Eating quality of pork: The interaction between meat quality and cooking

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It is well known that the quality of the raw meat can have an influence on the eating quality of cooked meat. Fat marbling, pH and connective tissue are only some of the raw meat characteristics, which are known to have an impact on the resulting eating quality. The cooking procedure is also known to influence the eating quality. Cooking on a pan or in an oven gives very different results but also the endpoint temperature has an effect on the resulting eating quality.

But is there an interaction between the raw meat quality and the cooking procedure in regard to eating quality in that some raw meat qualities are better suited for some cooking procedures compared to others? For instance, a higher level of fat marbling could make meat more robust against a rougher cooking, like a higher endpoint temperature, or a muscle high in connective tissue, could be more suitable for a cooking procedure with a low oven temperature.

With the aim of giving recommendations of combinations of cooking procedure and raw meat quality we investigated this interaction. In an initial experiment we looked at two muscles - the loin (m. longissimus dorsi, LD) and a ham muscle (m. biceps femoris, BF) - and two weight classes - heavy (warm carcass weight > 90 kg) and light (warm carcass weight < 65 kg). This was cooked in five ways - as minced meat prepared as crepinettes on a pan, as slices prepared as steaks, as whole roast prepared in a pot, as whole roast prepared in an oven at 190°C oven temperature or as whole roast prepared in oven at 80°C oven temperature. The results showed a great variation in eating quality. The main difference was between cooking on a pan and cooking in an oven or pot, and between muscles. An interaction between cooking procedure and raw meat quality was seen both in texture and flavour.

In the next experiment we studied the same two muscles but this time they were from average slaughter pigs taken randomly at an abattoir. The meat was cooked on a pan as steaks and in oven as a whole roast at 90°C oven temperature to three end point temperatures: 65°C, 75°C and 80°C. The results showed that the development in eating quality at increasing end point temperatures depended on muscle as well as cooking procedure.

In a final experiment the focus was on the cooking loss as affected by raw meat quality and cooking procedure. Ten raw meat qualities were chosen differing in genetic background, production background, carcass weight, and technological quality like pH. The loin (LD) and the ham muscle (BF) were cooked as steaks on a pan, as whole roast in oven at 190°C oven temperature and at 90°C oven temperature. The cooking loss was calculated at 60°C, 70°C and 80°C end point temperature. At 60°C end point temperature there was a large variation in cooking loss between raw meat qualities and cooking procedures. The difference in cooking loss both between raw meat qualities and cooking procedures decreased with increasing end point temperatures, and at 80°C only a small but significant variation between raw meat qualities was seen. There was no interaction between cooking procedure and raw meat quality at each temperature but the increase in cooking loss was different depending on both raw meat quality and cooking procedure. A further sensory profile of four of the raw meat qualities showed that the correlation between juiciness and cooking loss depended on the raw meat quality.
As a conclusion of this work showed that there is an interaction between the raw meat quality, the cooking procedure and the eating quality. But there is still much work to be done to map the main quality characteristics contributing to this interaction, in order to make it possible to give recommendation of cooking procedures as an effect of raw meat quality.

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