

tips & tools

MEAT STANDARDS AUSTRALIA

MSA03

MSA requirements for handling cattle

How you handle your cattle affects their eating quality

An important element contributing to predictable eating quality performance is the management of cattle on-farm or in the feedlot prior to slaughter. For this reason MSA has produced guidelines to optimise the eating quality potential of the animal.

The long period of care and investment in producing an animal with high eating quality potential is most at risk in the two weeks pre-slaughter and the first few hours post slaughter. The best carcass can be reduced to a low quality, unacceptable product by inappropriate action in this period.

The damage is caused by changes in muscle glycogen (blood sugar) levels. Glycogen is in essence the energy reserve of the muscle. The glycogen level in muscle is increased by feeding (a process taking days) and rapidly reduced by stress (which may only take minutes) or activity in the live animal. At the point of slaughter, the glycogen in muscle is converted to lactic acid that steadily decreases the pH of the muscle.

Mustering and good feed is important

The production of MSA graded product is consequently a partnership between the producer and the abattoir. An abattoir cannot rectify poor cattle handling practices or nutritional problems. Cattle should be mustered as quietly as possible, as it takes at least 4–5 days for the muscle glycogen levels to be restored, once they have been used. For this reason it is recommended that cattle are supplementary-fed good quality feed for at least one month prior to dispatch, to maximise the eating quality potential of the animal.

Key points

Cattle dispatched for slaughter must meet with the following requirements:

- Be continually grazed or fed rations to a level that is adequate for growth for a minimum period of one month prior to dispatch.
- Be handled and mustered quietly to reduce stress.
- Have free access to water until dispatch.
- Have free access to feed until dispatch, other than a minimum period required for preparation through cattle yards.
- Do not consign any cattle of poor temperament or with signs of severe stress.
- Do not consign sick cattle or cattle within a withholding period for any treatment.
- Do not mix cattle from different mobs or pens on the property within two weeks of dispatch.
- Do not dispatch cattle purchased or moved from another property/saleyard within one month of arrival.
- Load cattle quietly, preferably with no use of goads and electric prodders.
- Load cattle at the recommended densities set out in the trucking industry code of practice.

Temperament is also important

Temperament is also an important issue, with work in the United States by Dr Temple Grandin demonstrating that calm cattle show a reduced incidence of dark cutting. Cattle with poor temperament can lose more glycogen during the period leading up to slaughter. These cattle also have the tendency to stir up other cattle in the pen, which can lead to a higher overall incidence in dark cutting and high pH carcasses.

This is the reason for the MSA producer requirement that the cattle handling guidelines on the previous page be observed.

Recommended sound practices however are much broader and deserve inclusion in professional property and herd management.

Other stress factors

Other stress factors including weather should be taken into account with mustering and truck timing adjusted to minimise the animal welfare and eating quality risk, as dramatic changes in temperature (such as a cold snap or heavy rain whilst trucking) can cause undue stress to animals.

Damage is irreversible

In carcasses the pH fall is irreversible and continues post rigor mortis to an ultimate value, generally within 24 hours of slaughter, depending on the conditions. The optimum pH is below 5.71. MSA consumer eating quality tests show lower scores as ultimate pH rises above 5.70.

Where initial animal glycogen levels are very low at slaughter a higher ultimate pH results, which may be accompanied by a dark, undesirable meat colour. This is referred to as dark cutting and is a major industry problem. Dark cutting carcasses tend to be an indicator of stress to the animal pre-slaughter, but can be a result of other factors such as the chilling process and the age of the animal (meat colour gets darker as the animal ages).

Abattoirs have an important role

In addition to ultimate pH, the rate of pH decline (from around 7.10 at slaughter) in relation to muscle temperature, is of critical importance to eating quality. If the temperature fall is rapid and the pH fall slow, carcasses will cold shorten, resulting in extremely tough meat. If the pH fall is rapid and the temperature fall slow, heat shortening results. This also creates slightly tougher and less juicy beef with eating quality problems relating to colour changes, excessive drip loss and lack of improvement with ageing. The ageing damage is a result of the enzymes involved being denatured by low pH/high temperature conditions.

The rate of pH decline is also a function of the size of the carcass and the fat cover over the major primals. There are also abattoir conditions affecting this process, such as the time from knocking to the chiller, the temperature of the

slaughter floor and the chilling environment, including packing density and the cycle itself.

All electrical inputs (including electrical stimulation units, immobilisers and hide puller rigidity probes) have an impact on the rate of pH decline and resultant eating quality, and are thus often varied by MSA licensed processors to optimise this. Processors are required to maintain conditions that meet the MSA 'pH-temperature window' that describes the optimum rate of pH and temperature decline.

For more information

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