



STUNNING OF POULTRY: The Sharī Perspective on Multiple-Bird Water Bath Stunning of Poultry

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Abstract

Multiple-bird waterbath stunning, due to its effectiveness and commercial viability is the only stunning method adopted for poultry, in what is termed the developed world. It can meet the public demand whilst maintaining good animal welfare standards. However, research over the last decade or so has challenged this view that stunning through this process is as humane as possible, causing no harm to the bird, which is then slaughtered by a machine or in the case for Muslims, a Muslim slaughterer. This coupled with the view amongst many Muslims and some ḥalāl certification bodies that stunned poultry does not meet the criteria of ḥalāl slaughtering required a study to determine the veracity of this view. The research presented in this study found that animals are subjected to harm and pain through shackling and more importantly due to huge differences in bird impedances, some birds are not stunned unconscious, but instead suffer stun shocks and head immersion in water; these are for those birds that are receiving a lower current due to their higher impedances. As for those with lower impedances then they receive a higher current which brings about cardiac arrest; it therefore means that the bird is already dead before slaughter.

Based on the findings of this report the process of stunning by multiple-bird waterbath is ḥarām as it harms some birds and kills others. Those birds which are harmed or those which are stunned effectively would be considered as ḥalāl in the broadest sense of the term, however all the birds produced from this process are mashkūk (doubtful) as there is no reliable method of ascertaining death in the birds. Those birds which are killed are ḥarām and not permissible to eat and the problem is compounded as there is no means to separate them from the others. Head-only stunning in a non-shackled situation and controlled, sensitive gas methods are reasonable possibilities but further research is required to determine accurate and reliable electrical and gas parameters respectively. In current circumstances Muslims should take benefit of the exemption from stunning of poultry and consume non-stunned only.

Keywords: multiple-bird waterbath stunning, poultry, electrical stunning parameters, slaughter, ḥalāl, consciousness, broiler

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Introduction

The term ḥalāl has virtually become exclusive to foods and drinks in the modern world; and in fact, has become solely dedicated to poultry and meat in terms of whether it is permissible or not to consume. Every act of a Muslim when conducted in a manner which Allah or His Prophet has set out and as a result is termed ḥalāl, is an act of worship and to act in the contrary is an act of disobedience and as a result is ḥarām; there are also lesser grades of the two in between. Therefore, in a broader context, ḥalāl is a term defining what is permissible to engage in, hence in the area of foods, it is what can be consumed. The conditions for determining whether an animal is permissible to consume when being slaughtered is that the one slaughtering the animal is a human and is a Muslim; hence machine-slaughter is not permitted. A sharp knife must be used with the majority of the four neck vessels being cut (jugular veins, carotid arteries, trachea and oesophagus); *tasmiya* (the name of Allah) should be recited at the time of slaughtering by the slaughterer; hence recordings of this prayer or general *tasmiya* on all animals is not permitted. The blood should be allowed to pour out of the body, and adequate drainage should be facilitated in order to remove as much of the ḥarām blood from the animal as possible. What is more relevant to our study is that the animal is alive at the time of slaughter, even if not conscious according to some. It is this point which has caused some debate and difference between ḥalāl certifying bodies when determining whether stunned animals previous to slaughter are permissible to consume. The first argument is since it is not the prophetic way to stun animals before slaughter and the regulations permit Muslims, along with Jews, to continue to slaughter animals un-stunned then why adopt this methodology. Others have argued that the scale of demand and quality of wings requires a faster process and one that inhibits excessive bird flapping which can only be achieved by stunning. Even those that disagree with stunning accept that the animal stunned unconscious and then slaughtered would be ḥalāl to consume. Similarly, both positions also agree that an animal stunned to death will not be ḥalāl even if slaughtered post-mortem. As a result, the disagreement is based on whether a bird dies after stunning or not? Our focus for this study is to determine whether poultry stunned using a water-bath are still alive before slaughter. Initially however we will revisit the regulations to ascertain the legal position with respect to the obligation of stunning for Muslims.

