

# SCIENCE & FOOD TECHNOLOGY

## DISCUSSION ACTIVITY:

### DOES YOUR CHICKEN HAVE WHITE STRIPES?



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The chicken breast in this picture has white stripes.

Some of the muscle fibres have died or degenerated.

The muscle has been replaced by fat and connective tissue.



## WHY DOES WHITE STRIPING HAPPEN?

It is a by-product of intensive chicken farming.

Chickens have been selectively bred to grow very fast and to have larger breast muscles. This makes chicken meat cheaper, especially breast meat. It also reduces the amount of feed required to grow chickens.

Why does this cause white striping? One explanation is that the blood supply and other supporting tissue does not grow fast enough to support the growing muscle. The muscle becomes short of oxygen. It degenerates or dies. The muscle fibres are replaced by fatty connective tissue, which we see as white stripes.

## DOES WHITE STRIPING MATTER TO THE CHICKENS?

We don't know. However, we do know that other aspects of intensive production do.

Fast growing chickens can also grow too fast for their joints to develop. They have trouble walking. They can become painfully lame.

They can also grow too fast for the development of their heart and circulatory systems. Even four week-old chickens can suffer heart disease. They become tired easily. They become inactive and behave like "couch potatoes." Death rates are higher than for slower growing chickens kept in the same conditions.

### DISCUSSION POINT 1

Should we buy slower growing chickens for the sake of the chickens, or do we need faster growing chickens to keep down prices and improve feed efficiency?

**Slower growing chickens** stand fairly normally and are less likely to suffer from lameness, heart disease or tiredness.

**Fast growing chickens** (broilers) are top heavy due to large breast muscles. They walk and stand awkwardly, trying to support their large bodies. They are prone to lameness and heart disease.

They get tired easily.

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## DOES WHITE STRIPING MATTER FOR YOUR HEALTH?

Chicken breasts with white striping contain more fat. One study suggested that the fat content of chicken breast almost doubled from 0.78% in unaffected breasts to 1.46% where there was moderate white striping. Severe white striping increased fat levels to 2.53%.

Protein content dropped. Moderate white striping reduced protein levels by 3%. Severe white-striping reduced protein levels by nearly 9%.

## ARE THERE OTHER EFFECTS ON YOUR HEALTH?

Less intensive chickens contain less fat. Studies suggest that slower growing strains contain 12% and 31% less fat than fast growing breeds. Free-range and organic birds contain 8-49% less fat than birds kept indoors all their lives.

The fat composition of less intensive chickens is also healthier. Some studies have shown higher levels of omega-3 in the fat of slower growing chickens and of those kept in free-range or organic systems.

Slower-growing chickens are also less likely to need antibiotic treatment for disease. In the Netherlands, around one in three fast-growing chickens require an antibiotic treatment. For slow-growing birds, the requirement is less than one in ten. For slower growing birds kept with a lot more space the requirement may drop to as low as one in twenty.

Avoiding the use of antibiotics in farming is important for human health. This is because the more we use antibiotics, the more likely it is that dangerous bacteria may become resistant to antibiotics.

## DISCUSSION POINT 2

**List the health issues mentioned. How important do you think they are? Which is the most important?**

## DESIGN A SUPERMARKET SURVEY

You may have taken part in an activity, or watched a PowerPoint, to enable you to identify white striping in chicken breast fillets. If so, please move straight on to Discussion point 4. Otherwise, continue as below.

Try to determine which of these fillets (A-F) have white striping.

Please note the lines can be very thin but they are always the long length of a muscle fibre.

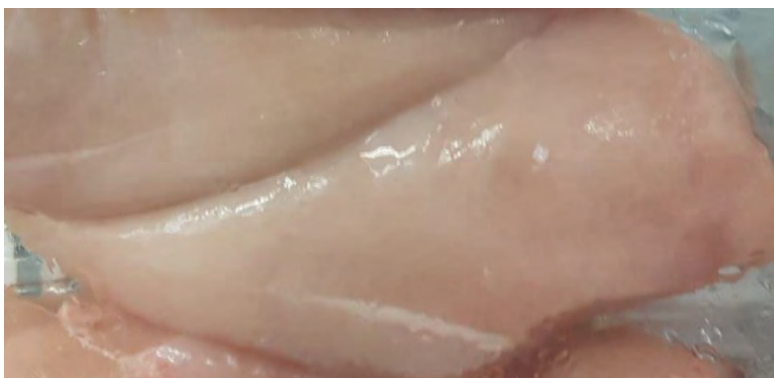
### A. SLICES OF STANDARD BREAST FILLET



### B. STANDARD BREAST FILLET



- C. **STANDARD BREAST FILLETS.** The long straight diagonal thick line along the bottom is normal connective tissue – ignore this.



