

Navigating the Tide of Controlled Atmospheric Stunning (CAS) in Muslim Minority Countries

Imam Omar Subedar

Halal Monitoring Authority



Contents

What is Controlled Atmospheric Stunning (CAS)?	3
Why consider CAS for Halal Slaughter in Canada?	3
The Journey to CAS	7
Test 1: Post Stun Body Temperature and Bleed Test	10
Test 2: Post Stun Pulse Test	15
Test 3: Post Stun Pulse Test	19
Test 4: Post Stun ECG Test	20
Test 5: Post Stun ECG and Pulse Test	27
Test 6: Post Stun ECG and Pulse Test	30
Test 7: Post Stun ECG Test	36
Conclusion	40

What is Controlled Atmospheric Stunning (CAS)?

Controlled Atmosphere Stunning (CAS) is a pre-slaughter stunning method used for poultry, among other animals that employs the induction of gases to achieve progressive loss of consciousness in birds thus making it easy for them to be hung and slaughtered with minimal suffering. This method varies from Controlled Atmospheric Killing (CAK) where animals are euthanized through the induction of gases within the chamber they are held, consequently reducing their exposure to oxygen and resulting in their death.¹

For CAS, birds are placed in a crate at the grow-out farm, transported to a designated abattoir, stunned in the very same crates and are hung upon exiting the CAS station. This results in them being minimally handled in a conscious state, which is considered a major advantage for animal welfare.

All birds that die prior to stunning are detected and removed either before or after gas stunning. They are not to enter the food chain and compromise food safety.²

Why consider CAS for Halal slaughter in Canada?

Canada is currently home to approximately 1.8 million Muslims,³ making them 4.9% of the country's population. This is double what they were in 2001 at 2%. Islam is the second most reported religion in the country, trailing behind Christianity. In 2022, Canada welcomed 273,535 immigrants, of which 62,349 (23%) were from Muslim Countries such as Afghanistan, Nigeria, Syria, Pakistan and Iran.⁴ With nearly one in every four new immigrants being Muslim, the Muslim population is projected to grow to 2.7 million by 2030.

¹ <https://inspection.canada.ca/food-guidance-by-commodity/meat-products-and-food-animals/slaughter-methods-and-monitoring/eng/1539372028443/1539372028884?chap=5>

² <https://inspection.canada.ca/food-guidance-by-commodity/meat-products-and-food-animals/guidelines-for-stunning-techniques/eng/1538160892409/1538160892704#a18>

³ https://www.google.com/search?q=muslim+population+in+canada&rlz=1C1GCEA_enCA963CA963&oq=muslim+&aqs=chrome.2.69i57j0i67i650l2j46i67i175i199i650j0i67i650j0i67i131i433i650j0i67i650l2j0i433i512j0i512.4231j0j15&sourceid=chrome&ie=UTF-8

⁴ <https://www.cicnews.com/2023/02/ircc-unveils-the-top-10-source-countries-of-new-immigrants-to-canada-in-2022-0233180.html>

These growing numbers undoubtedly pose a great challenge for the accessibility of halal poultry in Canada for a few reasons. Firstly, poultry in Canada is regulated by a quota system.⁵

Canadians do not have the liberty to mass produce or import poultry outside of the system.

Secondly, the corporate philosophy that has been embraced on animal welfare throughout the Canadian poultry industry is that birds should be insensible at the time of shackling and bleeding. This can only be successfully accomplished through CAS, as opposed to the electric water bath system where 100% of the birds are conscious at the time of shackling while a small percentage of them remain so at the time of bleeding. It is for this reason that many major poultry abattoirs in the country have either made the switch from electric water bath stunning to CAS or are planning to do so soon.