Regulations on the Protection of Animals at the time of Slaughtering

The key regulatory text with respect to our study is the ‘Council Regulation (EC) No 1099/2009 of September 2009 on the protection of animals at the time of killing.’ In paragraph 18 it is clear that there is exemption from stunning in the case of religious slaughter in slaughterhouses granted by the Directive 93/119/EC. This is based on the “freedom of religion and the right to manifest religion or belief in worship, teaching, practice and observances, as enshrined in Article 10 of the Charter of Fundamental Rights of the European Union” (European Union, 2009, p. 3). There is an acknowledgement that certain stunning methods are irreversible, in that they will lead to death, whereas others would require some other means to bring about death. Annex I of the regulations details the stunning methods and divides them into three main areas; mechanical, e.g. captive



bolt; gas, e.g. carbon dioxide and electrical, e.g. electrical water bath. The electrical requirements for chickens in a water bath vary according to the frequency.

<200Hz will be at 100mA

200-400Hz will be at 150mA

400-1500Hz will be at 200mA

There is an acceptance in Annex II paragraph 5.9 that when there is a breakdown or a delay in the line then the slaughterer must have access to the water bath stunning equipment in order to bleed the birds. This highlights that there will be situations in which stunned birds gaining consciousness could drown if the slaughterer does not get to the bird or if the line restarts and the slaughterer is unaware that these birds may already be dead due to drowning. The Commission realised the inhumane aspect of the electrical water bath method, which will be discussed later, and as a result on page 17 in Article 27(3) it stated,

No later than 8 December 2013, the Commission shall submit to the European Parliament and to the Council a report on the various stunning methods for poultry, and in particular multiple-bird water bath stunners taking into account animal welfare aspects, as well as the socioeconomic and environmental impacts.

We turn to this report next. The study identified that 80% of broilers (those chickens raised for meat; it is 83% for spent laying hens, those that produced eggs) were stunned using water bath and 20% by CAS (Controlled Atmosphere Stunning – gas methods). The other methods are head-only stunning and LAPS (Low Atmosphere Pressure Stunning – oxygen is removed rather than an introduction of a gas cf. gas methods) (European Commission, 2013). The reason for the report was that the European Food Safety Authority in 2004 highlighted two problems with multiple-bird water bath stunners:

1. Inversion and shackling of birds is painful which can bring about bones' dislocation and fractures, especially for spent laying hens,
2. The amount of current delivered to each bird varies due to the impedance (electrical resistance) of each bird and cannot be controlled.

These are also of grave concern from an Islamic perspective in declaring the process of poultry passing through a multiple-bird water bath stunner as a sound practice and the subsequent slaughtered poultry as *ḥalāl*. Due to these concerns electrical parameters were set at 150mA current between 200 and 400Hz. It also stressed the importance of CAS as it addressed both concerns, however it was found to be cost-intensive; not only was installation eight times as expensive, it cost approximately one and a half times more per bird. The report does suggest that appropriate stunning parameters set on multiple-bird water bath stunners could make the stunning reversible, but that would mean decreasing the stunning parameters and as a result some birds will not be properly stunned; so they will be distressed and feel pain through being neck deep in water and pre-stun shocks. We next turn to discuss the various poultry stunning methods as an overview of the topic before we discuss water bath stunners in detail.



Poultry Stunning Methods

There are a number of methods which may be used to render a bird unconscious in order to then kill it or to kill it through the process of initially rendering it unconscious itself. As it was noted above the commercially viable method of stunning is the multiple-bird water bath stunning method, however we will explore these in case in the future that one of them becomes more viable.

The methods can be divided into three means of bringing about stunning as LAPS can be considered under Gas Mixtures.

Gas Mixtures

Carbon dioxide introduced into air with or without oxygen can bring about stunning in poultry, however Raj discovered that due to carbon dioxide being an acidic gas and pungent when inhaled in large concentrations then birds would experience unpleasant sensations. This would be exacerbated because of the fact that it is also a respiratory stimulant which could cause breathlessness (Raj A. B., 1996). Replacing carbon dioxide with an inert gas, like argon, xenon or krypton would overcome these issues and it has been shown these gases demonstrate anaesthetic properties, however the costs are prohibitive to be seriously considered as a contender (Raj & Tserveni-Gousi, 2000). Carbon dioxide mixed with argon can also bring about the desired effect without the unwanted properties of carbon dioxide alone.

