Mycoplasma gallisepticum

INFORMATION SHEET
**Introduction**

Mycoplasmas are the smallest of all known free-living bacteria and can cause great concern to the poultry industry due to economic loss and disease. These simple looking bacteria have evolved relatively quickly and now possess only a minimal set of genes, but they put these few genes to excellent use in terms of their own survival. Despite successful eradication programs by the primary chicken and turkey breeders, mycoplasma infections still occur in commercial poultry stock and can cause significant problems. *Mycoplasma gallisepticum* (*Mg*) is the most important and can infect chickens, turkeys and game birds. It occurs in all countries where poultry are kept and the losses associated with the infection have been recognized for many years.

*Mycoplasma gallisepticum* (*MG*) infection is commonly known as Chronic Respiratory Disease (CRD) in chickens and Infectious Sinusitis in turkeys. *MG* infection causes significant economic losses to the poultry industry throughout the world. It causes a reduction in egg production of 10 - 20%, an increase in embryo mortality and chick mortality of 5 - 10% and a reduction in weight gain and feed conversion efficiency by 10 - 20%. *MG* predisposes birds to other infections such as *Escherichia coli* and *Haemophilus paragallinarum* through the inhibition of immune functions causing aggravation of disease leading to further economic losses. In the complicated infections the severity of the disease is greatly affected by the degree of secondary infection with viruses such as Newcastle disease and Infectious Bronchitis, and/or bacteria such as *Escherichia coli*.
**M. gallisepticum** can be found worldwide.

### Transmission

*Mycoplasma gallisepticum* infection is transmitted both horizontally and vertically and the disease remains in the flock constantly as a subclinical form. *M. gallisepticum* is transmitted during close contact between birds as well as on fomites. Aerosol spread occurs over short distances and can be responsible for transmission within a flock. *M. gallisepticum* is also transmitted vertically in eggs. Shedding in the egg can vary, egg transmission is more frequent in birds infected during laying than in birds infected before they mature. Infected birds carry *M. gallisepticum* for life, and can remain asymptomatic until they are stressed.

### Incubation Period

Experimentally infected poultry develop symptoms after 6 to 21 days. In natural infections, the incubation period is variable; infected birds may be asymptomatic for days or months until stressed.

### Clinical Signs

In chickens *Mg* may not cause obvious signs of disease unless the birds are stressed for example by respiratory viruses such as Infectious Bronchitis or Newcastle disease. The interaction between *Mg* and pathogenic strains of *E. coli* is also well known. Other stresses include overcrowding or excess ammonia in the poultry house. *M. gallisepticum* infections vary from asymptomatic to severe, depending on the infecting strain and other factors. More severe infections are seen when the birds are infected concurrently with Newcastle disease virus, Infectious Bronchitis virus, *Escherichia coli* or other pathogens. Infected chickens usually develop respiratory symptoms that may include rales, coughing, sneezing, nasal discharges and dyspnea. Turkeys typically experience more severe disease, often accompanied by swelling of the paranasal (infraorbital) sinuses. Conjunctivitis with a frothy ocular exudate is common in turkeys and occurs occasionally in chickens. Production is lower in infected flocks, with decreased weight gain, feed efficiency and egg production. The symptoms of Avian Mycoplasmosis are typically slow to develop, and the course of the disease can be prolonged. However, acute respiratory disease sometimes occurs in young birds, particularly turkeys. Often appears close to the onset of lay. In older birds the onset of a positive serological picture may precede the onset of clinical signs.

### Chickens:

- Foamy secretion in the eye, tracheal rales, open-mouthed breathing
- Reduced feed consumption, loss of weight which is worse in broilers
- Drop in egg production in laying flocks
- Breeding flocks will suffer reduced hatchability and chick viability

Morbidity can reach 100% and tends to be worse in the winter months. Mortality is variable being negligible in adults but up to 30% in broiler flocks again depending on the involvement of secondary infections.