Thirdly, there are five major companies producing halal fresh poultry for major retail outlets in Canada:

Brand	Company & Produced by	Type of Slaughter	Type of Stunning	Halal Certifier
Mina Halal	Maple Leaf Foods Inc.	Manual/Hand	CAS	HMA
Sufra Halal	Loblaws Companies Limited produced by Maple Leaf Foods Inc.	Manual/Hand	CAS	HMA
Zabiha Halal		Mechanical	CAS	CHFCA

⁵ <https://laws-lois.justice.gc.ca/eng/regulations/SOR-2002-36/FullText.html>

	Maple Lodge Farms			
Kirkland	Costco Wholesale Canada produced by Sofina Foods Inc. (Calgary) & Maple Lodge Farms	Mechanical	CAS	CHFCA
Zamzam	Sofina Foods Inc. (Port Coquitlam)	Manual/Hand	Electric Waterbath	HMA

According to Nielson Market Track, in 2022 there was 233,134,175 kgs of fresh chicken sold at retail in Canada. 10,803,816 kgs of that was halal. 92% of that halal chicken was stunned through CAS.

There are smaller operations that are provincially regulated and either use the electric water bath stun or no stun at all. They cater to second-tier markets such as small grocery chains, restaurants and processing facilities however, they do not possess the capacity to fulfill the current growing market demand. The following are examples of such operations:

Company	No. of birds killed per day	No. of days of operation	Type of stunning	Halal Certifier

Sargent Farms	40,000	5	Electric Waterbath	HMA
Sheik Halal Farms	5000 to 7000	4	Electric Waterbath	HMA
Sofina Foods	16,000 to 17,000	5	Electric Waterbath	HMA
Clarington Poultry	5000 to 7000	4-5	Electric Waterbath	HMA

Compare them to Maple Leaf Foods Inc., a federal establishment that has halal operations in Ontario and Alberta. In its London, ON plant, it currently slaughters approximately 400,000 chickens a day, five days a week.

Suggesting that Muslims begin their independent operations, although ideal is impractical to satisfy the current market demand as well. For example, in Ontario where 62% of all halal fresh chicken in the country was sold at major retail in 2022, the maximum number of birds a farmer can produce annually, quota free is 300. They can either use these birds for personal consumption or sell them at their farm gate. If some Muslims decide to obtain their own quota, they would first be required to prove to the province that the current allocation does not satisfy consumer demand. If proven, the minimum quota that would be allocated to them would be 14,000 units annually. One unit in Ontario equals 12.08 kg of live chicken, which would be approximately 5 to 6 birds per unit depending on their size. This would allow them to produce a maximum of 90,000 birds for the entire year at a cost \$1.75 million according to Practical

Farmers and Sustain Ontario.⁶ They could look at the Artisanal Chicken program, which is designed for farmers wanting to grow 600 to 3,000 chickens annually for select target markets such as local retail outlets, restaurants and farmers' markets. For 2023, a total of 146 applicants have been approved with an average allocation of 1646 birds for the entire year.⁷ It is clear that this program as well would be of minimum benefit to current halal poultry market.

Another important point to note is that in recent years, there has been a push towards irreversible waterbath electric stunning both from federal and provincial health inspection agencies. There is a growing environment of aversion towards reversible stunning thus putting many poultry abattoirs who wish to maintain the status quo in a predicament.

Considering these realities, it is only logical that CAS be looked further into, and an attempt be made to make this system shariah compliant, as opposed to dictating to the Canadian Muslim community that CAS is categorically haram based on the position that other certifying bodies in the world have taken. Issuing such fatwas prior to doing research would undoubtedly put the community into undue hardship (*haraj*).⁸

The Journey to CAS

In March of 2016, the HMA was informed by industry stakeholders that the poultry industry was going to begin a shift in their stunning procedures from the electric waterbath model to CAS. This was based on the belief that CAS is considered more humane for birds, better for animal welfare, and that many European countries had already made the shift. In the food industry, Canada typically follows Europe's lead and is usually five years behind them. This information was tabled to the Canadian Council of Muslim Theologians (CCMT) and it was decided that before dismissing the practice, the HMA should look more into it and then come back with their findings.