In summary, there seems to be merit in the use of gas mixtures to bring about the loss of consciousness in birds. Some have been found to bring about death whilst others have brought about unconsciousness. There is clearly much more research that needs to be conducted in order for Muslim jurists to be confident that birds are alive before they are slaughtered. However due to the commercial constraints on this method that may not be immediately forthcoming and as a result may remain a viable possibility until further investigation.

Low Atmosphere Pressure Stunning

LAPS is similar in principle to the gas methods but in this case rather than replacing the air with a gas, air is removed progressively until there is a lack of oxygen which induces stunning. It is currently not permitted in the EU, but the expectation is that it may eventually be, however there is a welfare concern as insufficient research exists to be able to make a sound decision. However, this method would bring about irreversible unconsciousness which would be considered as *ḥarām* (EFSA AHAW Panel, 2014).

Mechanical

There are two distinct approaches in mechanical slaughtering based on whether the bolt penetrates (percussive) the skull of the bird or not (concussive); in which both bring about concussion but the former also causes structural damage to the brain. The penetrating captive bolt can be inconsistent where in some cases it has been shown to kill the bird and in other cases, if fired perpendicular to the surface of the skull then it does not stun the bird but causes great harm (Raj & Tserveni-Gousi, 2000, p. 302).



This approach seems both inconsistent and high probability of causing harm to the bird exists; however, all that seems academic due to the fact of the high turnover of poultry at slaughterhouses this would not be commercially feasible.

Electrical

The focus for this section will be head-only electrical stunning rather than multiple-bird water bath stunning even though it also is electrical, as it is the main focus of the study, I will discuss it in detail. Head-only stunning has the possibility of being commercially viable as it has the potential to meet the rates of a small-sized slaughterhouse. The bird will still require to be restrained in some way so that the stunning electrodes can be placed on either side of the head; due to the need of good contact it is essential the electrodes are kept clean. Another way to achieve head-only stunning is to shackle the bird as normal but dip the heads only in the water. In this case the current does not pass through the body but from one side of the water bath to the other and as a consequence passes through the heads of the birds. It was found that when the head was immersed in water of conductivity 2.5mS/cm with a 50Hz and 20V/cm electric field then immediate and sustained unconsciousness was achieved for 30s. The wing flapping was managed by passing a 2000Hz, 25-40mA current through the bird simultaneously (Lines, Raj, Wotton, O'Callaghan, & Knowles, 2011) However the concern of harm due to shackling remains. The voltage needs to be set in such a way that the minimum current can be applied to each bird, which it must be added, is the advantage of this process as it eliminates incorrect current due to the difference in bird impedance. Head-only electrical stunning experiments on chickens with setting of 90v for 4s at 50Hz AC followed by neck cutting resulted in an isoelectric EEG and this continued until death occurred by loss of blood (Richards & Sykes, 1967).

