



THE EFFECTS OF WATER BATH STUNNING ON BLEEDING AND DEATH OF POULTRY

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European Halal Development Agency (EHDA)

**International Halal and Tayyib products workshops
24-25 October 2015 Istanbul - Turkey**



PARAMETERS FOR FOOD

يَا أَيُّهَا النَّاسُ كُلُوا مِمَّا فِي الْأَرْضِ حَلَالًا طَيِّبًا وَلَا تَتَّبِعُوا خُطُواتِ (168:البقرة اية)الشَّيْطَانِ ۚ إِنَّهُ لَكُمْ عَدُوٌّ مُبِينٌ

"O mankind, eat of the lawful (Halal) and good (Tayeb) on the earth and do not follow Satan because Satan is an open enemy for you." (Surah Al-Baqarah [2]: 168, Al Quran).



حرمة أكل الميتة

PROHIBITION OF EATING FROM DEAD ANIMALS

أحكام الذبائح وردت تفاصيلها في الكتاب و السنة

Slaughtering Rules are detailed in the Holy Quraan and Sunna

– الأصل في ميتة الحيوان المباح الأكل الحرمة إلا المذكى

- The Fundamental verdict on meat form permitted Animals (for Muslims) is to be Forbidden except those slaughtered according to Shariah

قوله تعالى: ﴿حُرِّمَتْ عَلَيْكُمُ الْمَيْتَةُ وَالدَّمُ وَلَحْمُ الْخَنزِيرِ وَمَا أُهْلَ لِغَيْرِ اللَّهِ بِهِ وَالْمُنْخَنِقَةُ وَالْمَوْقُوذَةُ وَالْمُتَرَدِّيَةُ وَالنَّطِيحَةُ وَمَا أَكَلَ السَّبُعُ إِلَّا مَا ذَكَّيْتُمْ﴾ (المائدة، 3)

Prohibited to you are dead animals, blood, the flesh of swine, and that which has been dedicated to other than Allah , and [those animals] killed by strangling or by a violent blow or by a head-long fall or by the goring of horns, and those from which a wild animal has eaten, except what you [are able to] slaughter [before its death], (Al-Maedah)

Halal and Haram

الحلال و الحرام

عن النعمان بن بشير رضي الله عنه قال سمعت رسول الله صلى الله عليه وسلم يقول
إن الحلال بين والحرام بين وبينهما أمور مشتبّهات لا يعلمهن كثير من
الناس فمن اتقى الشبهات استبرأ لدينه وعرضه ومن وقع في الشبهات وقع
في الحرام

On the authority of al-Nu'man Ibn Bashir (may Allah be pleased with him) ,who said : I heard Allah's Messenger (blessings and peace of Allah be upon him)say: " The Halal (lawful) is clear and the Haram (prohibited) is clear, and in between them there are some things that are doubtful ,which most people do not know - if they are Halal or Haram - Thus ,whoever avoids the doubtful, safeguards his religion and honour, but one who engages in the doubtful, falls in the Haram.



Doubt الريب أو الشك

عن الحسن بن علي رضي الله عنهما قال " بحفظت من رسول الله صلى الله عليه وسلم :
(دَعُ مَا يَرِيْبُكَ إِلَى مَا لَا يَرِيْبُكَ ، فَإِنَّ الصِّدْقَ طُمَأْنِيْنَةٌ ، وَإِنَّ الْكُذْبَ رِيْبَةٌ) ،
أخرجه الترمذي و صححه الشيخ الألباني رحمه الله .

On the authority of Abu Muhammad al-Hasan ibn Ali ibn Abu Taalib, the grandson of the Messenger of Allah (peace and blessings be upon him) and his beloved (may Allah be pleased with both of them), who said: I memorized from the Messenger of Allah (peace and blessings of Allah be upon him), "Leave that which makes you doubt for that which does not make you doubt." (Recorded in al-Tirmidhi)

Al-Ihsan

عن أبي يعلى شداد بن أوس ، عن رسول الله صلى الله عليه وسلم قال : *إن الله كتب الإحسان على كل شيء ، فإذا قتلتم فأحسنوا القتلة ، وإذا ذبحتم فأحسنوا الذبحة ، وليحد أحدكم شفرته ، وليرح ذبيحته* . رواه مسلم

‘Verily Allah has enjoined goodness to everything; so when you kill, kill in a good way and when you slaughter, slaughter in a good way. Every one of you should sharpen his knife, and let the slaughtered animal die comfortably.’



