Meat Technology

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CONTENT

MEAT QUALITY SOLUTIONS

-ELECTRICAL STIMULATION

-HOT BONING

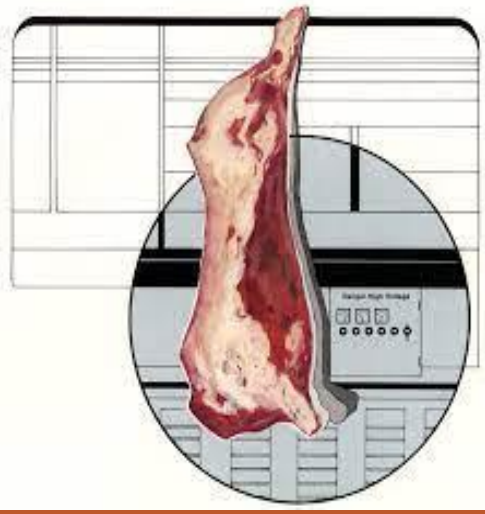
-DELAY CHILLING

Electrical stimulation (ES)

Electrical stimulation as a process involves passing an electric current through the carcass of freshly slaughtered animals.

Three major types of ES

- Extra low-voltage electrical stimulation (at voltage of <100 V)
- low-voltage electrical stimulation (at 100-110 V)
- high-voltage electrical stimulation (at >110 V)



Role of ES on post mortem glycolysis

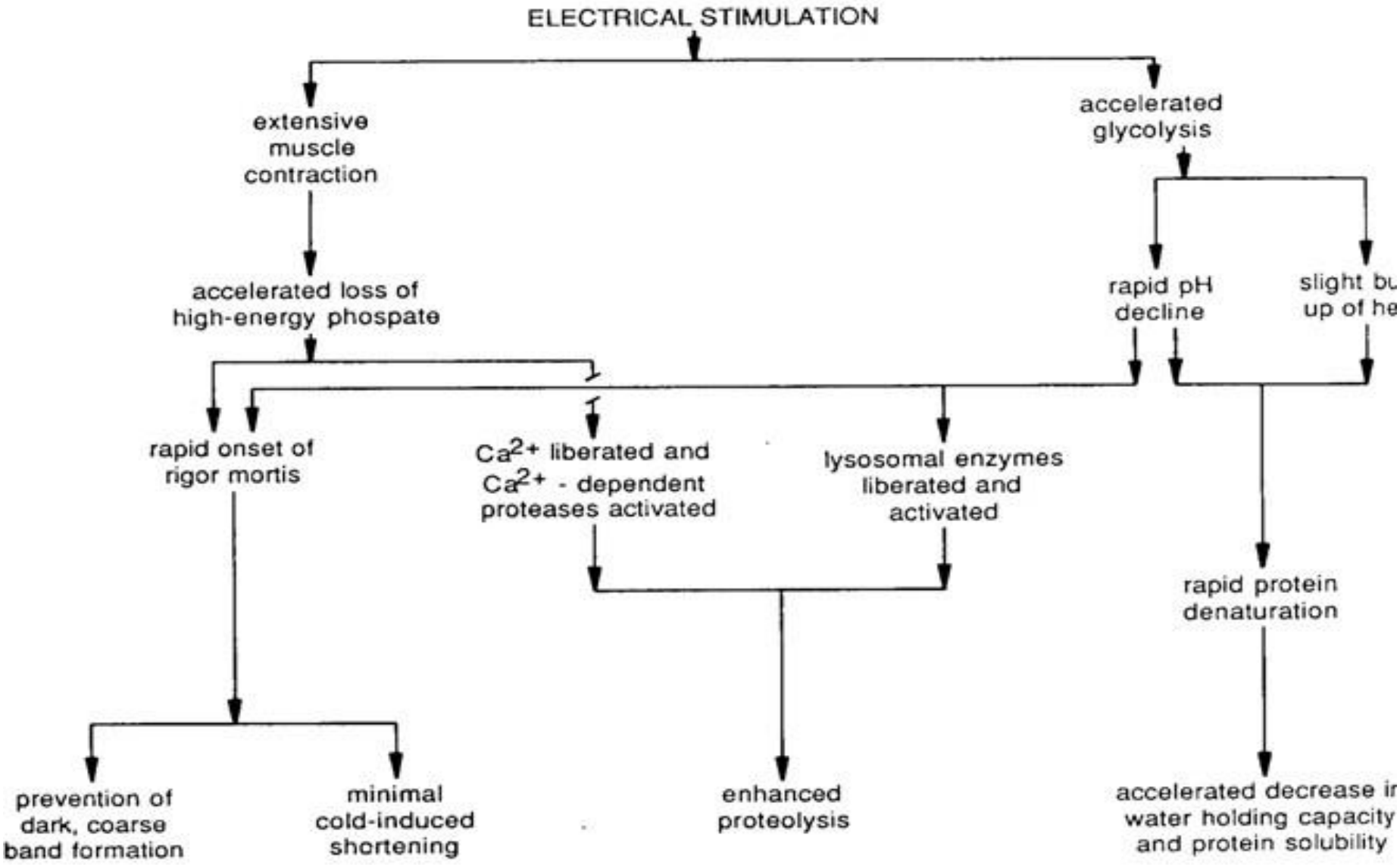
- ES accelerates postmortem glycolysis resulting in pH decline via rapid depletion of muscle glycogen.
- The application of ES results in extensive contraction of skeletal muscles whereby, the fibers become extended preventing additional contraction thus preventing shortening.
- Besides, myofibrillar matrix is physically disrupted thus accelerating proteolysis .

Role of ES on post mortem glycolysis

- Physiologically, the mechanisms of action of ES for improving meat tenderness occur by the release of calcium ion (Ca^{2+}) from sarcoplasmic reticulum (calcium ion pump).
- Muscle contraction is promoted by the activation of myosin-ATPase.
- During muscle contraction, the liberated Ca^{2+} activates calpain and disrupts the Z-line.
- During this event, the muscle pH and temperature is about 6.5 and 30°C, respectively.
- This condition favors intense calpain activity.
- There is also the disruption of lysosomes resulting in the release of cathepsins, which enhance muscle proteolysis.

Microbial stability of ES meat

- ES meats have lower bacterial count than unstimulated meats.
- The decrease in bacterial load results from high content of lactic acid, which brought about rapid decline in pH, which caused unfavorable conditions for microbial proliferation.
- However, the pH is only bacteriostatic (inactivate microbial activity) but not bactericidal (kill microbes).



Flow diagram of effects of carcass electrical stimulation.

Hot boning

Hot-boning is defined as the removal of muscles from the carcass before chilling.

The interest in hot-boning is a result of economic advantages due to:

- savings in space,
- energy and labour, as well as a result of demonstrated improvements in functional properties of meat

Delayed chilling

- Delay chilling is defined as the process of keeping intact carcasses out of the chill room for some period of time.
- This is not to be confused with high temperature conditioning, which is subjecting primals or cuts to elevated temperatures after boning.
- Delay chilled carcasses at 14-19 °C for 12-20 h postmortem are more tender than conventionally chilled carcasses.