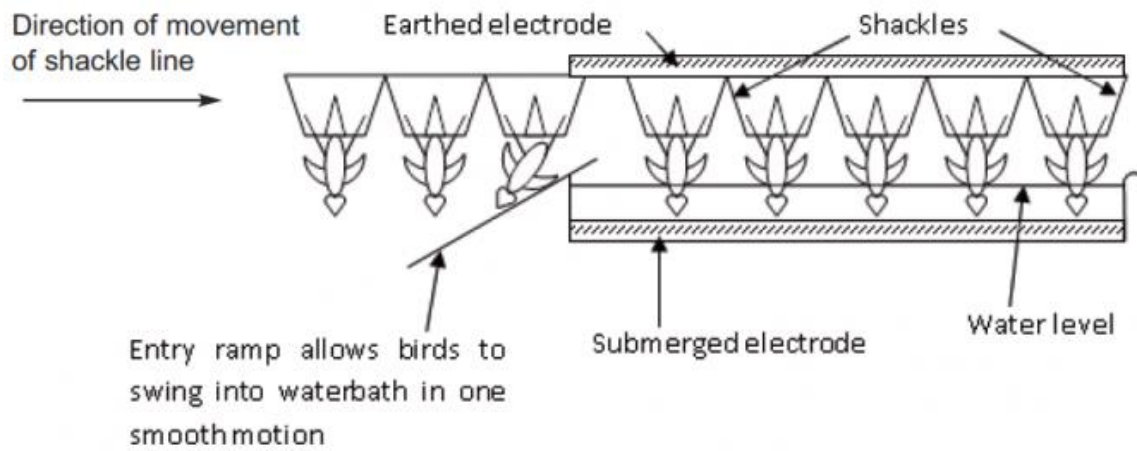
Gibson et al conducted an experiment in which birds were stunned with a 50Hz sine AC delivered through a constant voltage stunner. They demonstrated that the head-only electrical stunning causes the brain to dysfunction which results in recoverable unconsciousness; the reason why this stun is reversible is because it does not bring about cardiac arrest. They drew a distinction between head-only and back-of-the head stunning as the latter produced a shorter stun and recommended that further work is conducted in order to determine reliable and consistent minimum currents for stunning (Gibson, Taylor, & Gregory, 2016). This seems a potentially viable method of stunning, if stunning was to be adopted in the ḥalāl slaughter method but it should be conducted in a non-shackled way; having said that the issue of severe wing flapping will need to be dealt with. This could be reduced, if not completely eliminated, by a high frequency current through the spinal cord (Hillebrand, Lambooj, & Veerkamp, 1996).

Multiple-Bird Water Bath Stunning

In a multiple-bird water bath stunner the current flows from the bath through the birds to the shackle line, which is the earth. There is huge variation in this process due to the electrical frequency, the waveforms, whether sine or square wave, the current applied to each bird, the number of birds, duration of stunning and the time the blood vessels are cut at the time of exsanguination (Raj & Tserveni-Gousi, 2000, p. 293; Raj A. B., 2006).



Figure 1 – Multiple-Bird Water Bath Stunner



Courtesy of Humane Slaughter Association [Accessed from <https://www.hsa.org.uk/pre-slaughter-handling--restraint/actions-that-may-minimise-the-risk-of-birds-experiencing-pre-stun-shocks> on 25th December 2018]



Courtesy of BOS Fabrication Engineering Services. Accessed from http://www.bfeservices.com.au/machines/stunning_machine.html on 26th December 2018.



There are some basic requirements to ensure good stunning via the water bath

- i. Sufficient voltage to the water bath to ensure that every bird receives the recommended minimum current,
- ii. The electrode in the water bath must extend the complete length of the water bath,
- iii. It is essential there is good contact between the shackle and the legs of the birds,
- iv. The heads of the birds must be completely immersed in the bath.

However in this set-up one major issue arises which cannot be circumvented and that is due to the variance in impedance in birds, then the current will vary from bird to bird and as a result some birds will receive more than the necessary current and as a result cardiac arrest can take place and the bird would die or that there is an insufficient dose and the bird is not stunned unconscious and as a result is in panic and pain whilst on its way to the slaughterer.

The range of bird impedances can be seen below.

Table 1 – Range of Poultry Impedances

Bird Type	Effective Bird Impedance Ω
Broilers	1000-2600
Hens	1900-7000

[Courtesy of J. M. Sparrey, P. J. Kettlewell, M. E. R. Paice and W. C. Whetlor in Development of a Constant Current Water Bath Stunner for Poultry

It is important to demonstrate the impact of this variance in bird impedance by an example which Sparrey et al suggest in order to fully appreciate the difference in the resultant current (Sparrey, Kettlewell, Paice, & Whetlor, 1993, pp. 268-9),

As an example, if four birds with impedances of 1886, 1250, 1194 and 1498 Ω are in the bath simultaneously, then with a supply voltage of 100V and a source resistance of 100 Ω , the total current would be 220.9mA. The average current per bird would be 55.2mA, but individual currents would be 41.3, 62.3, 65.3 and 52.0mA respectively a variation of 20% from the average value. These differences are more difficult to predict if the current flows in alternative low impedance pathways within or externally to a bird and in parallel to the brain or heart.