### Differential diagnosis

In poultry, the differential diagnosis includes respiratory diseases such as Infectious Bronchitis, mild Newcastle disease and Avian Influenza. *Hemophilus paragallinarum*, *Pasteurella multocida* and *Mycoplasma synoviae* infections should also be ruled out. Mixed infections with *M. gallisepticum* and other organisms can occur.
Diagnosis

Confirmation of the diagnosis requires either:
1. Culture and identification of \( M_g \) from affected birds
2. Demonstration of seroconversion (from \( M_g \) negative to \( M_g \) positive), ideally on paired sera from the same bird or on a flock basis, using one of the following:
   - Rapid Serum Agglutination test
   - Haemagglutination Inhibition test
   - ELISA (Enzyme Linked Immunosorbent Assay) test
3. PCR (Polymerase Chain Reaction) test to demonstrate the presence of \( M_g \) DNA.

Laboratory tests

\( M. \ gallisepticum \) infections can be diagnosed by culturing the organism on mycoplasma media. The colonies are tiny, circular, smooth and translucent, and sometimes have a “fried egg” appearance with a central dense mass. Biochemical tests can be useful in preliminary identification, but definitive identification is by indirect immunofluorescence, immunoperoxidase staining, a growth inhibition test, metabolism inhibition or PCR. Polymerase chain reaction/ restriction fragment length polymorphism (PCR-RFLP) may be necessary to distinguish \( M. \ gallisepticum \) from \( M. \ imitans \). These two species can also be differentiated by immunofluorescence using serial dilutions of antisera to \( M. \ gallisepticum \) and \( M. \ imitans \) in parallel.

\( M. \ gallisepticum \) can be difficult to grow directly from clinical samples, and PCR-based assays are commonly used for diagnosis. Animal inoculation, using mycoplasma free chicken embryos or chickens, is occasionally necessary to isolate the organism if these results of other tests are not conclusive; however, animal inoculation has largely been superseded by PCR. Immunological tests to detect antigens are generally not used directly on clinical samples, due to the very small size of the organisms and the absence of suitable negative and positive controls in many cases. Serology can also be used for diagnosis, and is particularly helpful in screening poultry flocks. Serology is less useful in individual birds, as nonspecific reactions are common. Commonly used assays include a rapid serum agglutination (RSA) test, enzyme linked immunosorbent assays (ELISA’s) and hemagglutination inhibition. Other tests including radioimmunoassay, microimmunofluorescence and indirect immunoprecipitation assays may be available.
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Morbidity and Mortality

M. gallisepticum has been eradicated from most primary and multiplier poultry breeding flocks, but this organism can be endemic in large, multiple-age commercial egg laying flocks. Outbreaks also occur in meat flocks. Clinical cases tend to occur in large commercial operations during the winter. Stressors such as viral infections, vaccination with live viruses, cold weather or crowding can trigger disease outbreaks in infected flocks. In chickens with uncomplicated infections, the morbidity rate is high and the mortality rate low; however, more severe disease occurs if the birds are concurrently infected with other viruses or bacteria.

Public Health

Mycoplasma gallisepticum does not appear to be zoonotic.

Control

M. gallisepticum can be introduced into a flock by live birds or hatching eggs, as well as the movement of people and fomites. Subclinically, infected small backyard flocks can be a source of infection for commercial poultry. The lateral transmission for example is one of the most common means of introduction, as the disease has been eradicated from most primary and multiplier breeding flocks. M. gallisepticum – negative breeding stock can be identified and maintained by serologic testing. Heat treatment or Tiamulin can eliminate egg transmission from valuable breeding animals. Biosecurity measures are important in preventing transmission on fomites. Wild or pet birds can also carry M. gallisepticum, and should be excluded from poultry operations.

