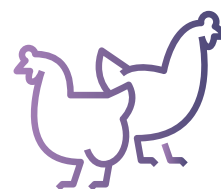


GUIDE TO COLIBACILLOSIS IN BROILERS





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INTRODUCTION

WHAT IS COLIBACILLOSIS?

Colibacillosis of poultry is caused by Avian Pathogenic *E. coli* ('APEC') which can act as a primary pathogen or an opportunistic, secondary pathogen following other disease processes or stressors. It is a major disease in broiler production; reducing on farm performance of birds, increasing reject levels (up to 43% of condemnations at slaughterhouses are due to *E. coli* infection) and generating increased use of antibiotics¹.

E. coli strains occur ubiquitously and form part of the normal commensal intestinal tract flora of poultry at high concentrations.

WHAT CAUSES A FLOCK TO SUFFER FROM COLIBACILLOSIS?

Different strains of *E. coli* have different characteristics that can make them more or less pathogenic to the birds. Commonly, serotyping and PCR testing can be used to assess the pathogenicity of *E. coli* strains on a site.

Serotyping of different strains can be performed via the types of O and K antigens possessed on the cell surface.

Commonly strains O1:K1, O2:K2 and O78:K80 are found to be involved in colibacillosis conditions, but **there are over 100 different 'O' serotypes** and beyond this many more strains have been found with untypeable O antigens.

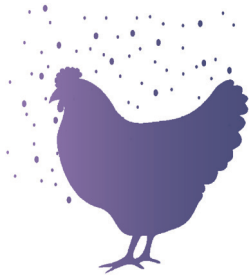
PCR testing for virulence genes (such as adhesins, protectins and iron acquisition systems) can also offer information on the pathogenicity of the disease, however there exists a great number of virulence genes and many of these genes can also be found in non-pathogenic *E. coli* strains.

The severity of disease seen is influenced by both the virulence factors of the *E. coli* strain and also the predisposing factors of the birds themselves, i.e. how susceptible to disease they are.

Common risk factors include:

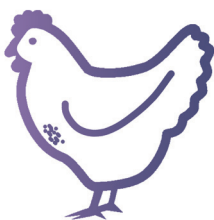
- Viral challenges, including Infectious Bronchitis (IB)
- Immunosuppression, often facilitated by stress or diseases such as Infectious Bursal Disease (Gumboro)
- Chick quality
- Grower management and seasonal challenges
- Typical disease challenges
- Bacterial outbreaks
- Mycotoxins
- Gut health challenges such as coccidiosis
- Poor water quality
- And more!

WHAT ARE THE POSSIBLE ROUTES OF INFECTION FOR *E. COLI*?



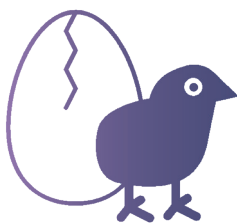
Aerosol and oral infection

Inhalation of dust containing pathogenic *E. coli* can invade the body via the respiratory tract. This is made more likely following a respiratory infection or when the immune status of the bird is compromised due to environmental stressors and poor air quality.



Local infection

Even very light scratches to the skin of the birds can be enough for some strains of *E. coli* to be introduced and allow cellulitis to develop.



Breeder flocks

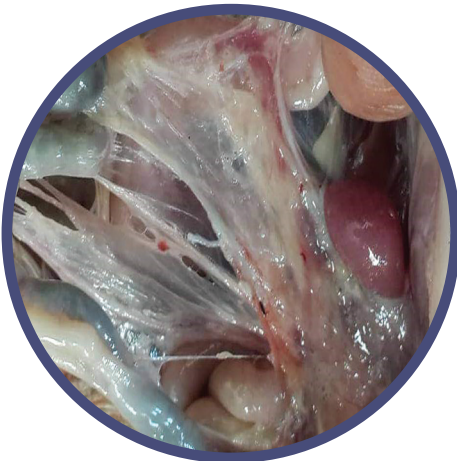
The yolk sac of broiler chicks may become infected with *E. coli*. This can originate from faecal contamination of the egg surface post-laying, during incubation or from contact with contaminated environments before the chick's navel has fully healed.

WHAT DO YOU SEE IN FLOCKS SUFFERING FROM COLIBACILLOSIS?

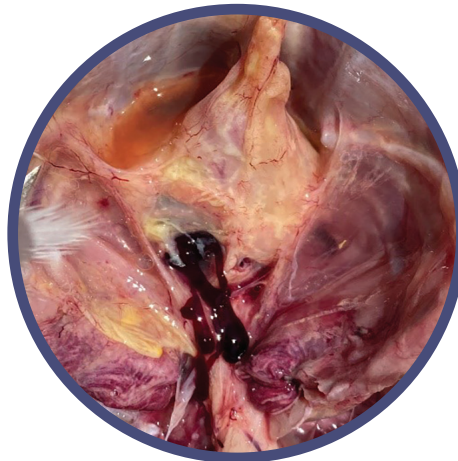
Colibacillosis can have several serious manifestations within broiler production, including:

- Colisepticaemia (airsacculitis, enteritis, meningitis, omphalitis, pericarditis, perihepatitis, peritonitis etc.)
- Increased carcass condemnation rates at processing
- Cellulitis
- Lameness
- Retarded growth
- Increased mortality

Colibacillosis outbreaks on farm often necessitate the use of interventional medication, raising the antibiotic usage levels of the business as well as adding further costs of production.