What they do not mention is that the range is 24mA, a difference of over 60% and with the difficulty in predicting the individual currents as less-resistant pathways will be found, means this process becomes even more uncertain. Therefore, in order to compensate for that, as there is no way at the moment to measure the current each bird receives in a commercial setting, an increase in voltage would be required; this would mean that low impedance birds would receive very high currents which would bring about their death (Sparrey, Kettlewell, Paice, & Whetlor, 1993, p. 269).

One can attempt to determine the minimum current in the laboratory, but the EEG (electroencephalography) does not show grand mal epileptic activity which would indicate a loss of consciousness (Raj & Tserveni-Gousi, 2000, p. 294). It has been shown that a sinusoidal waveform at 50Hz AC at a current of 148mA on average per bird brings about cardiac arrest in 99% of chickens (Gregory & Wotton, 1987); and with a sine wave AC at 50Hz with 120mA on average per bird brings about cardiac arrest in 90% of birds (Gregory



& Wotton, 1990). Prinz et al have conducted a great deal of research in determining the electrical stunning parameters for broilers. Four hundred and sixty-seven broilers were stunned for 10s using a pulsed direct current (pulsed DC) in an electrified water-bath for 60, 80, 100, 120 and 150mA at frequencies of 70, 100, 200, 400, 800 and 1500 Hz. When the stunning current was set at 120mA at a frequency of 70 or 100Hz or when at 150mA with a frequency of 200Hz then more than 80% of the birds did not resume breathing. When currents were set at 80 and 100mA with a frequency of 70 or 100Hz then unconsciousness was achieved in 90% of the birds who recovered within a minute; direct current causes less cardiac arrest during stunning (Prinz, Van Oijen, Ehinger, Bessei, & Coenen, Effects of Waterbath Stunning on the Electroencephalograms and Physical Reflexes of Broilers using a Pulsed Direct Current, 2010; Raj A. B., 2006). When the same experiment was carried out using alternating current (AC) they found that more than 80% of the birds stunned with 70 or 100 Hz at 100mA or 70, 100 and 200Hz with 120 and 150mA did not resume breathing or gain consciousness (Prinz, Van Oijen, Ehinger, Coenen, & Bessei, Electroencephalograms and Physical Reflexes of Broilers after Electrical Waterbath Stunning using an Alternating Current, 2010; Raj A. B., 2006). When assessing the different waveforms together, they concluded that the stunning current will vary depending on the waveform. Therefore, in order to achieve a 90% stunning efficiency, 70mA was required for sine wave AC, 90mA for rectangular AC and 130mA for pulsed DC (Prinz, Van Oijen, Ehinger, Bessei, & Coenen, 2012; Raj A. B., 2006).

In addition to the concerns raised by EFSA above, others have been mentioned by both authorities and experts in the field. The real risk of pre-stun shocks, suboptimum stuns are added to the two already stated of suspension of conscious birds upside down, which causes pain and damage and the variation of electrical current due to differences of the chickens' impedances (Hindle, Lambooi, Reimert, Workel, & Gerritzen, 2010; EFSA, 2014).

Furthermore, there is an admission that very little research has been conducted into the effectiveness of the electrical settings used in stun-baths. In fact, the work that has been done has been focussed in ensuring the birds are rendered unconscious rather than if they are killed and it has been found that birds are not stunned effectively or do not immediately become unconscious (Shields & Raj, 2010).

The key issue is not the type of current and its level, but rather is the variation in impedance in the current's pathway; this varies due to natural variability in the bird or in the system (Bilgili, 1999; Kettlewell & Hallworth, 1990). Ohm's Law, the most fundamental law of electricity ($V = IR$) which in our circumstance means that if the voltage (V) is constant and the resistance or impedance (R) varies from bird to bird then that would mean the current (I) delivered to every bird would be different. Some birds would receive a lower current and as a result will feel pain and distress due to shocks and others would receive a higher current which would bring about cardiac arrest and kill the bird before ritual slaughter. In the bird the variables would be due to body size, body muscle, fat content and the condition of the plumage; also, whether the feathers are wet, dry or dirty, the depth the bird is immersed into the water and the tightness of the shackles (Kettlewell & Hallworth, 1990; Bilgili, 1992; Boyd, 1994). This issue of contact on the shackles has been noticed when comparing male and female birds as female birds require a higher current due to poor contact on shackles as their legs are smaller. In fact, a 30% difference in required current on average was seen between the male and female broilers. This is of huge



