

WHITE STRIPING

in Broiler Breast Meat

Rebecca Fortner and Anand Mohan
Department of Food Science and Technology
University of Georgia

Contact Dr. Mohan at anandmohan@uga.edu



WHITE STRIPING IN BROILER BREAST MEAT

The white striping that often appears on broiler breast meat has become an area of great concern for the poultry industry. Over the last decade, the industry has invested significant resources into researching the causes of white striping. Why is this an important topic? White striping has the potential to impact the poultry industry on multiple levels, and it does not seem to be a disappearing condition. The following information will discuss the classification of white striping in broiler breast meat as well as its potential causes and implications.

WHAT IS WHITE STRIPING?

White striping is the term used to describe the white striations that appear on broiler breast meat running parallel to muscle fiber, as shown in Figure 1. It appears in varying degrees of severity and can be easily detected.

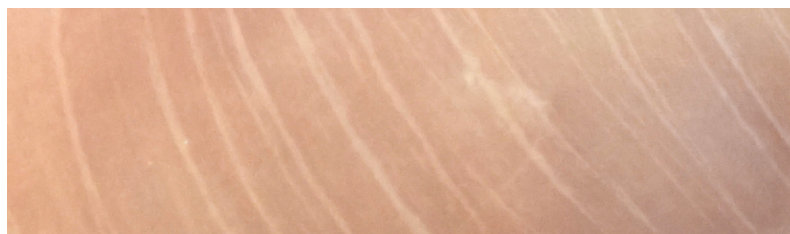


Figure 1. White striping is white striations running parallel to muscle fiber in broiler breast meat.

WHAT LEADS TO WHITE STRIPING?

Research has shown a correlation in high growth rate and body weight of broilers and the occurrence of white striping (V.A. Kuttapan *et al.*, 2013a). As broilers grow larger, there is an increased chance that they will present white striping. In one case study, 35 to 40 percent of broilers weighing 8.5 pounds or higher presented severe white striping, while only 10 to 20 percent of broilers with a body weight around 7 pounds showed severe white striping (Owens, 2016). These studies indicate that raising broilers to a high body weight over a short time can lead to white striping.

DOES WHITE STRIPING AFFECT MEAT QUALITY?

Depending on the severity, white striping can influence both the sensory and the nutritional properties of the meat. Consumers have reported that cooked chicken meat with severe white striping is significantly chewier and tougher than that with low to moderate white striping (V.A Kuttappan *et al.*, 2012). Furthermore, a recent study examining breast meat composition (M. Petracci *et al.*, 2016) found that both collagen and intramuscular fat content increased with the severity of white striping. In fact, broiler breasts with normal white striping (n=36) had an average fat content of $0.78 \pm 0.09\%$, whereas the breasts having severe white striping (n=36) had an intramuscular fat content of $2.53 \pm 0.30\%$. With this increase in fat content, there was a corresponding decrease in total protein of the meat. The normal breasts had a total protein content of $22.9 \pm 0.25\%$, whereas the breasts with severe white striping were composed of $20.90 \pm 0.23\%$ protein.

IS WHITE STRIPING A FOOD SAFETY ISSUE?

While moderate and severe white striping is an undesirable meat quality issue, it does not indicate a safety risk to consumers. Research has shown that white striping is a muscular abnormality that causes lesions that can affect the proximate composition of the meat (V.A. Kuttapan *et al.*, 2013b). This is not associated with any contamination or microbial infection.

IS WHITE STRIPING A CONCERN FOR THE INDUSTRY?

As the industry evolves, it generally develops greater efficiency. This holds true in the market for broiler meat. As illustrated in Figure 2, the average weight of a 56-day-old, conventionally grown commercial broiler has more than quadrupled since 1957 (M.J. Zuidhof *et al.*, 2014). If this trend continues, it is likely that white striping incidence will increase.

The condition is not currently regulated, but consumers are becoming increasingly aware and observant of white striping. These consumers may begin to deem the product inferior in quality and may be inclined to reject it during purchasing at retail. In one study, more than 50 percent of consumers said that they would not be willing to buy product showing either moderate or severe white striping. This suggests that willingness to purchase declines with any presence of white striping, not just severe cases. The same study showed that some consumers associate white striping with toughness and excessive fat (V.A. Kuttappan, *et al.*, 2012). Since other fattier meats have been rejected recently due to consumer health concerns, it is possible that there could be future rejection of the poultry products that are thought to have a higher fat content.