The five freedoms of animal welfare

- 1. Freedom from hunger and thirst by ready access to fresh water and a diet to maintain full health and vigour.*
- 2. Freedom from discomfort by providing an appropriate environment including shelter and a comfortable resting area.*
- 3. Freedom from pain, injury or disease by prevention or rapid diagnosis and treatment.*
- 4. Freedom to express (most) normal behaviour by providing sufficient space, proper facilities and company of the animal's own kind.*
- 5. Freedom from fear and distress by ensuring conditions and treatment which avoid mental suffering.*



HALAL SLAUGHTERING GUIDELINES

Halal Slaughtering guidelines should be set to include:

1- To ensure Animal Welfare (Al-Ihsan) is maintained throughout until death is definite.

2- To ensure that Birds should be alive at time of Slaughtering and that death is as a result of Bleeding.



ذَبْحَة
dhabīḥah
'slaughter' (NOUN)

in Islamic law, the prescribed method of ritual slaughter of all animals excluding locusts, fish, and most sea-life.

This method of slaughtering animals consists of a swift, deep incision with a sharp knife on the throat, cutting the jugular veins and carotid arteries of both sides (artery that delivers newly oxygenated blood from the heart to the head and neck), but leaving the spinal cord intact,.



شروط الذبح هو قطع الحلقوم والمريء والودجين . وهي الطريقة المفضلة شرعاً في تذكية الغنم والابقار والطيور ونحوها، وتجاوز في غيرها . و هي الطريقة الأسرع و الأمثل في حصول حالة الإغماء السريع عند الحيوان و فقدة لوعيه و عدم شعوره بألم الذبح . فإذا قطع الودجين يحصل إنخفاض فجائي لضغط الدم و يتوقف تدفق الدم الى الدماغ و بذلك يتوقف الأوكسجين عن تغذية خلايا الدماغ و بسبب ذلك يحصل فقدان للوعي ثم الموت بسبب نزف الدم.



Carotid artery

large artery that delivers newly oxygenated blood from the heart to the head and neck.

Jugular Vein

responsible for transferring deoxygenated blood from the head back towards the heart.

Oesophagus (also called gullet)

