

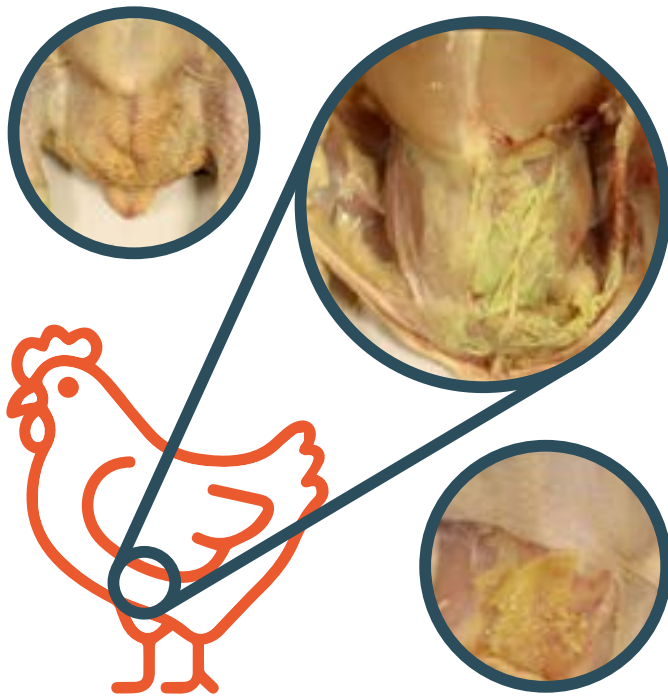


Tackling cellulitis in broilers



Whitepaper
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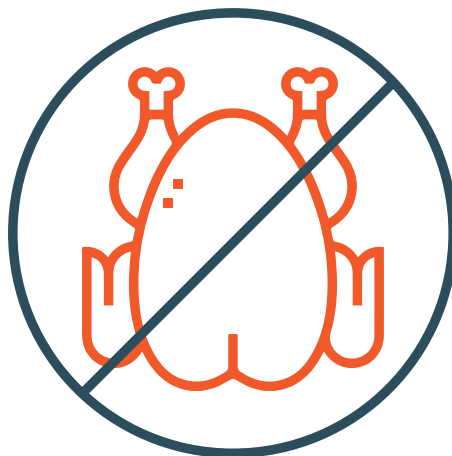


Cellulitis is a condition that every broiler farmer is familiar with. It starts during the growing period, resulting in discolouration and thickening of the skin and inflammation of the subcutaneous tissues. But the condition doesn't become apparent until the carcass is scalded and plucked. It is both unsightly and a health risk and carcasses showing signs are condemned at the processing factory.

Since 2010, the number of cellulitis rejects has increased nearly threefold, according to Food Standards Agency data. Even though cellulitis accounts for the condemnation of millions of birds every year, it is often accepted as an unavoidable side effect of intense poultry production. However, given that it is the single major cause of rejection at the factory, it is worthwhile exploring ways to limit cellulitis.

Expected carcass rejections at factory per crop

When a crop is seriously affected by cellulitis, it can have a significant financial impact on a farm's bottom line. As incidence has been rising incrementally for some time, it makes sense to start looking at ways to limit it wherever possible.



Average:

0.3-1.2%

Significant issue:

2%

Extreme issue:

10%

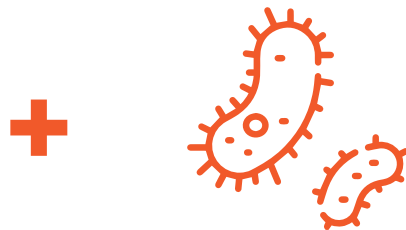
What causes cellulitis?

Cellulitis can be caused by a number of bacteria, but the main culprit is the opportunistic *E. coli* pathogen which lives in the bird's gut. *E. coli* spreads through faeces in the litter and enters the skin through scratches or lesions. Skin trauma caused by birds scratching each other in competition for food, or because they are stressed, provides a direct pathway for bacteria to enter the body.

Six to eight hours after the bacteria has entered the wound, birds will develop subcutaneous oedema, followed by a plaque build-up. Normally the areas most affected are the abdomen, thighs and around the cloaca. It therefore makes sense to look at ways of preventing these scratches occurring in the first place.



Scratch wound



Bacterial challenge



Cellulitis

Maintaining good husbandry habits

The broad tenets of good shed management will help to keep cellulitis at bay. Overcrowding causes stress which leads to scratching and should be avoided where possible – this includes ensuring good access to food and water to prevent competition and fighting over feeders and drinker lines. Shed walking routines can also be performed in a way that limits stress placed on a flock – rather than

walking through the middle of the shed, causing panic amongst the birds, start on the perimeter and gradually walk circuits inwards to the middle of the shed. Similarly, the good practice of keeping litter as dry as possible will prevent the bird's skin becoming soft and more susceptible to wounding. Wet litter also harbours bacteria which can directly enter a wound via the claws of a bird.



Good feather coverage prevents skin damage

As with many poultry conditions, a healthy gut biome plays a large part in limiting cellulitis. A compromised gut function will lead to birds shedding increased amounts of bacteria through their droppings, and the environmental burden rises sharply, increasing the likelihood of cellulitis infection. However, what we'd like to focus on in this piece is the crucial role of feather coverage in preventing skin damage to birds, and how nutrition might be used to boost the development of feathers in young birds.