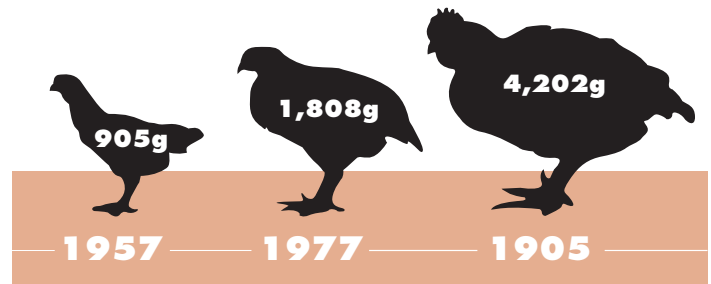


Figure 2. The average body weight of 56-day-old broilers in 1957, 1997, and 2005.

From Zuidhof *et al.*, *Poultry Science* 93: 2974.

HOW IS WHITE STRIPING CATEGORIZED?

Broiler breast meat can generally be separated into three categories in terms of white striping, including normal breast meat, with no or low striping; moderate white striping; and severe white striping. Visual examples and descriptions of each are provided in Figure 3.

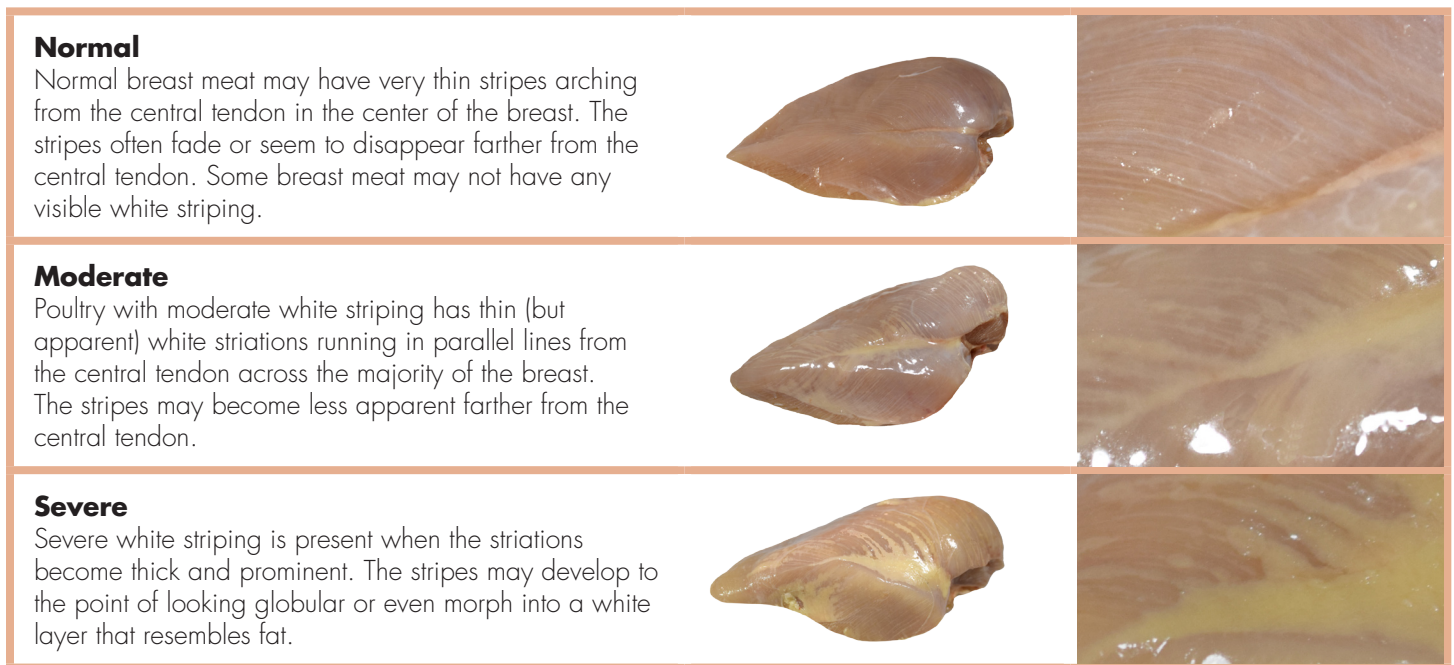


Figure 3. Classification of broiler breast meat according to severity of white striping. From top to bottom: normal breast meat, with magnification of meat from the central tendon; breast meat with moderate white striping from the central tendon; and breast meat with severe white striping from the central tendon.

WHAT DOES THIS MEAN FOR THE FUTURE OF POULTRY?

From the research that has already been conducted, it can be deduced that white striping is of concern to the poultry industry. The condition is more prevalent in frequency and severity as the growth rate of broilers increases. White striping is of particular interest because it has been shown to influence the sensory and nutritional composition of meat, which could lead to consumer rejection. However, white striping is not a cause for food safety concern, and there is not a great immediate risk to the poultry industry. Further research is necessary to find ways to prevent white striping or process the meat for better consumer acceptability.

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