



NATIONAL
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Trials Nidovirales - Coronaviridae

By:

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Overview and Foreword

Coronavirus is first described in the 1960s from the nasal cavities of birds, pigs and humans. These viruses were then named coronavirus 229E and human coronavirus OC43.

Two more members of this family have been identified (HCoV NL63 2004 and HKU1 2005) and they have been involved in more serious respiratory infections.

Coronavirus primarily infect the upper respiratory tract and the gastrointestinal tract of mammals and birds. Coronavirus causes very severe infections with symptoms, e.g. fever, throat problems and coughing. Coronavirus often causes pneumonia, either direct viral pneumonia or secondary bacterial pneumonia and bronchitis. The importance and economic impact of corona virus is difficult to assess, but it costs a lot of money every year, worldwide.

Coronavirus also causes a variety of sequelae in pets and animals in agricultural production such as poultry and pigs, but also calves, all sequelae are very serious and threaten the agricultural industry in both the short and long term.

In chickens, the infectious bronchitis virus (IBV) is the most extensive, it is a coronavirus that targets the airways but also the oro-genital tract, the virus can spread to various organs throughout the chicken's body.

Coronavirus in farm animals includes porcine coronavirus (transmissible gastroenteritis coronavirus, TGE) and Bovine coronavirus, both resulting in diarrhea in young animals.

In our tests and the report, we submit on order to IDD Group of Industries, we have concentrated on two different types of Coronavirus. The two virus species that are the most economical loss for farmers all over the world on pigs, poultry and calves. **IBV and TGEV viruses.**

Avian infectious bronchitis virus (IBV)

Avian infectious bronchitis virus (IBV) is a **coronavirus** that infects chickens, causing the associated disease, infectious bronchitis (IB). It is a highly infectious avian pathogen that affects the airways, intestines, kidneys and reproductive systems of chickens.

IBV affects the performance of both meat-producing and egg-producing poultry and is responsible for significant economic loss in the poultry industry.

Transmissible gastroenteritis coronavirus (TGEV)

Transmissible gastroenteritis **coronavirus (TGEV)** infects pigs and calves. On young pigs, the mortality rate is close to 100%. The pathology of TGEV is similar to that of other coronaviruses.

Coronaviruses enter the host by first attaching to the host cell using the spike glycoprotein.

The S protein interacts with the porcine aminopeptidase N (pAPN), a cellular receptor, to aide in its entry. The same cell receptor is also a point of contact for Human Coronaviruses. A domain in the S spike protein is recognized by pAPN, and transfection of pAPN occurs to nonpermissive cells and infects them with TGEV.

Once the virus infects the pig, it multiplies in the cell lining of the small intestine resulting in the loss of absorptive cells that in turn leads to shortening of villi.

The infected pig then has reduced capability for digesting food and die of dehydration.

0.25 PPM – AG Silver Concentration	5 Min. from point of contact.	30 Min. from point of contact.	2 Hours. from point of contact.
TGEV	88.2%	91.9%	98.8%
IBV	90.8%	93.5%	97.9%

1 PPM – AG Silver Concentration	5 Min. from point of contact.	30 Min. from point of contact.	2 Hours. from point of contact.
TGEV	95.6%	97.2%	99.5%
IBV	93%	96.1%	98.9%

2 PPM – AG Silver Concentration	5 Min. from point of contact.	30 Min. from point of contact.	2 Hours. from point of contact.
TGEV	95.9%	97.8%	99%
IBV	95.5%	98.7%	99.5%



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In our test, we have followed the recommendations of the AG - Silver PPM Concentration that the IDD Group proposed to our laboratory.

Each test is performed three times with the same concentration level and the results indicated in the columns are an average of three tests.

The results show that the AG - Silver solution from the Demeter system is effective on TGEV and IBV Coronavirus, even at low levels of concentration as 0.25 PPM AG Concentration. However, we want to reserve ourselves for whether there is an ongoing outbreak on a specific farm or in the immediate area (village), then PPM AG Concentration should be up to 1PPM or 2PPM AG Concentration for a shorter period, otherwise such low concentration as 0.25 PPM AG shows high killing effect, so 0.25 PPM AG is usually enough.

We have no clear idea of how often one should dispense AG - Silver solution in the water system to poultry, pigs and cattle (calves), but a recommendation is to do so at least 2-3 days per week. If it is an ongoing outbreak then it should undoubtedly be dosed to the animals every day, it is important!

AG - Silver solution is not an untested method for killing viruses and bacteria. There have been a lot of studies from various universities and laboratories since more than 50 years back in time, from all over the world.

Scientifically, AG - Silver has been critically reviewed many times, but the international studies that have been conducted show a very high and safe efficiency. In many studies better than other methods that science refers to. It also shows in all the tests that SVA laboratory in Sweden carried out for IDD Group for more than 10 years.

We are safe and we impressed by the technology and have no doubt about the efficiency. We recommend the technology as a very good preventive system for diseases of poultry, pigs and cattle.

Uppsala - Sweden March 2016.

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