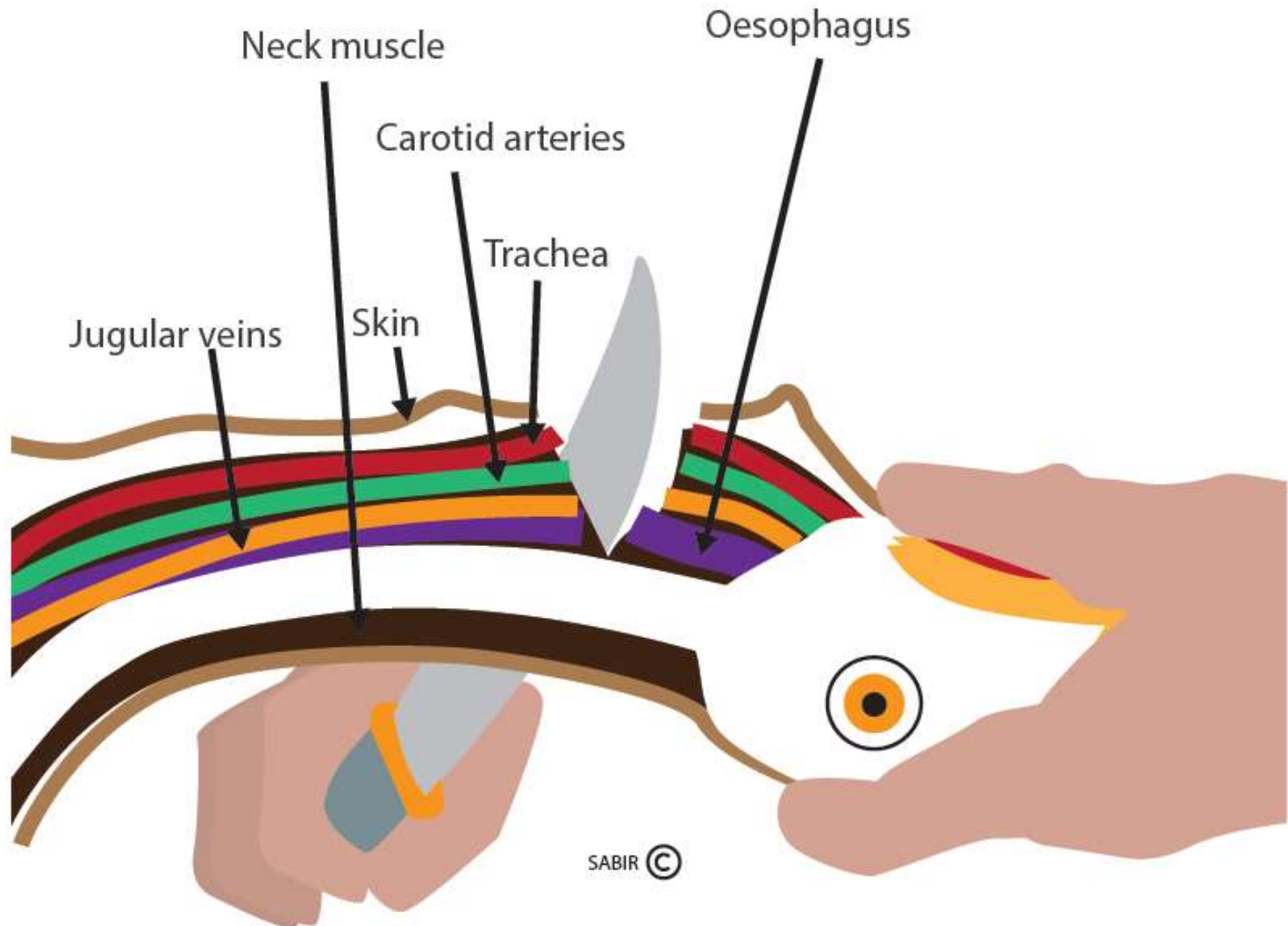
the part of the gastrointestinal system between the mouth and the stomach.

Trachea (called the windpipe)

a tube that connects the pharynx and larynx to the lungs, allowing the passage of air.



DIAGRAM OF SLAUGHTERING CHICKEN



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10. Raj, A. B. M. (2003). A critical appraisal of electrical stunning in chickens. *World PoultryScience Journal*, 59 (1), 89-98.



Waterbath Stunning:

Matters to be assessed for compliance with Islamic Shariah

Stunning is a procedure that induces an unequivocal pathological brain state that is incompatible with the persistence of consciousness and sensibility in order to perform slaughter without causing avoidable fear, anxiety, pain, suffering and distress. Raj

... the method should prevent avoidable pain, anxiety, distress and suffering. The stunning method itself should not be stressful. Raj



POULTRY WATERBATH STUNNING SYSTEM

- *During water-bath stunning operation, electrical current passes through the heart and may cause cardiac arrest and death.*
- *Controlling death and animal welfare causing factors as a result of water-bath stunning is complex.*
- *Poultry water-bath stunning system involves a number of INDUSTRIAL and BIOLOGICAL FACTORS that must be controlled to:*
 - 1- Ensure Animal Welfare is maintained throughout until death is definite.*
 - 2- Ensure that Birds should be alive at time of Slaughtering and that death is as a result of Bleeding.*



POULTRY WATERBATH STUNNING SYSTEM

INDUSTRIAL FACTORS IN A POULTRY WATER-BATH STUNNING SYSTEM THAT ARE RELEVANT TO DEATH PRIOR TO SLAUGHTERING AND ARE CRITICAL FOR ANIMAL WELFARE:

*Type of current,
Current value,
Frequency,
Voltage,*

Dwelling time (duration of exposure of bird to electricity).



