LiveTec

Testing of Crustastun single crab and lobster stunner

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Introduction

Research carried out in 1999 at Bristol University (Department of Food Animal Science)[1] by Dr. David Robb on the electrical stunning of crustaceans, indicated minimum currents required to stun edible crabs and lobsters into insensibility as being 1.3 amps in the case of edible brown crabs and 1 amp in the case of lobsters (at 110 V and 50 Hz alternating current). These currents would cause a sufficient period of insensibility for the crustaceans to be killed by immediate boiling.

The Crustastun is a machine which has been specifically designed and developed to deliver that requisite current to the crustacean in order to render it insensible as quickly as possible (within the criteria indicated by Dr. Robb's Report) and by the prolonged application of the current, controlled by a timer, to effect a destruction of the crustacean's nervous system whilst the crustacean is still unconscious so that the crustacean is ultimately killed by the electrical stun. This allowed a greater confidence that the crustacean would not regain consciousness if there was a delay prior to killing by immersion in boiling water or other cooking method.

The latest design of the Crustastun unit embodies a sponge electrode in contact with the top of the crab or lobster, the lower electrode being a stainless steel plate submerged in a bath of saline water. A voltage of 110 volts (50 Hz sinusoidal waveform) is applied across the electrode for a period of 10 seconds for crabs and five seconds for Lobsters.

Objective of the testing

The objective of this test was to evaluate the effectiveness of the Crustastun in achieving the required stun currents to induce anesthesia in the crustaceans, to see how quickly that was achieved and sustained and as to whether any of the stunned

1 1 Unpublished research report, The Humane Slaughter of Crustacea: Electrical Stunning Robb, D. Department of Food Animal Science, University of Bristol

crustaceans recovered from the stun. The test assessed a minimum stun duration of 60 minutes – a period regarded as reasonable to enable the animal (if not already killed by the stun) to be killed in the cooking process whilst still unconscious.

Method

The Crustastun unit has a simple current display consisting of an LED bar graph, each light representing one amp. In order for accurate current profile recording a current clamp (MK1200 Tti Ltd) was placed around the supply lead to the live electrode. The output of this clamp was connected to a Fluke 189 true RMS digital multimeter and the resulting signal was recorded using FlukeView Forms data logging program. FlukeView forms uses an event logging system. Each event is represented by duration, starting time, ending time, and the highest, lowest and average values detected during the event. The minimum recording interval is set at 1 second, but if the measured value changes by more than 4% during the interval an extra reading is logged.

Six crabs and two lobsters were stunned in the unit for the trial. The large south coast crabs and lobsters were used as delivered live on the morning of the trial, by the Blue Sea Food Company. The carapace was not wetted as may be expected during routine use in a restaurant kitchen. Before stunning they were checked for consciousness by positive response to mechanical stimulation around the eyes and antennae, this being considered the lowest level of sensory response in a crab.


Effective stunning was determined by the loss of this response on removal from the unit after application of the stunning cycle. Prior to stunning the last crab the sponge electrode was removed, rung out and replaced to simulate leaving the lid open for a prolonged period allowing the sponge to drain out.

Results

All crabs and lobsters were stunned and none of them recovered within one hour, nor subsequently prior to cooking. Currents recorded were substantially above the 1.3 Amp threshold recommended by Dr Robb. The current profiles showed that the target current was achieved within 0.5 seconds of the start of the stunning cycle and maintained throughout the stun cycle.
Despite being stunned with a “dry” sponge electrode crab six was still stunned and killed by the unit.

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Summary of data.

