



05th May 2020

Tristel Chlorine Dioxide Chemistry Efficacy Against *Coronaviridae*

SARS-CoV-2 (the virus responsible for the current COVID-19 outbreak) is a member of the family of viruses called *Coronaviridae*.

Viruses from the *Coronaviridae* family belong to Group IV of the Baltimore virus classification and are enveloped positive-sense single-stranded RNA viruses.

The active ingredient within Tristel's proprietary chemistry is chlorine dioxide (ClO₂) which is efficacious against destroying viruses demonstrated through extensive testing and research in laboratory and clinical settings.

Chlorine dioxide affects viruses and leads to their inactivation in several different ways.

ClO₂ reacts quickly with the amino acids, Cysteine and Methionine (two Sulphur-containing amino acids), with Tyrosine and Tryptophan (two aromatic amino acids) and with two inorganic ions: Iron (Fe²⁺) and Manganese (Mn²⁺). A study into the antiviral effect of chlorine dioxide against Influenza Virus revealed that ClO₂ performed an oxidative modification of Tyrosine residue and Tryptophan residues in the viral capsid surface proteins, hemagglutinin (HA) and neuraminidase. It also reacts with free fatty acids found within the virus.

Additional research on chlorine dioxide's efficacy towards Poliovirus shows that treatment results in reduced incorporation of Uridine (one of the four base units which comprise RNA). This results in the viral genome being unable to act as template for RNA synthesis therefore resulting in the virus being unable to replicate.

Chlorine dioxide is also able to disrupt Sulphur bonding interactions within the viral capsid protein which leads to changes in the virus shape resulting in a loss of pathogenic functionality.

In conclusion, the mechanism of Tristel's proprietary chlorine dioxide chemistry in destroying *Coronaviridae* is expected to be a combination of oxidative modification of amino acids and fatty acids, RNA synthesis disruption and viral capsid modification. All of these in combination lead to the lysing (destruction) of the virus.