POULTRY WATERBATH STUNNING SYSTEM

INDUSTRIAL FACTORS IN A POULTRY WATER-BATH STUNNING SYSTEM THAT ARE RELEVANT TO DEATH PRIOR TO SLAUGHTERING AND ARE CRITICAL FOR ANIMAL WELFARE:

Poultry species, age, sex, stress conditions during farming, weight of bird, conditions of transport from farm to slaughterhouse, length of bird when it is shackled, stress levels at the moment a bird touches electrified water, physical fitness of bird at the time of exposure to the electric current, reaction of bird at the point of contact with electrical current, reaction of bird to shackling, miss-stunning effects



POULTRY WATERBATH STUNNING SYSTEM

Inevitable pain associated with:

- *Tipping birds out of crates to be shackled*
- *Shackling*
- *Painful pre-stun electric shocks*
- *Painful Miss-stunning*

POULTRY WATERBATH STUNNING SYSTEM

Permanent problems:

- *Variation in electrical impedance (resistance) : Although the electrical current is supposed to flow through the whole bird in the electrified waterbath, various body parts including fat, muscle tissue, and bone ends impede the flow of electricity.*
- *Number of birds in the stunner also affects the amount of current each bird gets.*
- *The industry failed to find a way to harmonize electrical resistance in broiler chickens.*

(Raj 2004)



POULTRY WATERBATH STUNNING SYSTEM

Overall Perceptions:

“The complexity of multiple bird waterbath stunning is not conducive to maintaining good welfare.

Effectiveness of the stun cannot be determined.

The method, widely practiced because it is simple and cheap, cannot be controlled.” Raj 2004

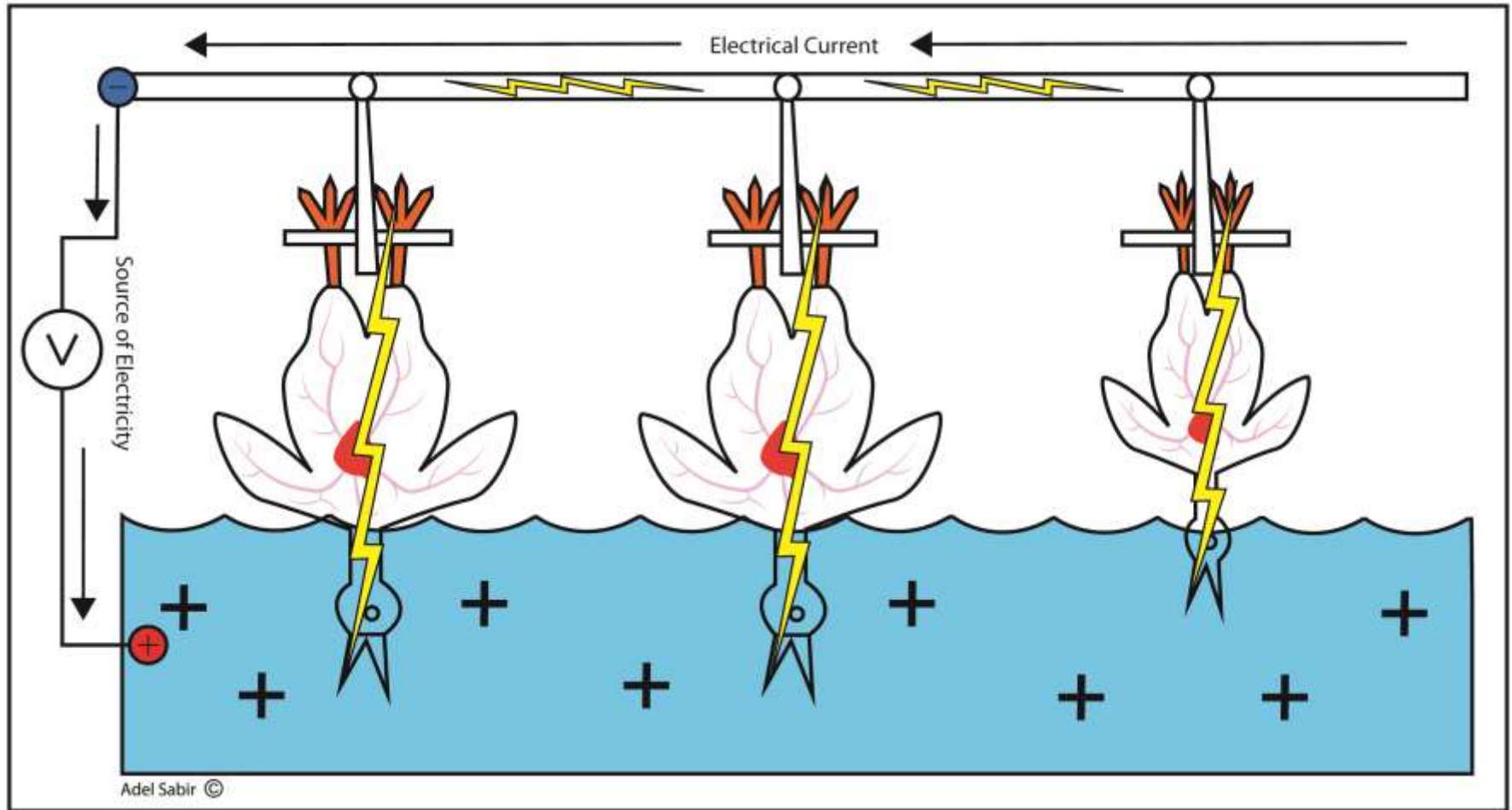
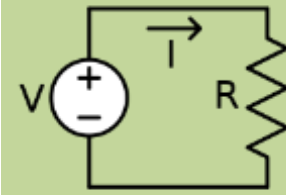
POULTRY WATERBATH STUNNING SYSTEM