	Max Current (Amps)	Average Current (Amps)	Stunned	Recovered
Crab 1	8.5	7.4	Yes	No
Crab 2	6.8	6.1	Yes	No
Crab 3	7.9	7.0	Yes	No
Crab 4	6.1	5.1	Yes	No
Crab 5	10.7	9.0	Yes	No
Crab 6	3.4	2.9	Yes	No
Lobster 1	10.1	9.1	Yes	No
Lobster 2	10.4	8.3	Yes	No

Conclusions

The sponge electrode has been the most successful version of top electrode to date. With the confirmation by the Food Standards Agency that it is permissible to use a sponge in this way it would seem that this is the best way forward. Previous versions had avoided having a sponge in direct contact with the crustaceans as it had been advised that it would be contrary to food hygiene principles. Instructions for use must make it clear that the sponge should be cleaned and disinfected daily and totally replaced on a regular basis.

It is noted that the currents achieved by the Crustastun are in greatly excess of the minimum currents determined by Robb. In the electrical stunning of poultry and red meat animals, stunning currents are kept as low as possible by processors, to minimise damage to the carcase, such as bone breakages and blood spots when sinusoidal waveforms of 50 Hz are used. This is not such a problem when higher frequencies or alternative waveforms are used, however these alternatives are not as effective in maintaining a sufficient stun or causing cardiac arrest when whole body application is used to produce a stun-kill. Since there is no evidence of damage to the meat of crustaceans by the passage of high currents, there is no need for limiting the current. The use of high currents will increase the probability of death resulting from the stun.

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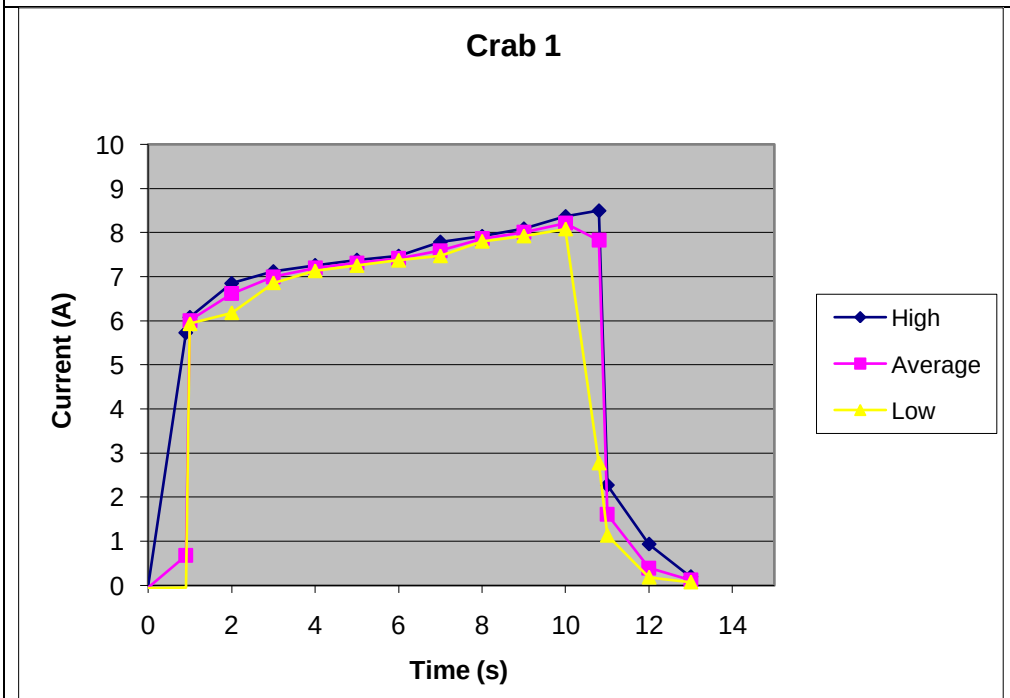
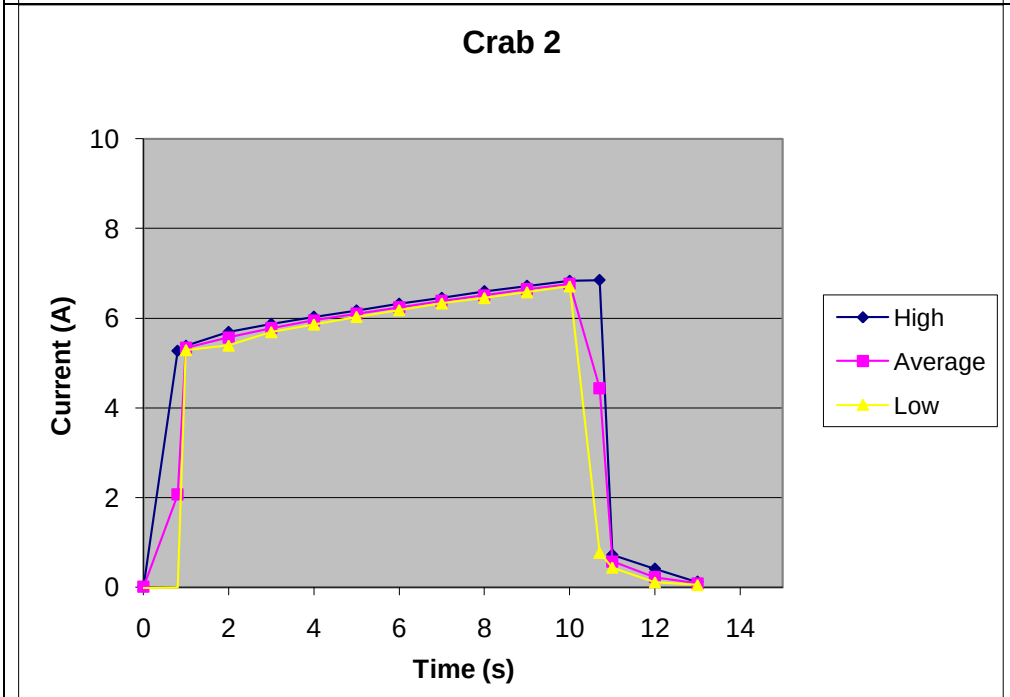
Current Profile	Comment
	
