The effect of electrical waterbath stunner, current frequency on the incidence of cardiac arrest in chickens.

**Stun/Kill:** Previous research with chickens (Gregory and Wotton, 1987) has shown that cardiac muscle is particularly sensitive to electrical stimulation at low frequencies. Figure 1, demonstrates that the magnitude of the applied current also contributes to the incidence of cardiac arrest (Stun/kill) and that at the minimum recommended alternating current (AC) of 105 mA per bird will result in the death of about 90% birds (Gregory and Wotton, 1988, 1990).

![Figure 1. The effect of current magnitude at low frequency (50 Hz) on the incidence of cardiac arrest in chickens (adapted from Gregory and Wotton, 1987).](image)

**Stun-to-stun:** Wilkins and others, (1998) showed that the use of frequencies greater than 50 Hz was associated with a failure to induce a cardiac arrest (table 1) and resulted in improvements in carcass and meat quality.
Table 1. The effect of stunning current frequency on the incidence of cardiac arrest in chickens (adapted from Wilkins and others, 1998).

<table>
<thead>
<tr>
<th>Live weight</th>
<th>50</th>
<th>50 clipped</th>
<th>100</th>
<th>500</th>
<th>1,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>89</td>
<td>71</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Medium</td>
<td>95</td>
<td>90</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low</td>
<td>88</td>
<td>88</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Therefore, where birds are processed for the Halal market, the use of high frequency pulsed DC will ensure that birds are not killed in the waterbath stunner but are alive when their necks are cut.

In birds that are ‘alive’ post-stunning the accuracy of the neck cutting procedure is vital to their welfare. Research by Raj and others, (2006) has demonstrated (figure 2) that when broilers are neck cut by a method that severs both carotid arteries, the time to loss of brain responsiveness is on average, 15 s. However if only one carotid artery is severed this time is extended to 35 s.

Figure 2. Time to less than 10% pre stun EEG activity in broilers.

References:


of alternating current used in water bath stunning and of slaughter methods on electroencephalograms in broilers. Animal Welfare. 15. 7-18.


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