Problems with monitoring physical signs of stunning (unconsciousness and insensibility):

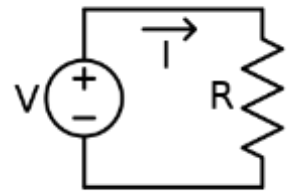
- *Both effectively and ineffectively stunned broiler chickens exhibit seizures and apnea (absence of breathing); therefore, these are not good indicators of unconsciousness and insensibility following electrical stunning.*
- *If electrical stunning is incomplete, it is a painful experience to recover from that immobility.*



POULTRY WATERBATH STUNNING SYSTEM



POULTRY WATERBATH STUNNING



MechanicalSlaughter05102011

يغطس رأس الطير ويمرر تيار كهربائي خلال جسم
الطير بين الرأس و الأرجل مما قد يؤدي الى حدوث نوبة
قلبية (Cardiac Arrest) التي قد تسبب موت الطير
قبل الذبح



REJECTED WATERBATH STUNNED BIRDS



WATERBATH STUNNING OF CHICKENS

Article

Effect of electrical stunning on the electroencephalogram in chickens



N G Gregory



Stephen Wotton

AFRC — Institute of Food Research — Bristol Laboratory, Langford, Bristol BS18 7DY U.K.
British Veterinary Journal 03/1987; 143(2):175-83. DOI: 10.1016/0007-1935(87)90009-1
Source: PubMed

ABSTRACT

Electrical stunning at normal current levels (approximate range 30 to 100 mA per bird) was found to cause low frequency epileptiform activity in the EEG of chickens. High stunning currents (over 100 mA per bird) inhibited the expression of epileptiform activity and this occurred irrespective of whether the heart was fibrillating. An appraisal of electrical stunning baths used commercially showed that 40% of the broilers were subjected to a cardiac arrest at stunning. The stunners used a variety of electrical waveforms but just over half of them put out a 50 Hz sinusoidal alternating current. Experimental work showed that when this waveform was used the current necessary to induce cardiac arrest in 99% of the broilers was 148 mA per bird.