	

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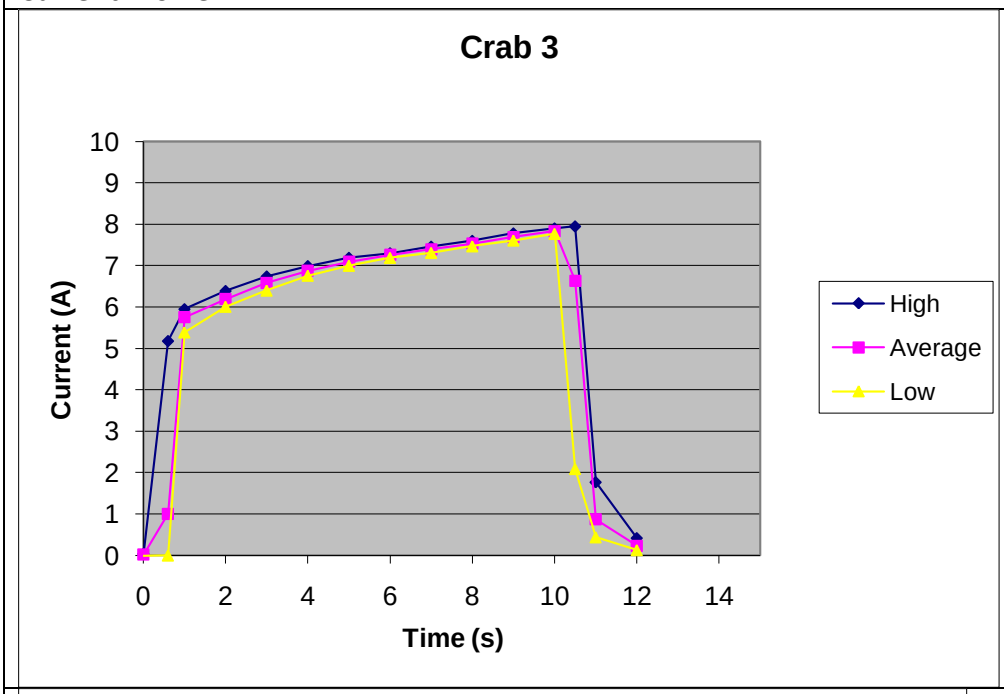	
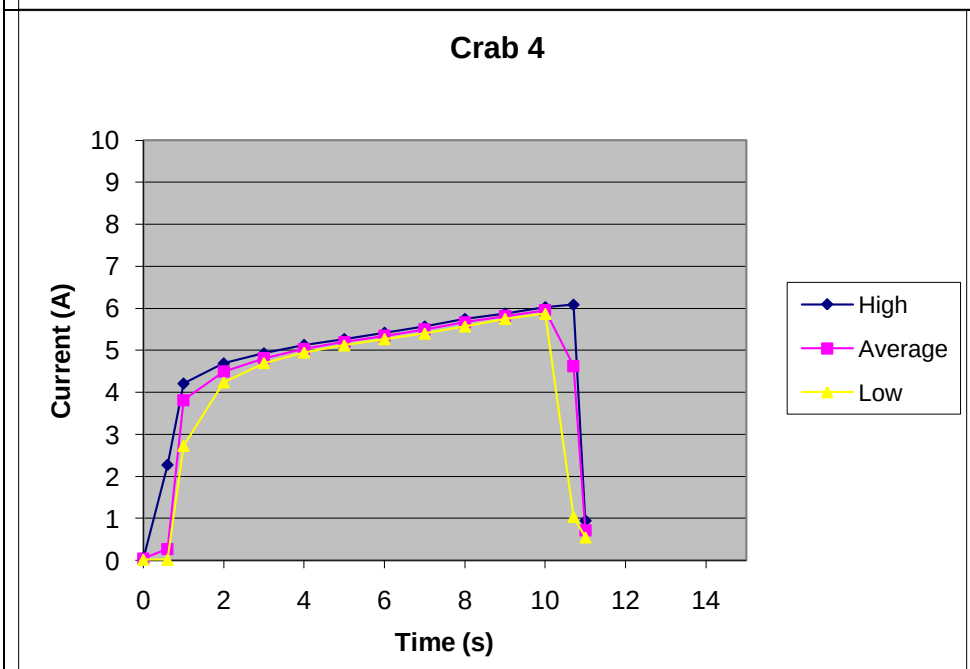	