concern as both genders are stunned together on multiple-bird stunners and selecting the appropriate current will be difficult. As setting it for the male broiler would mean that the female broilers are suffering pain and distress and setting it for the female broiler would mean that the male broilers could be suffering cardiac arrest and dying. The conclusion they reach is that low frequency-alternating currents induce death in most birds hence high frequency should minimise that; also that pulsed DC stunning can reduce the occurrence of death (Prinz, Van Oijen, Ehinger, Bessei, & Coenen, 2012, pp. 1002-4).

Table 2 – Means and SD of the current obtained by male and female broilers in response to different waveforms

Waveform	Voltage	Root mean square current per broiler (mA)	
		Males	Females
Sine Wave AC	60	72 +/- 8	52 +/- 10
	80	92 +/- 14	73 +/- 6
	120	174 +/- 22	138 +/- 15
Rectangular AC	60	67 +/- 6	48 +/- 7
	80	91 +/- 12	71 +/- 9
	120	153 +/- 21	117 +/- 15
Pulsed DC	60	61 +/- 7	36 +/- 10
	80	78 +/- 17	57 +/- 10
	120	128 +/- 24	103 +/- 15

Courtesy of S. Prinz, G. Van Oijen, F. Ehinger, W. Bessei and A. Coenen in Electrical waterbath stunning: Influence of different waveform voltage settings on the induction of unconsciousness and death in male and female broiler chickens, *Poultry Science*, 91, 2012, p. 1002.

Similarly spent laying hens also showed higher resistance which has been attributed to the thinner legs and tougher skin. In the electric bath the variables are mineral content, dirt and brine content which all affect the conductivity (Bilgili, 1992; Boyd, 1994). In short, stunning birds using a multi-bird water bath stunner is an extremely complex operation with many variables and is extremely difficult, if not impossible, to control in order to adequately stun the birds without it being ineffective or bringing about cardiac arrest (Raj A. B., 2004). Similar arguments were posited by others who investigated stunning in ten slaughterhouses in Netherlands where they found in most cases blood splashing occurs which is a sign of cardiac arrest. They conclude that multiple-bird water bath stunning does not ensure effective stunning and advises that future legislation should consider the relationship between current and frequency which takes into consideration individual bird impedance and the effect on meat quality whilst maintaining appropriate animal welfare (Hindle, Lanbooj, Reimert, Workel, & Gerritzen, 2010). Another method has been suggested but has not been implemented in any slaughterhouse which is termed constant-current stunner. This type of stunner will facilitate control over the current flow to each individual bird by isolating each one, however as the shackles are only 15cm apart the birds are in contact with each other and due to the high processing speed, as high as 220 chickens per minute, there is serious doubt that it is possible to electrically isolate each bird. As a result, the commercial application of this method has been limited (Shields & Raj, 2010, p. 287).



It is quite clear that water bath stunning is a complex process especially when determining the appropriate current for each individual bird. The European Food Safety Authority carried out a detailed scientific study in 2012 and reported that to achieve an appropriate stun then the regulation should indicate for each bird the minimum current, frequency and current type as well as the wave characteristics, which concurs with this study's findings. In all the tests using various parameters as mentioned above a significant percentage of birds suffered cardiac arrest. On average 80% of Broilers receiving an AC suffered cardiac arrest; 70% of Laying Hens (AC) suffered cardiac arrest and 80% of Broiler (DC) suffered cardiac arrest. One very important conclusion this scientific study produced was that somatosensory reflexes (comb-pinch response) and muscle tone and direct observations (rhythmic breathing, seizures) are not sufficiently reliable indicators of insensibility at high frequencies. EEG methods are more reliable; however, it is not possible to link EEG phases to physical observations (EFSA Panel on Animal Health and Welfare (AHAW), 2012).