#### D. ORGANIC BREAST FILLET



**E. STANDARD BREAST FILLET.** Ignore the thick piece of normal white connective tissue across the right-hand side of the picture



#### F. RSPCA-ASSURED FREE-RANGE BREAST FILLET



#### DISCUSSION POINT 4

1. Design a survey to check the level of white striping in breast fillets and whether it varies between standard (intensively reared) chickens vs higher welfare chickens kept to RSPCA-Assured, free-range or organic standards.
2. Carry your survey out, in-store or online, and write it up.

## CAN WE FEED THE WORLD WITHOUT KEEPING CHICKENS INTENSIVELY?

Some people think it is important to use less land to produce food for animals. This means we can produce enough food for everyone to eat. It may also mean that we don't need so much land for agriculture and can leave more for nature. We can do this by keeping animals intensively. If chickens grow faster, their lives are shorter and they use less energy for maintenance. If they are inactive, they use less energy for exercise. Therefore they eat less food and less land is required to produce it. However, some people think this is cruel to chickens and bad for human health.

An alternative is to eat less meat and more plants. This usually requires less land since energy is lost at every stage of a food chain. The animals use some of the energy in the plants and only turn some of it into meat.

### DISCUSSION POINT 5

**Do you think it matters whether we use less land to produce food? If you think it does, should we keep animals more intensively or eat less meat? Are there other solutions?**

## HOW DO I KNOW WHAT KIND OF CHICKEN I AM BUYING?

Intensively produced chicken doesn't have to be labelled. Perhaps it should be.

Higher welfare chicken, which is often slower growing, usually has one or more of the following labels:

- **RSPCA-Assured or Red Tractor Enhanced Welfare chicken** comes from slower-growing, healthier birds. They may be kept indoors or free range, but in either case they have extra space in the shed. They are provided with perches, bales of straw and natural light to encourage natural behaviour.
- **Free-range chickens** live in sheds where they have extra space. At around 28 days old, they are allowed outside into a field during the day. They live for a minimum of 56 days before being sent to slaughter. RSPCA Assured free-range chickens are always slower growing breeds. Other free-range birds may be fast-growing breeds, but they may grow more slowly due to the feed they are given.
- **Organic chickens** are usually slower growing, healthier birds. They usually live for at least 70 days. They have even more space in the sheds (there is an exception if they are kept in smaller more natural groups). They are allowed outside into a field for the last third of their lives. Soil Association organic birds are allowed out for the last two-thirds of their lives. Organic chickens are also fed organic food which has been grown without synthetic fertilisers and pesticides.

If the chicken doesn't have one of these labels it is likely to be **standard intensive chicken**. These animals will be fast growing and kept in more crowded environments. If they have a standard **Red Tractor** label, they will have been given perches, bales of straw and natural light.

### DISCUSSION POINT 6

**Should shoppers try to pay extra for higher welfare chicken? If so, which kind is the best? Should the government change the law?**

**EXTENSION ACTIVITY:** Make a list of the different kinds of chicken you can buy and put them in order of preference.

## SELECTIVE BREEDING

This is an archive picture from the late 1990s. It shows the selective breeding of meat chicken compared with that of a young hen bred to lay eggs.

Today, fast-growing meat chickens now reach their slaughter weight in around 5 weeks.

What differences do you notice? How do you explain them?

