

A Picture Guide of Turkey Feed Withdrawal

It is important that turkeys arrive at the processing plant with digestive tracts that are empty, reducing the chances that the carcasses will be contaminated during processing. A carcass can be contaminated while hanging on the processing line if food leaks out of the crop through the mouth; feces are excreted from the vent; or material in the digestive tract is released by nicking or cutting the intestine during processing. Any of these contaminants may contain bacteria that will adhere to the carcass. Proper feed withdrawal produces an empty gut that can be processed efficiently without contaminating the body cavity or surface of the carcass.

Two windows of opportunity exist to successfully process turkeys. Between these windows, is a “wall” where potential for contamination is increased and line speeds may need to be reduced. The first window occurs at eight to 12 hours after a bird stops eating. At this time, the gut is almost completely empty but still strong and unlikely to break during processing. Any individual bird that is without feed or “off-fed” for 15 to 16 hours poses a potential problem at the plant. The intestine is weakened by the extended hours off-feed and filled with gas and released intestinal lining. In turkeys, the amount of liquid material in the gut at this time is greatly increased if the birds have been allowed to drink excess water prior to shipping. With proper water management, the intestinal contents of turkeys will be relatively dry and it may be possible to successfully process birds between the windows. The second window normally starts at 18 hours off-feed. By this time, the bird has flushed out the released intestinal lining and has started to produce new villi. A bird processed in this second window of opportunity will have a weaker intestine than a bird processed in the first window, but the intestine will contain very little material that could contaminate the carcass if the intestine is damaged during processing.

A thorough discussion of turkey feed withdrawal and water management can be found in Dr. Stan Savage’s factsheet, “Feed Withdrawal: Designing a Feed and Water Withdrawal Program for Turkeys.” This web page supplements that factsheet by providing pictures from a workshop conducted by Dr. Savage at the University of Manitoba.

Examination of Digestive Tracts of Birds at Different Stages of Feed Withdrawal

A turkey’s digestive tract will undergo a fairly typical pattern of change as time off-feed progresses. By knowing the signs of how the digestive tract changes, it is possible to examine viscera on the processing line and estimate how long individual birds have been off-feed. Careful observation also provides signs of improper feed and water withdrawal. Some of the signs to watch for are outlined below.

Zero Hours of Feed Withdrawal

Feed and digesta are found in the crop, stomach (proventriculus), gizzard and intestine. If the bird has recently eaten pelleted feed, pellets may be found in the crop. Because it is full of digesta, the intestine is round and tubular and will remain round as long as it is prepared to accept new feed. Some isolated areas of the intestine will not contain digesta due to the peristaltic muscle movements which move feed through the intestine in “waves.” As long as feed is passing through the gut, the ceca dump their contents on a regular basis and will be relatively small compared to later stages of feed withdrawal.



Feed in intestine



Pellets in crop.



Feed in gizzard.



Rounded intestine.



Intact intestinal lining.

Eight to Twelve Hours of Feed Withdrawal

Normally, the crop is empty and has passed its contents into the gizzard and the rest of the intestinal tract. The gizzard will usually still contain feed and perhaps feathers and litter. The gizzard has tightened and wrung much of the moisture out of this material. The duodenum (loop of intestine immediately after the gizzard) is sloughing intestinal lining. The rest of the intestinal lining is intact and very little of it will release when lightly scraped with scissors. Cutting open the intestine at mid-gut (at Meckel's diverticulum or the yolk stalk remnant) will reveal villi in good condition. If a finger is placed under the intestine and scissors are used to scrape the exposed villi on that section of intestine, a rough surface similar to a cat's tongue can be felt. The intestine is almost completely empty of feed and has a more flattened, less rounded appearance.



Firm, dry material in gizzard.



Wet, sloughed lining in duodenum



Flattened intestine.



Closer view of flattened intestine.

Between Windows

Enough broken down intestinal lining has accumulated in the duodenum to trigger the gall bladder to release bile. Reverse peristalsis, the backward movement of material which regularly occurs in turkey digestive tracts, carries the bile from the intestine into the gizzard. Some of this bile may then run back into the crop during processing. Green bile staining of the gizzard is a good indicator that a bird has been off-feed for 13 hours or longer. Some gizzards are empty.



Green, bile stain material in gizzard

The intestine is almost entirely rounded as it fills with gas and gas may bubble out if the intestine is nicked. The entire gut lining is broken down and sloughed lining is found in much of the intestine. Excess water consumption prior to shipping can greatly increase the volume of watery material in the gut. If a bird empties its ceca, the cecal contents will mix with the watery material and significant quantities of wet this mixture may leak out of the vent during processing. Almost nothing is felt when performing the “cat’s tongue” scratch test to detect villi. The gizzards are becoming more difficult to peel.



Stained gizzard – almost empty.



Bile backup into crop (greenish liquid seen at tip of scissors).



Sloughed material in intestine



Scissors easily scrape off intestinal lining.



Rounded intestines



Gas bubbling out of nicked intestine.

Eighteen Hours of Feed Withdrawal (Start of Second Window)

The broken down intestinal lining has passed out of the bird and the intestinal villi are starting to rebuild. The villi can be detected with the “cat’s tongue” scratch test and little material scrapes off when scissors are run over the exposed intestinal lining. The intestine is now flattened again and little gas production is visible. Green staining of gizzard is still visible in many birds and gizzard continue to be difficult to peel. Contamination is lower than “between the windows” because the intestines are now empty and should be relatively dry instead of being filled with gas and sloughed intestinal lining. Cecal contamination can still be a problem if a bird drank excess water prior to shipping. If the bird does not eat feed in the next few hours, the intestine will start to slough again.



Rejuvenated intestinal lining.

Summary

Proper feed and water withdrawal will reduce carcass contamination in turkeys. By understanding how the digestive tract reacts to time off-feed, you can better judge how to withdraw feed from your birds. The goal should be to process as many birds as possible after they have passed most of their feed, but before the intestinal lining has started to slough. In turkeys, preventing excessive water consumption prior to shipping is especially important. Flocks handled in this manner will process more easily, with less contamination, and increased edible meat delivered to the plant.

Acknowledgements

The information on this web page is based on the Turkey Feed Withdrawal Workshop held on April 26, 2001 at the University of Manitoba. The workshop was conducted by Dr. Stan Savage, retired Poultry Extension Specialist at the University of Georgia, and the workshop would not have been possible without his expertise. The workshop was organized by Manitoba Agriculture and Food and the Animal Science Department at the University of Manitoba.

Reference

Stan Savage. 1998. Feed Withdrawal: Designing a feed and water withdrawal program for turkeys. Pfizer Inc.