

# Good practice can reduce stress and improve eating quality

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FACTSHEET 2

Acute stress can affect the eating quality of meat. Good practices required by conformance and quality management programs help reduce stress and improve eating quality.

## Key points

- The tenderness and juiciness of meat influence consumer satisfaction.
- Meat from animals that have been stressed has been rated by consumers as being tougher, drier and of inferior quality.
- Acute stress prior to slaughter must be minimised to maximise an animal's potential meat quality.
- Implementing good practices prior to slaughter can reduce the incidence of acute stress.

## Why reducing stress is important

Acute stress occurs when an animals' natural "fight or flight" response is evoked, causing the release of the hormones adrenaline, nor-adrenaline and cortisol. This can affect the eating quality of the meat yielded from the animal by impacting the three most important characteristics of meat quality for consumers; tenderness, juiciness and flavour.

- **Tenderness** describes the amount of effort required to chew a piece of meat. This has a large influence on the consumers overall satisfaction with a piece of meat.
- **Juiciness** is the amount of water retained in the cooked meat product and released during the eating process. A juicy piece of meat will be more succulent and enjoyable to eat. Juiciness also increases flavour and tenderness. Marbling in meat also stimulates saliva production in the mouth, adding to the overall impression of juiciness.
- **Flavour** is the sensations felt on the tongue when eating food. These sensations include saltiness, sweetness, sourness and bitterness. Flavour is impacted by numerous chemical compounds and can be enhanced by the smell of the cooked meat.

Increased levels of acute stress reduce tenderness and juiciness and by association, the consumer's perception of flavour.

## The impact of stress

The hormones released pre-slaughter due to acute stress cause muscle energy or glycogen to be depleted which can negatively impact meat quality. Glycogen is hydrophilic or water loving meaning that high levels of glycogen mean high levels of water and juicy meat. When glycogen levels are depleted, so too are water levels resulting in dry meat.

Glycogen stores replenish very slowly and it takes a number of days after a stress related event for an animal's glycogen to return back to normal levels. This is why pre-slaughter stress management is particularly important as there is generally insufficient time for glycogen levels to recover prior to slaughter to prevent and adverse affect on eating quality.

Acute stress can be caused by an activity that makes the animal expend energy through physical activity and/or fear. These include:

- use of electric goad or prodders
- unsuitable handling practices
- increased closeness of human contact
- unsuitable handling equipment and conditions
- novel/unfamiliar environments
- loud noises
- isolation
- unfamiliar animals, and
- poor lighting.

## Five practices which reduce stress

There are five good practices which help reduce stress and these are required by conformance and quality management programs:

1. Ensure all handlers, including those handling livestock during transport, handle animals quietly and calmly.
2. Reduce stress and exposure to new environments.
3. Ensure access to quality feed and clean water pre-slaughter on-farm.
4. Never mix groups of different animals who have not been together for more than 14 days – even if they are from the same property.
5. Minimise the time in lairage.

**Acute stress prior to slaughter must be minimised to maximise an animal's potential meat quality.**

## Good practices required by conformance or quality management programs to reduce stress and improve eating quality

While lairage and pre-slaughter practices vary from abattoir to abattoir, the principles of good management remain the same. It is recommended that a conformance or quality management program which aims to eliminate stress through the five practices listed above be actively adopted in your operation as this will:

1. improve the tenderness of meat
2. improve the juiciness of meat, and
3. improve customer satisfaction and deliver greater returns.

These five practices can be reinforced through a conformance or quality management program that requires the following:

- DO handle and move livestock calmly and effectively, avoiding harm, distress and injury.
- DO ensure livestock are not subjected to procedures that cause pain or suffering.
- DO ensure all facilities used to handle the animals, including transport vehicles do not have any flaws that could cause injury to the animals.
- DO provide animals with enough space in pens to stand up, lie down and turn around.
- DO ensure animals are protected from exposure to adverse weather conditions.
- DO keep equipment used to handle animals is in good repair and working order.
- DO restrain animals effectively during the slaughter process.
- DO NOT stress livestock by isolating them unless absolutely necessary.
- DO NOT force livestock to walk over the top of other animals.

## Benefits of good practice

A consumer's decision to make a repeat purchase of red meat is governed by their previous eating experience.

If conformance or quality management programs are implemented in a value-chain and stress is minimised, the eating quality of the meat produced through that value chain will improve, potentially increasing the re-purchase rate and quantity purchased by consumers.

Through good practice, value chains can engage in livestock handling courses and access training materials as outlined in *Factsheet 11 Good practice reinforced through training* and *Factsheet 12: Support and training in good practice*.

## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
- *Factsheet 5: Good practice delivers benefits from improved infrastructure*
- *Factsheet 6: Good practice can reduce animal stress and shrinkage for increased profits*
- *Factsheet 7: Good practice in the provision of quality feed and clean fresh water can improve growth rates and eating quality*
- *Factsheet 8: Good practice in reducing slipping and falling can improve hide cleanliness and carcass hygiene*
- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
- Australian Meat Processor Corporation and Meat & Livestock Australia. *Fact sheet 13.11: Low-stress livestock handling techniques*. Access online: <https://www.ampc.com.au/uploads/cgblog/id245/Low-Stress-Livestock-Handling.pdf>
- Warner RD, Ferguson DM, Cottrell JJ and Knee BW (2007). *Acute stress induced by the pre-slaughter use of electric prodders causes tougher beef meat*. Australian Journal of Experimental Agriculture 47: 782-788.