Infections can be eliminated from a farm by depopulation of the flock, followed by thorough cleaning and disinfection of the premises. Most commonly used disinfectants are thought to be effective for M. gallisepticum. Recommended disinfectants for buildings and equipment include phenolic or cresylic acid disinfectants, hypochlorite, and 0.1% glutaraldehyde. Mycoplasmas are typically fragile and only survive in the environment for a few days; birds can be re-introduced after two weeks. The fragile nature of the mycoplasma means that infected premises can be successfully cleaned and disinfected between flocks.

The importance of good biosecurity in maintaining mycoplasma-free flocks cannot be overstated. Primary and commercial breeding flocks are monitored regularly for Mg by blood testing for antibodies.

Vaccines are generally used to prevent egg-production losses and reduce the impact of respiratory disease in commercial layers, but they can also aid eradication, or reduce egg transmission in breeding stocks.

Routine cleaning of bird feeders and disinfection is very important. Transmission at wild bird rehabilitation facilities should be minimized by good sanitation and disinfection.

Eradication from large, multiple-age commercial egg laying flocks is complicated by persistent infections and periodic shedding under stress. In these flocks, M. gallisepticum infections may be treated with antibiotics, which decrease the clinical signs but do not eliminate the infection. Other concurrent infections must also be treated. Control of MG infection in broiler breeder by chemotherapy is the most practical way to minimize economic losses. One of the most important antimicrobial agent used for treatment and control of MG infection is Rodotium® containing Tiamulin.
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Treatment

- Huvepharma recommendations is to use Rodotium 45% wsg, or Rodotium 80% and Rodotium 10% premix in treating mycoplasma infections.

Recommendation dosages:

- For the prevention of clinical diseases in broiler breeders, tiamulin can be used in water as 15 mg/kg for 1 week.
- For the prevention of clinical diseases in laying hens till the 17th week, tiamulin can be used in water as 15 mg/kg for 1 week.
- For the treatment of clinical disease in broiler breeders, tiamulin can be used in the water as 30 mg/kg for 3-5 days.
- For the treatment of clinical disease in laying hens till the 17th week, tiamulin can be used in the water as 30 mg/kg for 3-5 days.

Practical Administration

For the preparation of the medicated water and/or medicated feed the body weight of the animals to be treated and their actual daily water/feed consumption should be taken into account. This consumption depends of the age, state of health, breed and husbandry system. To provide the required amount of active substance in mg/gram per liter/kg of drinking water or kg of food, the following calculation should be made:

For more information about the product, please contact Huvepharma at:

HUVEPHARMA AD • 5TH FLOOR 3º NIKOLAY HAYTOV STR. • 1113 SOFIA • BULGARIA • P + 359 2 862 5331 • F + 359 2 862 5334 • SALES@HUVEPHARMA.COM

HUVEPHARMA N.V. • UITBREIDINGSTRAAT 80 • 2600 ANTWERP • BELGIUM • P + 32 3 288 1849 • F + 32 3 289 7845 • CUSTOMERSERVICE@HUVEPHARMA.COM

User warnings:

- Direct contact with the skin, eyes and mucous membranes should be avoided by wearing overalls, impermeable rubber gloves and safety glasses when mixing or handling the product. In case of accidental eye contact, irrigate the eyes thoroughly with clean running water immediately. Seek medical advice if irritation persists. Do not inhale. Inhalation and accidental ingestion must be avoided at all times. Seek medical advice immediately and show the package leaflet or label to the physician. Consult a physician. Contaminated clothing should be removed and splashes onto the skin should be washed off immediately. Wash hands after use.
- People with known hypersensitivity to tiamulin should handle the product carefully. Use personal protective equipment.
- Any unused product or waste material should be disposed of in accordance with national requirements.

* Used references can be requested on demand
** Indications listed above are not necessarily authorized in all countries. Please consult the local label for exact indications and posology
*** Check with your local Huvepharma representative which pack sizes are available in your region as this may vary.

Packaging

Products are available in bags from 1-5 and 25 kg. Check with your local Huvepharma representative which pack sizes are available in your region as this may vary.