Hence, the HMA began researching CAS by studying multiple documents on what the procedure entailed. Documents such as "A Review of Different Stunning Methods for Poultry – Animal Welfare Aspects (Stunning Methods for Poultry)" by Charlotte Berg and Mohan Raj⁹ and

⁶ <https://www.betterfarming.com/online-news/groups-want-chicken-farmers-ontario-increase-quota-free-limit-11550#:~:text=Buying%2014%2C000%20minimum%20quota%20units,about%2090%2C000%20birds%20a%20year.>

⁷ <https://ontariochicken.ca/en/community-artisanal-chicken/>

⁸ *Haraj* is technically defined as every element that immediately or eventually leads to personal, physical or financial hardship above and beyond what has been sanctioned by the shari'ah.

⁹ *Animals*, 2015, 5, 1207-1219; doi:10.3390/ani5040407

Temple Grandin's article on Gas Stunning¹⁰ were reviewed while an effort to seek research material from other Islamic organizations throughout the globe on CAS was undertaken. There were a few fatwas that were obtained on the impermissibility of CAS but no research from any Muslim body was available for the HMA to review. The documents the HMA reviewed claimed that CAS:

- Did not result in immediate unconsciousness but induced it gradually
- Had several animal welfare and product quality advantages
- Kept the bird sedated long enough for brain death to occur at bleed out
- Is considered superior to electric waterbath stunning however, due to its historic connotations, the public may harbor negative sentiments towards it

In order to understand this procedure further, the HMA sent a delegation to GoldnPlump (GNP), a poultry abattoir located in Minneapolis, MN in November of 2016. This abattoir had implemented CAS in January of the same year and was slaughtering a million conventional birds a week. Upon witnessing the operation, the delegation felt that CAS may be doable for halal slaughter but with stipulations. As a result, after one year of research, the HMA developed some preliminary guidelines on the use of CAS for halal slaughter and then presented them to several Islamic Institutions throughout the world seeking their guidance and fatwa on the matter. The guidelines in brief were as follows:

1. The gas applied in the CAS Station must be 100% CO₂. No other gases may be used.
2. The maximum concentration that will be applied in the station will be 60%.
3. All birds must be alive at the time of slaughter supported by an adequate bleed out.
4. In the event of a mechanical breakdown, all birds in the CAS station until the slaughter area will be considered non-halal.
5. The electric waterbath stun will be used as a backup in the event of the CAS station being non-operational.

¹⁰ <http://www.grandin.com/gas.stunning.poultry.eval.html>

There are other technical guidelines that were formed however, they are not relevant for this report. It was also understood that the guidelines were open to modification if the HMA felt the need to amend them at any point.

After a period, fatwas were received from:

- The Academy of Research in Islamic Jurisprudence
- Darul Uloom Canada
- Jamiah Qasimul Uloom¹¹
- Mufti Khalid Rahmani

All have been published on the HMA website.¹²

The HMA then proceeded to test the application of the guidelines at Maple Leaf Foods Inc., Edmonton, AB in October of 2019. Since the birds were going to exit the CAS station with progressive loss of consciousness, the criterion that was developed to determine life in them at the time of slaughter was:

- All birds must be flaccid
- All post stunned birds must maintain the same body temperature as pre-stunned birds
- All birds must bleed the same amount as an electrically stunned bird
- All birds must have an active heartbeat at the time of slaughter

This criterion was decided considering what Ibn ‘Ābidīn al-Shāmī رحمته الله has written in his Radd al-Mukhtār, “Bazāzīyah has stated, ‘[It is written] in Ṭaḥāwī’s commentary: Blood coming out is not indicative of life except if it comes out the way it comes out from a living animal according to the Imam. This is the Ṣāḥih al-Riwāyah.’ [...] It is stated in Minaḥ: The principle is for something to remain in its default state. Hence, the cessation of life cannot be ruled on due to doubt. [...] Even if its life may be light [...] and that is by having enough life remaining it in that amounts to the life that remains in a slaughtered animal after being slaughtered [...]. This is what the fatwa is issued on.”¹³

¹¹ This institute has currently retracted their fatwa for modification purposes at the time of preparing this report.