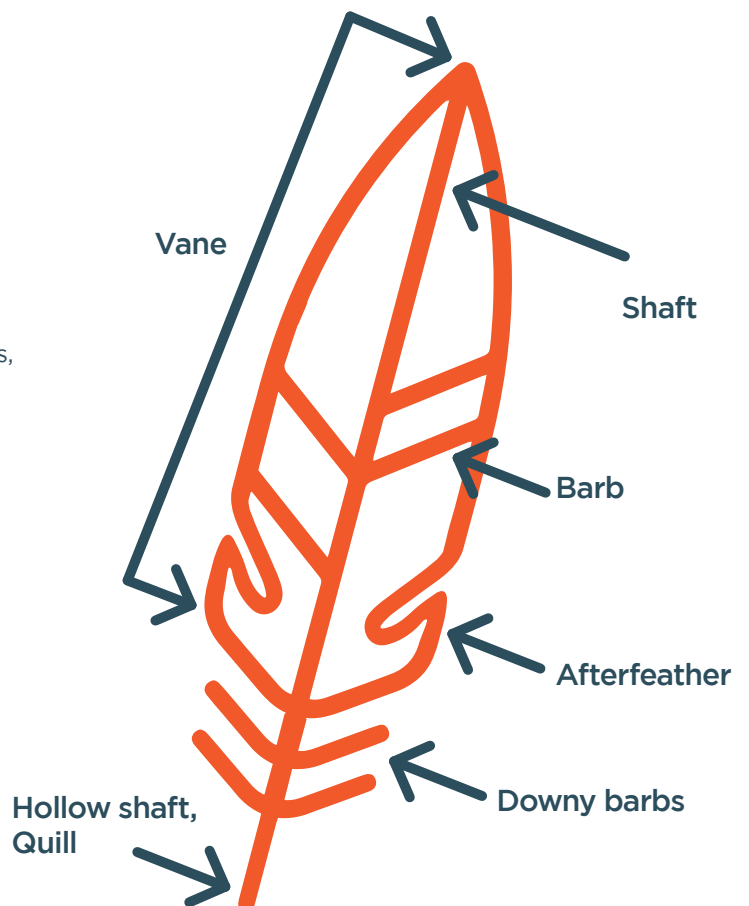
Recent phases of the genetic development of broilers have possibly resulted in feather development becoming slower, particularly in strains such as the Ross 308 that are slow to feather anyway. It is not uncommon for a male Ross 308 to be only lightly feathered at 20 days – this is not affording the bird much protection against scratches or broken skin.



We believe this late feathering could well be one of the reasons why there has been an increase in the incidence of cellulitis. By focusing on maximising nutrition that can help feather development, we could ensure that birds are better equipped to withstand the odd scratch, thereby reducing the risk of cellulitis. While there are some environmental factors that play a role in feathering status, improper nutrition is the main cause of poor feather quality.

What are feathers and how are they made?

Even though feathers only account for 3% to 5% of a bird's bodyweight, they cover 75% of the body surface. Feathers play a vital role in keeping a bird warm and protecting the delicate layer of skin underneath from injury. Feathers are composed of 89-97% keratin proteins, that are cross-linked with disulfide bonds, making them very strong. Feathers also have high amounts of sulfur amino acids. They are a very complex part of the bird – development of the feathers and the feather follicles starts during the first few days of embryonic growth.



+ Nutrition is essential for healthy feather development

Nutrition plays a critical role in feather development. A bird's dietary protein and amino acids (AA) requirements are very high during feather synthesis, especially for sulphur-based AA and arginine. Trace minerals and key vitamins also play a key role. Therefore, unintentional restricted feed intake associated with high density stocking can negatively affect feather development in young broilers.

+ Key trace minerals

Among trace minerals, zinc, manganese and selenium are all responsible for the enzymatic process of feather development, particularly zinc. Deficiencies in minerals such as zinc can result in delayed feather development, frayed feathers and blisters on the shafts. Zinc (Zn) and copper (Cu) are two trace elements involved in feather development, and the main dietary source of these is normally via a liquid supplement. Normally, the recommendation of dietary Zn and Cu in breeder diets is around 100 mg/kg and 10 to 15 mg/kg, respectively. It has also been reported that dietary Zn deficiency can cause feather pecking and cannibalism.

+ Essential amino acids

Low dietary crude protein intake can negatively affect feather quality in broilers, particularly in the juvenile phase. Sulfur-containing amino acids, such as methionine, arginine and valine, are particularly valuable for the synthesis of feather keratin. While some of these amino acids are produced by various tissues in the body, others must be supplemented by diet.

+ Important vitamins

Vitamins such as pyridoxin (B6), pantothenic acid (B5), biotin, and PP are also important vitamins for feather development. Deficiencies of these vitamins will not only impact feather development, but growth performance as well, because they are important for nutrient metabolism. More specifically, deficiencies of vitamins B5 and PP can lead to slower feather development and swollen tip of down feathers.

Preventing cellulitis warrants further investigation

Cellulitis has been accepted as an unavoidable problem for many years whilst the industry has focused on overall bird health and weight gain. However, now could be the time to address the issue and work towards preventing it happening in the first place. We can never completely eradicate E.coli, but we can work to prevent it entering the body through scratches, and good feather coverage is key to that.

Given that cellulitis is on the rise, we think it is a key area for proper investigation – one which would help avoid unnecessary financial losses at the very end of a crop cycle. At the moment, we are speaking to farms and nutritionists and investigating formulas that could be used to supplement the diets of birds that are slow to develop feathering in order to combat an increase in incidences of cellulitis.

If you've experienced a recent spike in cellulitis, we'd be interested to hear from you.

