decrease by 90% within 20 minutes of exhalation

June 29 2022




The microphysics of airborne MEM droplets. (A) Mie scatter evaporation profiles of MEM 2% FBS generated by a droplet dispenser and levitated in the CK-EDB at different RHs (51, 66.8, 78.2, 86, 92, Left to Right). Blue indicates a homogenous spherical droplet, yellow indicates the presence of inclusions within the droplet, and red indicates a nonspherical particle (note that size estimates become inaccurate for nonspherical particles). (B) Proportion of particle morphologies formed by MEM 2% FBS at different RHs. The frequency of the formation of each particle type is shown for the RHs studied, with black indicating efflorescence, red indicating a nonspherical particle, yellow indicating a semi dissolved particle, and blue indicating an aqueous homogenous particle. Credit: *Proceedings of the National Academy of Sciences* (2022). DOI: 10.1073/pnas.2200109119

The SARS-CoV-2 virus can lose 90% of infectivity when in aerosol particles within 20 minutes, according to new University of Bristol findings. The study, published in the journal of the *Proceedings of the National Academy of Sciences* (*PNAS*), is the first to investigate the decrease in infectivity of SARS-CoV-2 in aerosol particles over periods from seconds to a few minutes. The aim of the study was to explore the process that could change viral infectivity over short timescales following exhalation.

Scientists from Bristol's Schools of Chemistry, Vet School and Cellular and Molecular Medicine, sought to gain a detailed understanding of the factors which regulate the survival of airborne SARS-CoV-2 inhalable particles, and how infectivity is affected by environmental conditions such as relative humidity (RH) and temperature. RH measures how much water vapor (moisture) there is in the air compared to how much there could be at that temperature. Ideally, healthy indoor RH levels are between 40 to 60%.

Using a novel instrument called CELEBS (Controlled Electrodynamic Levitation and Extraction of Bioaerosols onto a Substrate), the team were able to probe the survival of SARS-CoV-2 in laboratory generated airborne particles and examine how temperature and humidity drive changes in infectivity, from timescales spanning five seconds to 20 minutes. The same experiment was carried out comparing four different SARS-CoV-2 variants, including alpha and beta.

Results from the team's experiments found a significant loss in infectivity within the first ten minutes of aerosol particle generation that is strongly dependent on the environmental relative humidity, but not temperature. This effect did not alter across the different SARS-CoV-2 variants.

The team observed a decrease in airborne infectivity at low relative humidity (