¹² <http://hmacanada.org/what-is-halal/>

¹³ Radd al-Mukhtār 6:308

Imām al-Bukhārī has recorded in his Jāmi‘ al-Ṣaḥīḥ: Ka‘b ibn Mālik ؓ reported that he had a flock of sheep that would graze at Sal‘. A slave girl of ours saw a sheep from our flock dying, so she broke a stone and slaughtered it with it. Ka‘b told his family, “Do not eat it until I ask Allāh’s Messenger ﷺ or send someone to ask him.” He then either asked the Prophet ﷺ about this or sent someone to do so. The Prophet ﷺ instructed them to eat it.¹⁴

The Canadian Centre for Islamic Research and Iftā writes: In principle, an animal must be alive at the time of slaughter for it to be considered Halal. Regardless of the method utilized, determining its permissibility will depend on whether the animal was alive or not at the time of slaughter. Any minimal sign of life, such as an active heartbeat, would be sufficient.

Dr. Kathleen Long, a certified vet and the VP of Animal Care at Maple Leaf has written regarding controlled atmospheric stunned birds: In all cases, the detection of a regular heart rate is a sign of life.

To determine life in the birds based on the aforementioned criterion, a series of focused tests were conducted and continue to be conducted till this day to ensure that no compromise is made to the halal status of the slaughtered birds. The following are the tests that have been conducted to date:

Test 1: Post Stun Body Temperature and Bleed Test

Location: Maple Leaf Foods, Edmonton AB

Date: October 15, 2019

Specimen	Weight	Post Stun Body Temperature	Time After Exiting CAS	Total Blood Drainage

¹⁴ Ṣaḥīḥ al- Bukhārī 2304

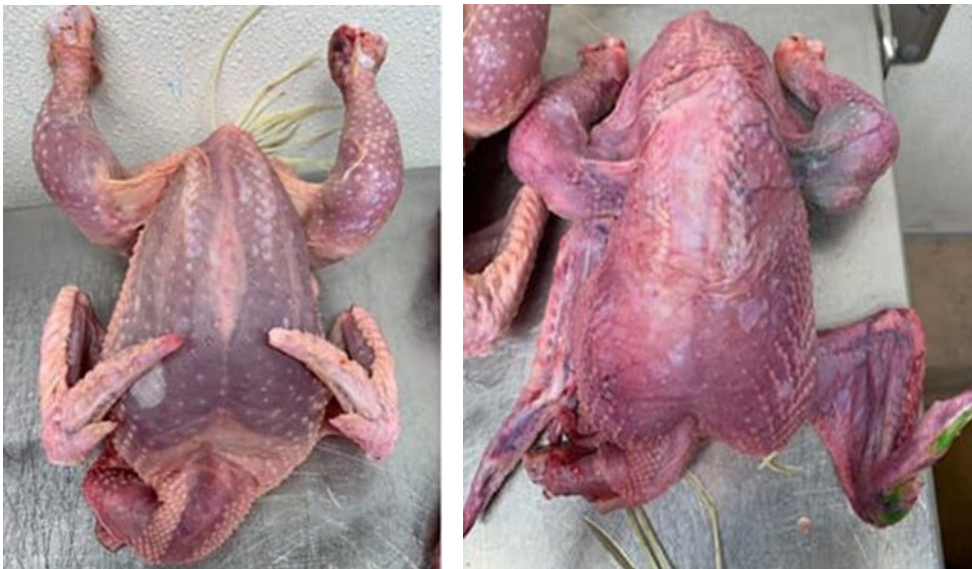
1	2.35 kg	40.1 C	4 minutes	95 ml
2	2.2 kg	40.1 C	4 minutes	73 ml
3	2.2 kg	41.9 C	4 minutes	73 ml
4	2.2 kg	40.1 C	4 minutes	76 ml
5	2.2 kg	40.5 C	4 minutes	77 ml

The stunner was set at 55% upon exit. The distance between the first hanger and the last slaughterer was 1:12 minutes while the distance between the last hanger and the first slaughterer was 42 seconds. The line speed was set at 110 chickens per minute. The average temperature of a non-stunned adult bird is between 40.6 C to 41.7 C. Dead birds are easily detected by the hangers as they are stiff and cold. An example of a live bird vs. a dead bird can be observed in the picture below:



The bird on the left is a dead bird pulled out by the hangers post CAS. Notice that it is stiff while the bird on the right is flaccid and warm.