There is little doubt that a large percentage of birds are receiving inappropriate currents where in some cases the bird is not stunned and experiences pain during shackling, pre-stun shocks and being immersed in water before being slaughtered. The bird would be considered to be slaughtered correctly Islamically-speaking; however, the process is inappropriate. Whereas other birds will receive a current too high which would bring about cardiac arrest and as such will be dead before slaughtering; this would mean that the bird is not permitted for consumption for Muslims. But could these birds be determined to be alive or dead by somatosensory or direct observation? The scientific study by EFSA casts doubt upon that approach however we will look at it in more detail in the next section.

Determining Death in Poultry after Stunning

As a background we find that in the UK the proportion of animals stunned during ḥalāl slaughter is 63% for sheep and goats, 75% for cattle and 84% for poultry (Food Standards Agency, 2015).

Unfortunately, there is very little research in this area. Fuseini et al looked at three areas which are commonly used to determine life in an animal after slaughtering and dismissed them all as inappropriate (Fuseini, Knowles, Hadley, Lines, & Wotton, 2016).

Presence of Movement after Stunning

Movement can be observed in stunned cattle 180s after the start of bleeding when sufficient blood loss would have occurred bringing about death. Terlouw et al also observed that even when the spinal cord was severed (brain is disconnected from the spinal cord) the cattle continued to exhibit paddling and neck movement (Terlouw, Bourguet, Deiss, & Mallet, 2015) which are termed 'brain dead associated automatisms.' Therefore, it is not a reliable assessment of determining life in an animal and also it is impractical.

Presence of a Beating Heart

The whole debate as to how to determine death was explored in my other paper, 'Harvesting the Human' (Mohammed, 2017) and is also relevant here as brain stem death can occur but the heart could continue to beat until the oxygen supply to the heart is exhausted. As a result, a beating heart immediately after stunning is not a sure sign of life (Fuseini, Knowles, Hadley, Lines, & Wotton, 2016).



Presence of Bleeding-out

Numerous Ḥalāl certification bodies consider bleeding-out as an indication of live animals; they view the inability of carcasses to bleed-out at exsanguination as an indicator of death (Malaysian Standard MS1500, 2009; Halal Food Standards Alliance of America (HFSAA), 2016). There are numerous other reports of dead animals bleeding-out, some around six hours later; this has demonstrated that bleeding-out is not necessarily a function of a pumping heart. For instance, research has shown that when lambs are stunned head-to-back, which leads to death due to the cause of ventricular fibrillation, bleeding-out still occurred (Kirton, Frazerhurst, Woods, & Chrystall, 1981).

Conclusions

Commercial multiple-bird water bath stunners have been shown to be ineffective as a means to stun poultry in order to subsequently slaughter by a knife cut. Due to the large variability in the birds' impedances, it is clear that a significant number of birds will not be stunned effectively and will suffer pain and distress before slaughter which clearly goes against the spirit of Islamic slaughter even if the slaughtered bird will be considered ḥalāl. However, more significantly there will be a large proportion of birds that would die during the process of stunning due to cardiac arrest and their subsequent slaughter would be inconsequential and therefore these birds will not be considered ḥalāl for Muslim consumption. The other point is if there was a means of determining those birds which had died and separating them from the others then that could facilitate a more favourable understanding of the multiple-bird water bath stunner, however that is not the case. Taking into consideration that current regulations permit Muslims to be exempted from having to stun their animals before slaughter then this would render the stunning process as ḥarām, as it is either harming birds or killing them prior to slaughter; also, the birds which are killed by stunning are equally ḥarām. Furthermore, as there is no viable means of determining live birds from dead ones, then all the birds from this process would be considered as mashkūk (doubtful). Having said that, those birds that are stunned effectively and reach the slaughter's knife whilst still alive, albeit unconscious, then that animal is ḥalāl. Therefore, it is not the concept of stunning which is the issue, even though it is not a Sunna practice and as a result some have argued for its prohibition, but the effect this stunning process has on the birds. Looking ahead, those Muslim ḥalāl certifying agencies who see stunning of poultry as a means to assist in the slaughtering process then they should join animal welfare groups to move to head-only poultry stunning of non-shackled birds and certain gas methods, and lobby for research to be conducted so correct electrical and gas parameters are determined for commercial application.

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