

CAMPYLOBACTER

INTERVENTIONS ON THE FARM

Bacteria found in the intestines of poultry
Birds usually show no signs of illness
Contaminated poultry products can cause human illness

800,000 human illnesses each year in the U.S.

Interventions on the farm and at the processing plant can reduce bacteria numbers

There is no single solution or remedy to prevent *Campylobacter* from contaminating poultry products. Multiple interventions on both the production side and on the processing side are needed, in combination, to reduce the level of contamination on the final poultry carcass products.

ON THE FARM



RISK · ACTION · REDUCE

Personnel and equipment can spread bacteria on the farm	<i>Campylobacter</i> in the intestines spreads via feces	<i>Campylobacter</i> in poultry feces can survive in the environment	Insects or animals can spread bacteria on the farm	Bacteria in the intestine can contaminate the product during processing
Strict Biosecurity	Probiotic Use	Litter Management	Vector Control	Feed and Water
<p>Minimize traffic and visitors onto the farm</p> <p>Wear clean clothing and footwear when working with the birds</p> <p>Wash and sanitize hands before and after contact with the birds</p> <p>Disinfect all equipment and vehicles before using at other buildings or farms</p>	<p>Promoting the growth of “good” bacteria can outcompete “bad” bacteria, such as <i>Campylobacter</i>, for space in the gut</p>	<p>Reduce litter pH and moisture</p> <p>Use a combination of aluminum sulfate and sodium bisulfate and magnesium sulfate</p>	<p>Increased <i>Campylobacter</i> in the summer has been linked to increased populations of vectors</p> <p>Reduce/eliminate insects, rodents and wild birds from poultry housing areas</p>	<p>Feed Withdrawal Target 10-12 hours prior to the birds being put on the processing line</p> <p>Water Acidification Water treatment can reduce bacteria in the bird’s intestines and improves the effect of chlorination</p>

REDUCE THE NUMBERS · REDUCE ILLNESS · WE ALL PLAY A PART

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OVERVIEW

Major sources of *Campylobacter* infection on the farm include:

- Hands, clothing or footwear of persons on the farm, including both workers and visitors
- Old litter which contains the microorganism
- Equipment and transport vehicles which are contaminated from infected birds and feces
- Rodents, insects, wildlife species, domestic pets or livestock (e.g., cattle) can serve as disease vectors

Interestingly, feed and water are not major contributors to the initial introduction of *Campylobacter*; however, these sources can contribute to the spread of the microorganism among individual birds within infected flocks.

BIOSECURITY

Suggested biosecurity practices that can have direct impact on *Campylobacter* prevalence in poultry include:

- Ensure all personnel **wash and sanitize hands** often and use **dedicated footwear** and clothing for each poultry barn.
- Ensure the service room is clean and **sanitized** frequently and footbaths are properly maintained.
- Monitor and **control traffic** onto the farm and minimize visitors on the farm.
- Control disease vectors, such as **flies** (especially in the summer time), **rodents, wild birds, or other wildlife**, as well as **domestic animals** (e.g., livestock or pets) to avoid fecal contamination or spread to poultry.
- Avoid moving **equipment** from house to house or farm to farm unless it is thoroughly cleaned and disinfected. These items can easily spread *Campylobacter* to other locations.

Improved biosecurity can produce a measurable reduction of *Campylobacter* prevalence and numbers in poultry.

WATER TREATMENT

Water acidification through the use of organic acids (e.g., **formic acid, acetic acid, lactic acid, propionic acid**) can reduce bacterial counts and colonization, further reducing the transmission of *Campylobacter* between infected and susceptible birds. Water acidification can also increase the efficacy of water chlorination and further reduce *Campylobacter* prevalence and transmission.

COMPETITIVE EXCLUSION

Competitive exclusion functions to supply the intestine with large numbers of beneficial bacteria that can outcompete pathogens, such as *Campylobacter*, for space in the gut. In poultry, competitive exclusion products have shown variable results for reducing *Campylobacter* in the intestines of poultry. There are two kinds of competitive exclusion (probiotic) products:

1. **Complex probiotic products** include diverse species of beneficial bacteria. Products like Broilact® (Nimrod Veterinary Products Ltd., Upper Rissington, U.K) use a preparation of freeze-dried

bacteria collected from the intestine of a normal adult fowl. Products like PoultryStar® (Biomim, Herzogenburg, Austria), contain multiple probiotic species, such as, *Enterococcus faecium*, *Pediococcus acidilactici*, *Bifidobacterium animalis*, *Lactobacillus salivarius*, and *Lactobacillus reuteri*;

2. The other type of product is **defined single microorganism competitive exclusion products**. As its name suggests it contains a single species of beneficial bacteria.

Complex products tend to affect *Campylobacter* prevalence and bacterial load more than single microorganism products. Still there is inconsistency in probiotics results in general.

LITTER MANAGEMENT

Litter acidification and moisture reduction helps to reduce the bacterial count of *Campylobacter* on the farm. Two commercially available chemicals commonly used for litter acidification are **aluminum sulfate** and **sodium bisulfate**. Combining these two chemicals with **magnesium sulfate** has been shown to be effective in reducing litter pH and litter moisture (~50%). This 3-product combination has been found to be highly effective in preventing chickens from becoming colonized by natural *Campylobacter* exposure for up to 6 weeks. Proper ventilation, especially during the winter, will lead to less foot pad issues, better gain, and a decrease in *Campylobacter* positive flocks.

FEED WITHDRAWAL

The goal of feed withdrawal is to supply the processing plant with birds that have an empty intestinal tract by the time they are on the evisceration shackles. This process helps to reduce the amount of feces in the intestines, and can reduce the degree of intestine breakage during the evisceration process. Both of these measures lead to reduced fecal contamination of the poultry carcass.

The timing of this feed withdrawal period is the critical part of this process. The target is 10-12 hours from the time of feed withdrawal until the birds hang on the evisceration shackles. Catching, loading, transportation and holding time in the processing plant shed should be accounted for when planning the withdrawal timing.

Feed withdrawal coupled with water acidification and proper chlorination can be a powerful tool to reduce *Campylobacter* load in the intestine, particularly in the crop.

VACCINATION

Currently there are no commercial vaccines available for control of *Campylobacter* in poultry. Research on inactivated or live modified vaccines have had **limited to no success** in controlling *Campylobacter*. However, very recently, vaccines using new technology to prevent colonization by *Campylobacter* have shown **some promise** and maybe be a potential approach in the **near future**. It has also been found that probiotics and vaccination together can work synergistically to reduce *Campylobacter* colonization in broilers.