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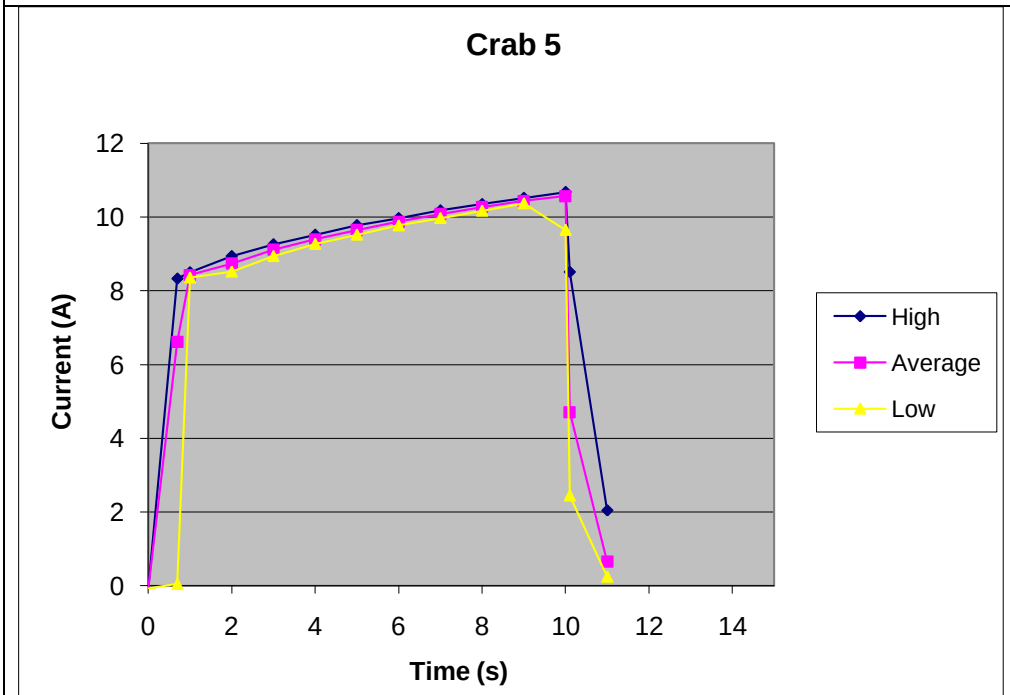	
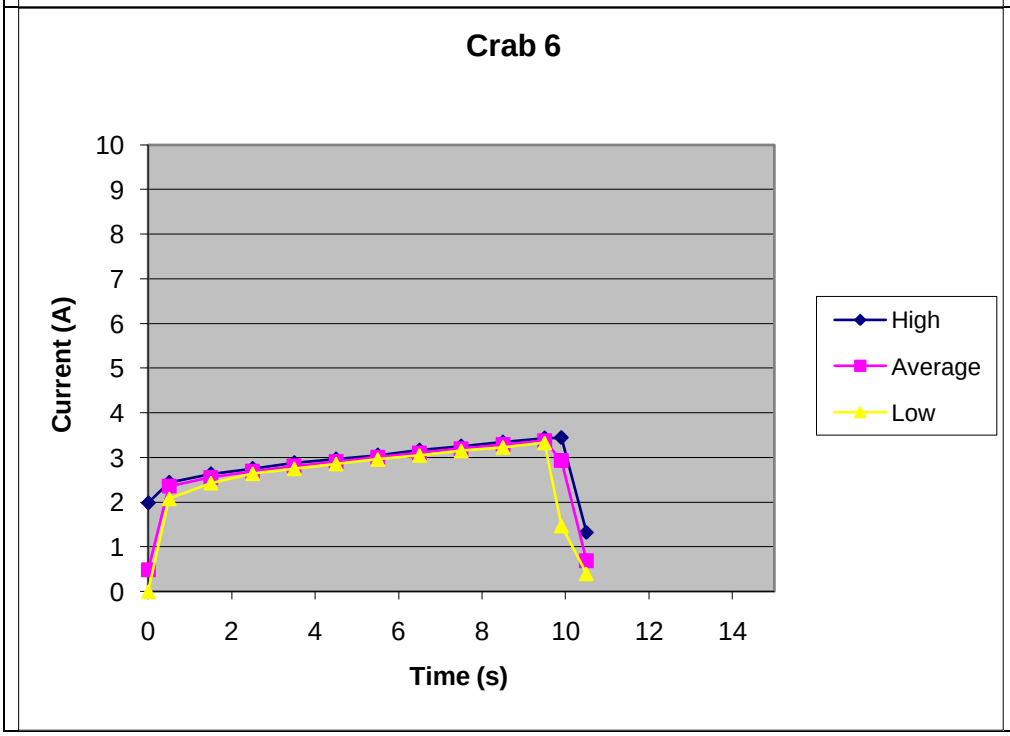	The sponge was rung out but still damp.

