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Nutritional control of heat stress in feedlot cattle

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This issue explains why heat stress in feedlot cattle requires more than shade and water, and why nutrition must focus on TMR moisture, intake rhythm, starch pressure, rumen stability, electrolyte balance, and cattle type.

Heat stress changes the way cattle eat before it visibly reduces performance. First, intake becomes uneven and cattle shift more eating into cooler hours. Then, rumen fermentation becomes less predictable, and the margin for bunk-management errors narrows.

Not surprisingly, heavy cattle near finish are usually at greatest risk because they carry more metabolic heat, higher fat cover, and greater daily energy intake. Black-hided cattle, cattle with limited heat adaptation, dairy-influenced cattle, and especially Angus × Holstein groups may also require closer attention.

The objective is not to force normal intake during heat. The objective is to keep cattle consuming safely, maintaining rumen stability, and recovering quickly after heat stress.

TMR moisture and water access

Water access is a prerequisite, not a ration adjustment. If trough space, flow rate, cleanliness, or access are inadequate, no diet change will rescue performance. But, from a ration perspective, TMR moisture is a useful nutritional tool. Very dry, dusty diets increase sorting and reduce uniform intake, especially when cattle are already uncomfortable. Adding water, molasses, silage, wet distillers' grains, or other wet ingredients can improve ration cohesion and reduce selective feeding. The target is not a wet ration, but a stable ration. In many feedlot systems, a complete diet around 55–70% DM is a practical working range, but bunk heating, spoilage, ingredient moisture, feeding frequency, and intake response must decide the final target.

Intake rhythm against daily averages

During heat stress, cattle often eat less during the day and more during the evening or night. This can create slug feeding when temperatures fall, especially if feed calls were too aggressive earlier. Bunk management should become more conservative before and during severe heat events. The goal is a clean, steady bunk, not maximum feed delivery. Some yards may shift a larger share of feed delivery toward late afternoon or evening, but this must be matched with careful next-morning bunk reading. The most dangerous pattern is not low intake for one hot day; it is low intake followed by rapid overconsumption.

Starch pressure and rumen stability

High-starch finishing diets are efficient, but heat stress makes them less forgiving. Erratic intake can turn a normal finishing ration into an acidosis risk. For high-risk pens, it may be better to hold diet changes, slow the step-up, increase effective roughage, or temporarily reduce starch pressure.

Finishing roughage may commonly sit near 6–10% of diet DM in many grain-based systems in the U.S., but some pens may justify 15–20% roughage DM during high-risk periods if it reduces intake disruption, digestive upsets, liver abscess pressure, and carcass inconsistency. Energy density only pays when cattle consume it safely. Without ionophores, the above numbers should be increased accordingly.

Electrolytes and DCAD

Heat stress increases water turnover and changes acid-base pressure. Diets should be checked for sodium, potassium, chloride, sulfur, and water mineral load before adding electrolytes blindly. In ruminant diets, the more useful term is DCAD, calculated as (Na + K) – (Cl + S) in mEq/kg DM. During heat-risk periods, finishing diets should generally remain clearly positive, often around +150 to +300 mEq/kg DM, depending on ingredients, water sulfates, sulfur from distillers' grains, roughage level, starch pressure, and acidosis risk. The objective is not to chase a number, but to avoid a high-grain diet becoming acid-base unstable when cattle are already under heat stress.

Additives as rumen stabilizers

Yeast products, direct-fed microbials, buffers, osmolytes, antioxidants, plant extracts, ionophores where legal, and other feed additives may help support rumen stability, intake consistency, or stress resilience. Their value depends on diet type, delivery consistency, cattle risk, and economics. Sodium bicarbonate can raise DCAD and add buffering capacity, but it will not fix poor bunk calls. Yeast may support rumen function, but it will not compensate for inadequate water. Additives should be used to reduce variation, not to justify pushing cattle harder through heat.

High-risk cattle need different decisions

Heat stress is another reminder that feedlot cattle are not one biological type. Heavy cattle near finish, high-fat cattle, newly received calves, sick cattle, black-hided cattle, and dairy-influenced cattle may not tolerate the same ration or feed call as lighter, later-maturing cattle. Angus × Holstein cattle are a useful example: they may combine dairy frame and maintenance with Angus early maturity and fat deposition pressure. During heat, these cattle may need tighter endpoint control, more conservative starch management, and earlier marketing decisions rather than simply more days on feed.

In brief, nutritional heat-stress control in feedlot cattle is practical risk management. Water access must be secure, but the ration tools are TMR moisture, intake rhythm, starch control, effective roughage, DCAD discipline, and selective use of stabilizing additives. The goal is not to maintain perfect summer performance at any cost. The goal is to prevent unstable intake, acidosis, dehydration, health setbacks, excess carcass fat, and unnecessary deaths while helping cattle return to normal performance as quickly as possible.

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