

Summary of Academic and Field Research on the Humane Slaughter of Shrimp

Summary

- Across the academic and field research, one conclusion consistently emerges: when it is set up and run correctly, electrical stunning—especially in water—provides the best welfare by reliably making shrimp insensible within seconds.^{5, 7, 9}
- Stress markers like cortisol are not indicative of which method is humane. Reviews emphasize that humane slaughter is best judged by how fast insensibility happens and whether it lasts, not by a single short-term stress signal like cortisol.^{7, 8}
- Freezing animals to death in ice slurry cannot provide good welfare. Studies demonstrate ice slurry/chilling can make animals still without being insensible, and it can take several minutes or more before animals are insensible—creating prolonged suffering.^{1, 13, 15}
- Correct implementation and operation of electrical stunning matters. Farm and lab trials demonstrate the need for proper settings and routine quality checks (video monitoring of recovery and burns/lesions) to ensure shrimp are stunned correctly and not recovering. Proper electrical stunning followed by 0-degree Celsius ice slurry immersion may provide the highest welfare.^{5, 6, 9}

What “humane slaughter” means

The key benchmark for humane slaughter is achieving a very rapid onset of insensibility (one to two seconds), followed by death before recovery.^{7, 10}

What the studies show about common slaughter methods

Asphyxiation (oxygen-deprivation) methods

Because humane slaughter is defined around rapid insensibility and no recovery, slow methods such as asphyxiation are strongly disfavored across the welfare literature.^{10, 15}

Ice slurry/cold shock

Academic and field studies consistently caution that ice slurry can immobilize animals without generating insensibility. Freezing animals to death in ice slurry results in a dramatically lengthened period during which shrimp are sensible and suffering significantly; research from the University of Sterling and others shows this process can take from several minutes to tens of minutes depending on temperature and other conditions.^{1, 9, 13, 15}

Electrical stunning

In-water electrical stunning has been validated in commercial farm settings across multiple countries.^{2, 3, 9, 16, 17} Neurophysiology studies (including academic studies published in *PLOS ONE* and *Frontiers* and by the University of Stirling) have shown rapid arrest of nervous activity consistent with loss of sensibility following electrical stunning.^{6, 7}

Questions around electrical stunning have centered in two areas: stress marker (lactate and cortisol) levels and recovery times. Each of these topics is discussed immediately below.



Stress markers in context

The welfare literature makes clear measures of cortisol, lactate and other stress markers can vary for many reasons, and such markers are often not reliable indicators of stress or pain.^{6, 7, 8}

For example, animals in cage-free egg-laying systems and crate-free pork production systems show higher cortisol levels than animals in cage and crate systems, and for years factory farm producers pointed to this to argue that cage and crate systems are better for animal welfare. But research from countless academic, veterinary, and government researchers make clear that despite the increased levels of cortisol, cage-free and crate-free systems provide dramatically better welfare overall.

It is no surprise that electrical stunning generates increased lactate levels; electrical stunning generates muscle contractions, which trigger lactate spikes. What matters most for assessing humane slaughter is the duration of suffering. Electrical stunning renders shrimp insensible within one to two seconds, and from a welfare perspective increased stress for one to two seconds is far preferable than the prolonged suffering that results from freezing animals to death in ice slurry, where it takes several minutes to tens of minutes for animals to be rendered insensible.

Electrical stunning parameters and recovery time

Welfare-friendly outcomes from electrical stunning depend on proper implementation of process parameters. Academic researchers designing their own parameters for single-fish or single-crab electrical stunning in lab settings often find their settings inadequate to properly stun animals. On the other hand, commercial electrical stunning systems correctly deployed show high successful stun and kill rates.^{16, 17}

Nevertheless, these rates can vary based on the type of equipment used and proper implementation, which is why it is important for companies to not only require electrical stunning but also to ensure suppliers deploy it correctly. Companies should strongly prefer in-water electrical stunning systems; should ensure such systems are implemented with validated settings; and should require video monitoring for animal recovery and burn/lesions.^{3, 5, 9} Proper electrical stunning followed by 0-degree Celsius ice slurry immersion may provide the highest welfare.⁹

Conclusion

Based on the total research base, in-water electrical stunning clearly and consistently provides the most humane approach for killing farmed shrimp. Freezing animals to death in Ice slurry could only be humane if it was clear such methods generated near-immediate insensibility, but the literature makes clear this approach results in several to tens of minutes of sensibility and prolonged suffering in shrimp.^{7, 9, 10, 13}

It is for these reasons that every animal welfare organization working on this issue, and every animal welfare-focused certification scheme (such as RSPCA and Certified Humane) has concluded that electrical stunning should be required to ensure the humane slaughter of shrimp.

Sources

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