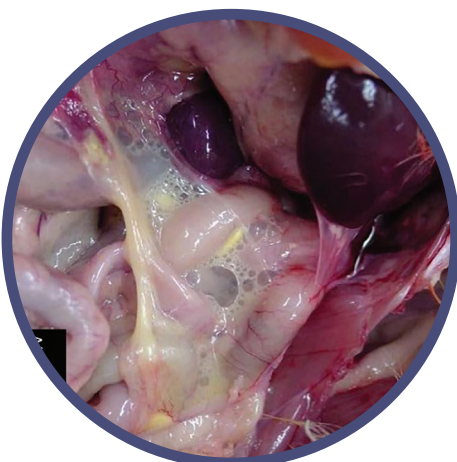
Airsacculitis



Pericarditis



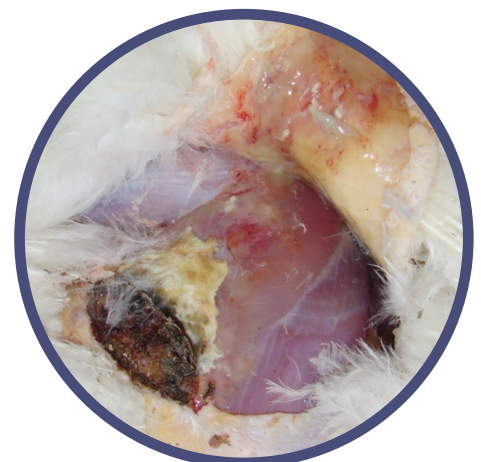
Perihepatitis



Peritonitis*



Omphalitis*



Cellulitis*

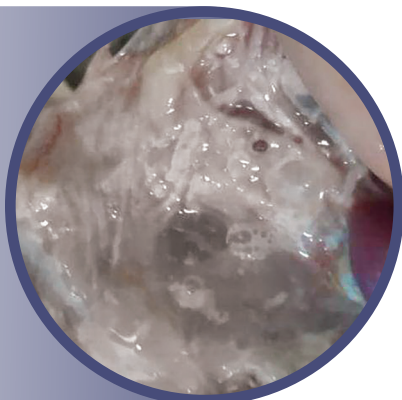
*Images courtesy of NJ VAN BILJON

POST MORTEM LESIONS:

Lesions can vary greatly depending on the stage and severity of infection. Some of the most common colibacillosis lesions include:

Airsacculitis

Resulting from inhalation of dust containing pathogenic *E. coli*.



Omphalitis*

Young broiler chicks with unhealed navels and infected yolk sacs can be seen. This normally creates a peak in mortality at around 5 days of age.



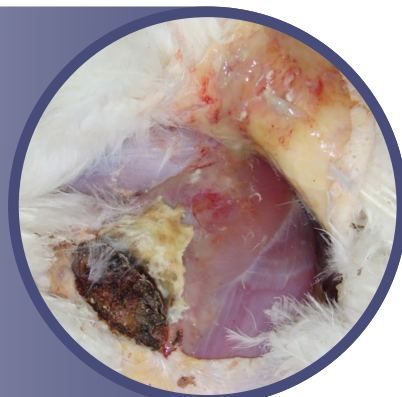
Polyserositis

Following systemic spread, signs including perihepatitis and pericarditis can be seen at post mortem examination



Cellulitis*

Subcutaneous bacterial infection commonly seen on the surface of the breast muscle,



*Images courtesy of NJ VAN BILJON

HOW IS COLIBACILLOSIS DIAGNOSED AND TREATED?

Colibacillosis on broiler farms will largely be diagnosed by the clinical signs seen at post mortem, however a bacterial culture and sensitivity analysis should be performed to rule out other potential bacterial causes of these post mortem signs.

In the case of colibacillosis, bacterial culture should yield a pure culture of *E. coli*. When found, this condition will likely require a course of appropriate antibiotic medication.

PREVENTION AND CONTROL

With current efforts to reduce antibiotic usage on farms; proactive prevention methods are becoming increasingly important.

Control programs primarily include elimination of predisposing factors. As previously mentioned, *E. coli* can frequently cause colibacillosis as a secondary pathogen following another disease process. This highlights the importance of appropriate vaccination and control programs against primary pathogens such as respiratory viruses, IBD and coccidiosis.

E. coli is susceptible to disinfectants, therefore good hygiene management both on farm and at the hatchery is imperative.

Breeder flocks should be optimally managed to reduce the potential for colibacillosis infections in young chicks. Live, autogenous and inactivated *E. coli* vaccines are available to help control disease at this level of production. Autogenous vaccines can be prepared using isolates of strains found on the farm to increase protection against a specific strain, whilst a live vaccine can give broader protection against several *E. coli* serotypes.

The variety of *E. coli* strains and variability of virulence genes means broad protection is often necessary in field conditions and this should be considered when designing an appropriate vaccination program with your veterinary surgeon.

A live, attenuated vaccine is also available for use on broiler chicks, which has been shown in field studies to reduce condemnations, mortality levels and antibiotic usage whilst improving weight gain and FCR. The vaccine is administered as a coarse spray or through drinking water. Onset of immunity is 14 days after vaccination, with proven duration of immunity of 12 weeks. It can be used from day-old and has no withdrawal period.

TALK TO YOUR VETERINARY SURGEON ABOUT VACCINATION AND ELIMINATION OPTIONS



Reference: 1. Nolan LK, Barnes HJ *et al.* Colibacillosis. In: Swayne DE , ed. Diseases of Poultry. 13th Edition. India: Wiley-Blackwell; 2013 751.

Poulvac® E. coli contains Live aroA gene deleted Escherichia coli, type 078, strain EC34195 **POM-V** For further information please contact Zoetis UK Limited, First Floor, Birchwood Building, Springfield Drive, Leatherhead KT22 7LP. www.zoetis.co.uk Customer Support: 0845 300 8034.
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