WATERBATH STUNNING OF CHICKENS



THE HUMANE SOCIETY
OF THE UNITED STATES

An HSUS Report: The Welfare of Birds at Slaughter

Sara Shields, Ph.D.,* and Mohan Raj, Ph.D.†

Abstract

The customary slaughter method of birds killed for human consumption involves the stunning of several live birds at one time using electrical water baths supplied with constant voltages. The birds are hung upside-down on shackles prior to conveyance through the electrified bath. This system, which is used globally, is increasingly under scrutiny as research suggests that it can be both inhumane and ineffective. Scientists have demonstrated that handling, inversion, and shackling are traumatic and stressful to birds and that shackling itself may be painful. In some cases, birds may also receive painful pre-stun electric shocks. There is growing evidence that the existing electrical water-bath stunner settings, including those used in U.S. slaughter plants, may not render birds immediately unconscious. Further, birds may miss the stunner completely and remain conscious when their throats are cut and possibly when they reach the scald vat. Since the existing, constant voltage, electrical water-bath systems that involve stunning several birds simultaneously are increasingly considered inhumane, alternative technologies that use gas mixtures to render birds unconscious have been developed to improve animal welfare. To date, the most effective and least aversive method of stunning birds prior to slaughter is Controlled Atmosphere Killing (CAK), which rapidly and efficiently gasses birds while they are in transpo



STUNNING: The Legal Stand



To: Stakeholders

Date: 23rd January 2013

CHANGES TO ANIMAL WELFARE WITH REGARDS TO REGULATION 1099/2009

As you may be aware from 1 January 2013, Reg EC No 1099/2009 came into effect in all EU Member States. This introduces a number of changes to welfare requirements for the slaughterhouse, moving the emphasis for monitoring and improving welfare to the Food Business Operator.

There are also a range of new definitions in the Regulation and we have become aware of some concerns relating to interpretation of the new Regulation and what the Regulation actually means. On that basis the FSA is writing to clarify the actual position with regards to the new definitions of key aspects of the slaughter process under the new Regulation.

The Regulation introduces new definitions for the slaughter process as follows:

- "Slaughter" means killing animals intended for human consumption
- "Stunning" is any process that causes a loss of consciousness and sensibility without causing pain
- "Stunning" includes any process that results in instant death
- "Simple stunning" is any stunning process which does not result in instantaneous death
- "Simple stunning" must be followed as quickly as possible by a procedure ensuring death occurs before the animal regains consciousness



DEATH

- **Brain death** is the complete and irreversible loss of [brain function](#) (including involuntary activity necessary to sustain life).^{[1][2][3][4]} Brain death is one of the two ways of determination of death, according to the [Uniform Determination of Death Act](#) of the United States (the other way of determining death being "irreversible cessation of circulatory and respiratory functions").
National Conference of Commissioners on Uniform State Laws.
Retrieved 2 March 2014.
- **Clinical death** is the medical term for cessation of blood circulation and breathing, the two necessary criteria to sustain human and many other organisms' lives.^[1] It occurs when the [heart](#) stops beating in a regular rhythm, a condition called [cardiac arrest](#). At the onset of clinical death, consciousness is lost within several seconds. Measurable brain activity stops within 20 to 40 seconds.^[2] Irregular gasping may occur during this early time period, and is sometimes mistaken by rescuers as a sign that CPR is not necessary.^[3] During clinical death, all tissues and organs in the body steadily accumulate a type of injury called ischemic injury.
- **Ischemia**, also spelled as **ischaemia** or **ischæmia**^[a] ([/ɪˈskiːmiə/](#)^{[1][2]}), is a restriction in blood supply to [tissues](#), causing a shortage of [oxygen](#) and [glucose](#) needed for [cellular metabolism](#) (to keep tissue alive).^[3] Ischemia is generally caused by problems with [blood vessels](#), with resultant damage to or dysfunction of tissue. It also means local [anemia](#) in a given part of a body sometimes resulting from congestion (such as [vasoconstriction](#), [thrombosis](#) or [embolism](#)).