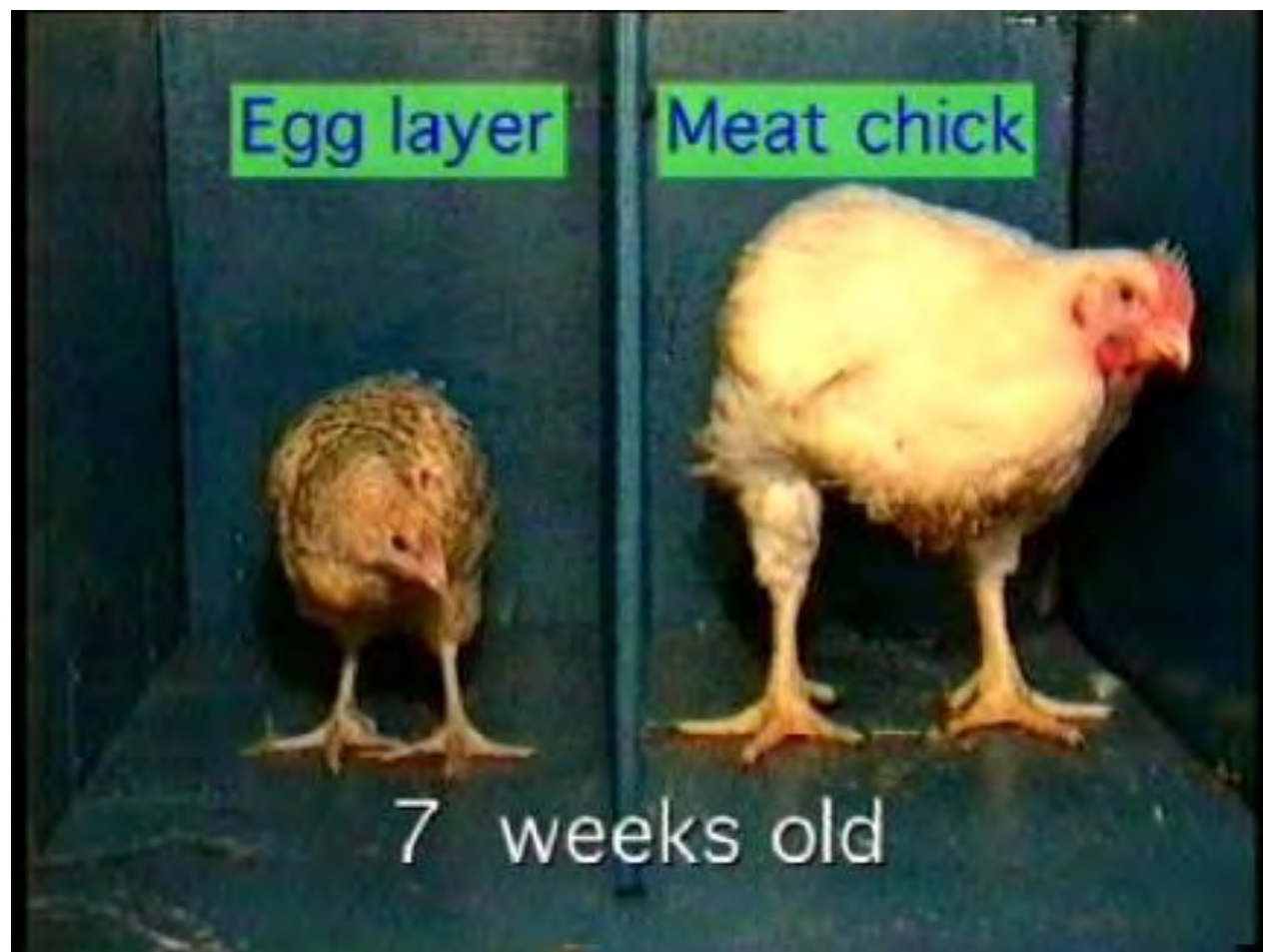


Photo ©ASAB.

Egg laying hens have been bred to lay lots of eggs. Meat chickens have been bred to grow fast and large. Chickens are also being bred to walk better and to be healthier.

### DISCUSSION POINT 7

How do you think breeders have managed to breed chickens to grow faster? How could they breed them to be healthier?

## SOME STATEMENTS OF OPINION

1. We should rear slower growing chickens for the sake of our health
2. Intensive chicken is necessary to feed the world
3. It is cruel to breed chickens to grow so fast
4. The government should subsidise higher welfare chicken so that everyone can afford it
5. We should eat less meat for the sake of animals, the environment and our health
6. People should be able to choose which kinds of chicken they eat
7. Intensive chicken farming should be banned
8. You can't expect everyone to pay more for their chicken
9. The best answer is to go vegetarian or vegan
10. We shouldn't breed chickens which are likely to need antibiotic treatment for disease

### DISCUSSION POINT 8

**Decide which of the statements above you agree with.**

**Are there any other statements you would like to add?**

**Now, give yourself 100 points and distribute them amongst the points you agree with according to how important they are to you.**

## RESEARCH OPPORTUNITIES

1. Design a survey to find out how common white striping is in chicken breast fillets on sale in the shops. Test the hypothesis that it is more common in standard intensive chicken versus higher welfare chicken breast fillets.
2. Carry out internet research to find out whether images of chicken breast fillets on sale in supermarkets have white striping. Is it different for higher welfare fillets such as RSPCA, free-range or organic? NB You may also find white striping mini breast fillets and slices of chicken breast, but you won't find it in other parts of the chicken such as thighs, wings and drumsticks. You won't be able to see white striping if the fillet still has the skin on.
3. Carry out research into chicken "myopathies" such as white striping, woody breast and spaghetti meat. What are the causes of these problems and how can they be addressed?
4. Carry out research into different ways of farming chickens and make the case either for or against intensive chicken farming.
5. Carry out the same research but make a balanced case which outlines the advantages and disadvantages and allows the reader to make up their own mind.