Surface iridescence in fresh and cooked beef

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Results for today; Ideas for tomorrow

As colour is the main factor that determines whether or not meat cuts will be purchased, any deviation from normal may decrease the value of the meat. One problem is the natural occurrence of iridescence, which is a rainbow-like or multi-coloured appearance sometimes found in fresh beef muscles and often in cooked meats.

Consumers may associate iridescent colours with chemical or bacterial contamination of meat products. Green iridescence followed by orange-red has been reported as the most common colour in cooked cured beef, which could explain why consumers confuse iridescence with spoilage.

Studies have determined that iridescence is the result of microstructural diffraction by myofibrils much like the effect of a prism. It is affected by angles of lighting and viewing and is likely to be related to the hydration state of the tissue and this increases as the water-holding capacity decreases. It is more common in cured meat probably because of the higher water content.

An investigation of the factors associated with iridescence in eight different fresh beef muscles, showed that it was observed most frequently in the *Semitendinosus* (ST, eye round of the silverside; 90.6%), the next highest was in the *Semimembranosus* (SM, topside; 34.4%) and it was observed the least frequently in the *Psoas major* (PM, tenderloin; 6.3%; Table 1).

Further examination showed that higher iridescence scores in the ST were associated with younger cattle with large rib eye areas, lighter, redder colour and lower ultimate pH. Surface iridescence had no effect on cooking loss or tenderness assessed by Warner-Bratzler shear force measurements.

Iridescence has been found to be affected by the angle of cutting across the muscle fibres with the greatest incidence occurring when the cut was made perpendicular (90º) to the muscle fibres. It was suggested that the higher incidence in the ST compared with the PM, which was also cut perpendicular was due to the higher average ultimate pH of the PM muscle.

References

Kukowski, A.C., Wulf, D.M., Shanks, B.C., Page, J.K. and Maddock, R.J. (2004). Factors associated with surface iridescence in fresh meat. *Meat Science* 66(4), 889-893.

Swatland, H.J. (1984). Optical characteristics of natural iridescence in cooked meat. *Journal of Food Science,* 49(3), 685-686.

Table 1: Incidence of significant iridescence in beef muscles.

Muscle							
ST	**SM**	**LD**	**GM**	**RF**	**BF**	**TF**	**PM**
90.6%	34.4%	26.6%	20.3%	12.5%	9.4%	7.9%	6.3%

ST – *Semitendinosus,* SM – *Semimembranosus,* LD – *Longissimus dorsi,* GM – *Gluteus medius,* RF – *Rectus femoris ,* BF – *Biceps femoris,* TF – *Tensor fascieae,* PM – *Psoas major*

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