POULTRY WELFARE AND SLAUGHTERING METHODS: RISK ASSESSMENT IN A HALAL CONTEXT¹

... ..continued

The quality of risk assessment depends on:

- 1- Appropriate formulation of questions for risk assessment.*
- 2- Clear understanding of the Background of each question.*
- 3- Use of scientific data, statistical analysis and expert opinion.*
- 4- Advanced risk assessment methodology should be applied to address the question at hand.*

¹ *Adapted from The European Food Safety Authority (EFSA) on Animal Health and Animal Welfare (AHAW)*



POULTRY WELFARE AND SLAUGHTERING METHODS: RISK ASSESSMENT IN A HALAL CONTEXT

For Islamic-Scholarly evaluation

*Risk Assessment for Shariah compliance to
ensure that:*

- Animal Welfare (Al-Ihsan) is maintained during slaughtering process until death is definite.*
- Birds are alive at time of Slaughtering and that death happened as a result of Bleeding.*



Risk Assessment on Issues Connected to Waterbath Stunning

- *The duration of unconsciousness induced by the stunning method should be longer than the sum of the time interval between the end of the stun and neck cutting and the time it takes for blood loss to cause death or for bleeding to cease. Raj*

Risk Assessment:

- *Risks of breach of Ihsan Principles*
??????
- *Risks of death*
??????
- *Conclusion*
??????



Issues connected to Stunning continue

- *Stunning procedure should not cause fear, anxiety, pain, suffering and distress.*

Risk Assessment:

- *Risks of breach of Ihsan Principles
??????*
- *Risks of death
??????*
- *Conclusion
??????*



Issues connected to Stunning continue

- *Birds need to loose sufficient blood so that they don't regain consciousness. Raj.*

Risk Assessment:

- *Risks of breach of Ihsan Priciples
??????*
- *Risks of death
??????*
- *Conclusion
??????*



Issues connected to Stunning continue

• Irrespective of the stunning method and species of animal, the stunning method should induce no less than forty seconds of unconsciousness. Inadequately stunned birds may recover consciousness while bleeding out, and enter the scald tank alive. Raj

Risk Assessment:

- Risks of breach of Ihsan Principles
??????*
- Risks of death
??????*
- Conclusion
??????*



Issues connected to Stunning continue

Slaughter without stunning induces unconsciousness quicker than carbon dioxide. Raj 2014.



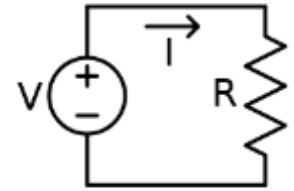
- **The Mechanism of Electrical Current:**

- An electric circuit is formed when a conductive path is created to allow free electrons to continuously move. This continuous movement of free electrons through the conductors of a circuit is called a current, and it is often referred to in terms of “flow,” just like the flow of a liquid through a hollow pipe.



• The mechanism of electrical current

... continued



- A simple electric circuit, where current is represented by the letter i . The relationship between the voltage (V), resistance (R), and current (I) is $V=IR$; this is known as Ohm's Law.
- Free electrons tend to move through conductors with some degree of friction, or opposition to motion. This opposition to motion is more properly called resistance.
- The amount of current in a circuit depends on:
 - the amount of voltage available to motivate the electrons, and a
 - the amount of resistance in the circuit to oppose electron flow.
 - Just like voltage, resistance is a quantity relative between two points. For this reason, the quantities of voltage and resistance are often stated as being “between” or “across” two points in a circuit.



