

Measuring the pH Value of Meat

The pH value of meat provides evidence as to:

1. How long it will keep
2. Technical processing characteristics

The flesh of animals prior to slaughter has a pH value of 7.1. After slaughtering, some of the glycogen in the meat turns into lactic acid. As a result, the pH value is lowered. The increasing acidity of the maturing carcass varies in its speed, depending on a number of factors such as type of animal, breed, rearing characteristics and treatment of the animal prior to slaughter.

Beef normally reaches its lowest pH value of 5.4 to 5.7 at 18-24 hours after slaughter. After the lowest pH level is reached, the pH starts to rise again slowly but steadily. By the time it reaches pH of 6.5, it is starting to decompose. Pork already reaches its lowest pH value of 5.4 to 5.8 at 6-10 hours after slaughter.

A high percentage of meat (especially pork, but also beef) does not follow the normal pH value curve after slaughter. This is mainly PSE (Pale Soft Exudative) and DFD (Dark Firm Dry) meat. With PSE meat, a weak watery pale pork, the lowest pH value of about 5.8 is reached within one hour of slaughter.

This meat normally has poor water retention characteristics. Its use in the preparation of boiled sausages is therefore restricted. During boiling or roasting it loses its juices and becomes tough. For this reason many wholesalers and kitchens decline to buy PSE meat.

DFD meat, another meat whose characteristics vary from the normal, can lead to losses if it is incorrectly used for processing. This meat has first class water retention properties. The glycogen degradation in this meat is delayed or shortened. It reaches a lowest pH value of about 6.2 to 6.5.

This meat is prone to decomposition from micro-organisms, and so is unsuitable for preparation of sausages from uncooked meat, for vacuum packaging of fresh meat, or for maturing. It is, however, ideal for the production of boiled sausages due to its water retention characteristics.

Where can the pH measurement of meat be used profitably?

1. When choosing meat for making boiled sausages

Ideal pH value of meat to start with is 5.8 to 6.3. The meat with higher pH has the better water retention properties. The weight loss during smoking and drying is lower when using high water retention meat. The consistency, appearance and "bite" of the sausage are decidedly better.

2. Choosing material for fresh (uncooked) sausage proportion

Ideal pH value of the meat to start with is 5.4 to 5.8. Only meat with a low pH value is suitable for fresh sausage manufacture. The use of unsuitable meat results in, more often than not, "incomprehensible" failures.

Meat with a low pH value avoids the development of binding similar to that in boiled sausages which arises when shredding at near to 0°C. Such binding has a negative influence on filling and dry processing. It often leads to dry edges, which causes changes in acidity leading to poor smell and taste.

In addition, a low pH discourages the development of undesirable micro-organisms. As a result of this, the desirable lacto-bacteria and microbes have a chance to develop, which improves the taste and keeping characteristics. A low pH value of the meat to start with also aids drying in the first hours after

filling.

3. Choice of material for uncooked ham

Ideal pH value of the ham is 5.8 to 6.3.

4. Choice of material for uncooked ham

Ideal pH value of the ham is 5.3 to 5.9. The tiresome problem of the glutinous-cutter is entirely solved by choosing hams according to their pH value. The maturation, drying and aroma building in the raw ham follows normal lines only when the pH value of the ham is below 5.9. This avoids the onset of failures assuming correct processing procedures.

5. Further important uses

Control of the conditioning room (literally Climate Room) according to the pH value of the uncooked sausage (in this way ideal drying conditions are achieved).

Specifying the pH value of the carcass at 1 hour after slaughter (PSE and DFE can be accurately identified).

Specifying the pH value of meat for vacuum packing while maturing (the meat must have a pH of below 5.9 if it is to keep).

Testing the suitability of meat and meat products for sale, or whether it is spoiling (the pH value confirms impressions gained by the senses).

Testing whether Brine (pickle) has gone off (a change to alkaline values indicates spoiling).

For pH tests on solid meat, we suggest using the [pHTestr10BNC](#) / [pH Spear](#) pocket testers or [EcoScan pH5/6](#) handheld meter in conjunction with a spear tip pH electrode.

In both cases always calibrate the pHTestr10 BNC tester before taking measurements on the sample and always dispose of the sample after testing. Never return the meat sample for processing after testing. The electrode contaminates the meat, because the electrode bulb is made of delicate glass that can break easily and the electrode can leak reference electrolytes into the meat. The electrode is also a great home for contaminating fungi, bacteria and viruses which can produce health hazards.