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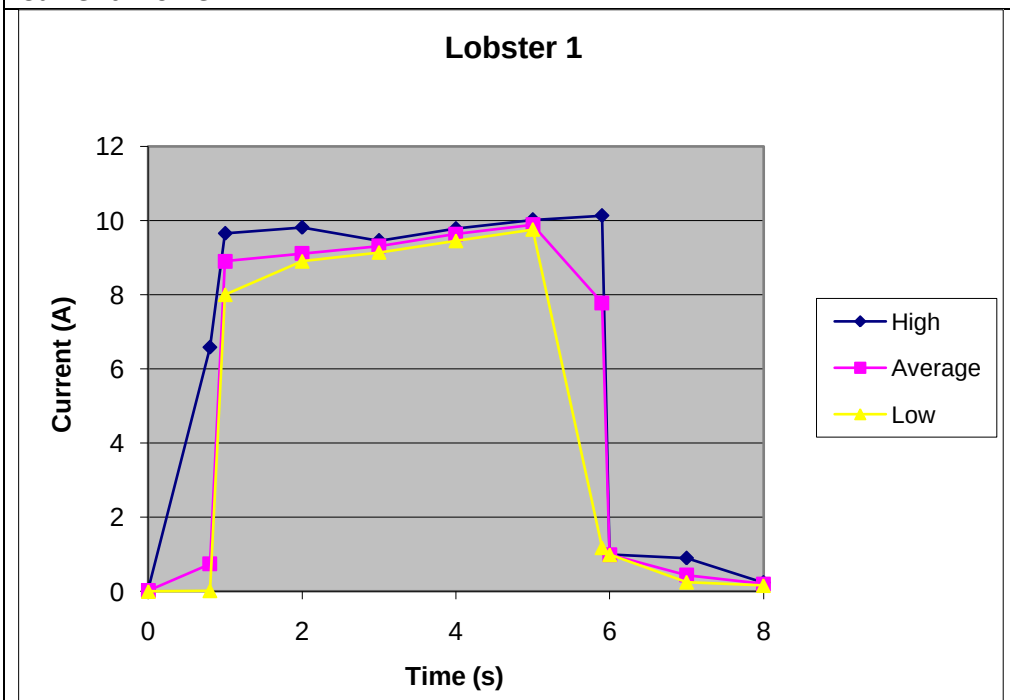	
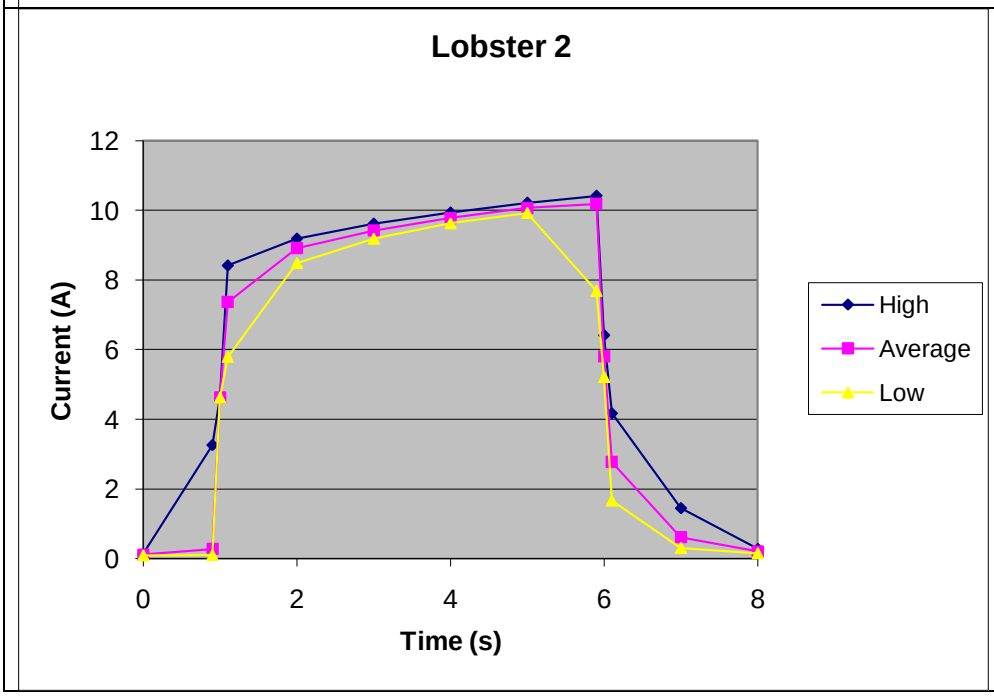	

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