Certification Bodies Responsibility

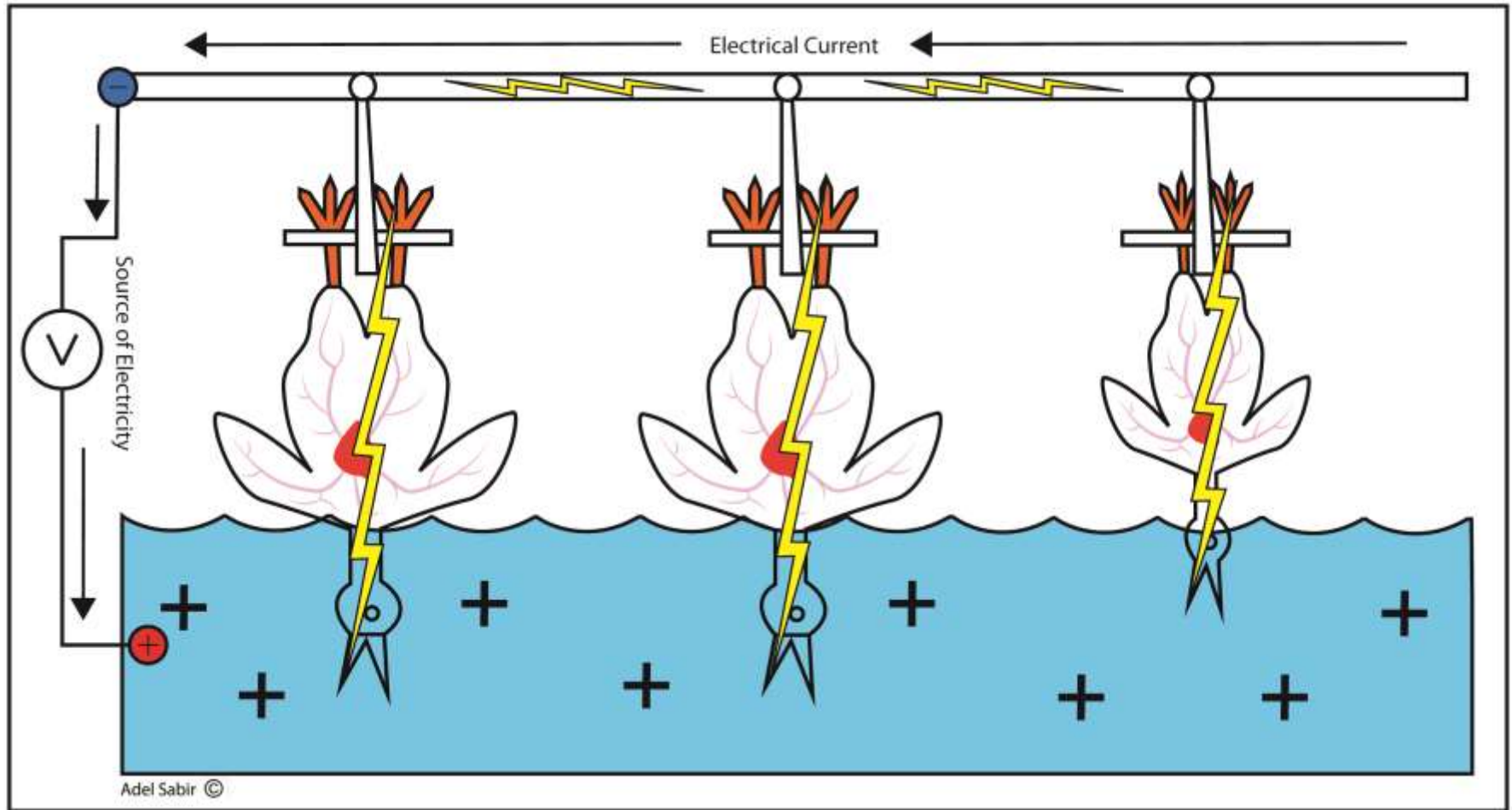
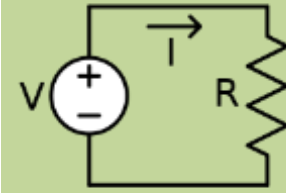
Certification Bodies have religious responsibility as well as to Muslim consumers that:

- *To ensure Animal Welfare (Al-Ihsan) is maintained during slaughtering process until death is definite.*
- *To ensure that Birds are alive at time of Slaughtering and that death happened as a result of Bleeding.*



WATERBATH STUNNING SYSTEM

IS IT HUMANE? IS IT HUMANE?



WATERBATH STUNNING SYSTEM

IS IT HUMANE? IS IT HUMANE?