The reason why blood drainage was tested was because dead birds don't bleed out the way a live bird does. A dead bird retains blood in the body and ultimately becomes a "red bird," which would be pulled out at evisceration. Such birds are condemned and are immediately discarded of. The following are samples of red birds:





Halal chicken that has been properly bled

An interesting observation that was made was that CAS chickens bled 10% more than electrically stunned birds at this facility. The average amount that a CAS chicken of 2.2 kg bled was 75 ml while that same size bird that was electrically stunned bled an average of 61 ml. The two are visually different as well. The CAS chicken is clearly whiter than an electrically stunned bird as can be observed below:



Electrically stunned birds at Maple Leaf Foods, Brampton ON Est. 196



CAS birds at Maple Leaf Foods, Edmonton AB Est. 7F

Another observation that was made was that both the CAS bird and the electrically stunned bird bled in the same manner. There was no difference in the way the blood flows out from the throat upon being cut as the pictures below demonstrate:



Electrically stunned bird bleeding out immediately after slaughter at an HMA certified facility



CAS bird bleeding out upon slaughter at Maple Leaf Foods, London ON Est. 901

Test 2: Post Stun Pulse Test

Location: Maple Leaf Foods, London ON

Date: March 3, 2023

Specimen	Pulse Reading	Time	Test Place
1	80 bpm	2:12 min	Leg
	75 bpm	2:50 min	Leg
	67 bpm	3:00 min	Leg
2	94 bpm	1:14 min	Wing
	92 bpm	1:34 min	Wing
	121 bpm	2:50 min	Leg
3	108 bpm	1:20 min	Leg
	108 bpm	1:37 min	Leg
	89 bpm	2:14 min	Leg
4 (DOA)	0	0	Leg
5 (DOA)	0	0	Leg
6	89 bpm	1:30 min	Leg
	76 bpm	5:44 min	Wing
	49 bpm	6:18 min	Wing

A CM560D-VET pulse oximeter was used for this test. The stunner was set at 66% upon exit.¹⁵ The current distance between the first hanger and the last slaughterer is 1:23 minutes while the distance between the last hanger and the first slaughterer is 35 seconds. The line speed is set at 225 chickens per minute. Specimens 4 and 5 were taken from the pile of dead birds that were pulled by the hangers post-CAS to see whether they had a reading or not, and to compare them to the live birds that were being tested. It is clear from this test that all birds were alive at the time of slaughter.

¹⁵ It should be noted that the initial guideline of the maximum concentration being 60% that was set was in light of the operation that was implemented in Edmonton AB. In London ON, the CAS station is far larger and holds more birds. Hence, the concentration of 66% was permitted after witnessing that it did not produce any adverse results.



CM560D-VET Pulse Oximeter



Test being conducted



Sample Reading

Test 3: Post Stun Pulse Test

Location: Maple Leaf Foods, London ON

Date: July 23, 2023

Specimen	Pulse Reading/ BPM	Time	Test Place
1	65	2:29	Leg
	110	3:14	
2	59	1:35	Leg
	97	2:39	
	97	3:00	
3	61	2:22	Leg
	56	3:36	
4	80	1:55	Leg
	75	2:30	
	74	3:00	
5	83	2:05	Leg
	77	2:35	
	77	3:00	
6	79	2:58	Leg
7	74	1:20	Wing
8	141	1:38	Leg
9	113	2:29	Wing
	113	3:00	
10	100	1:08	Leg
	100	2:00	

The apparatus used, the CAS concentration, and the line speed were all the same as Test 2, which was conducted on March 3, 2023.

Test 4: ECG Test

Location: Maple Leaf Foods, London ON

Date: August 28, 2023

Specimen	ECG Reading	Minutes	Test Place
1	150	1:11	Both legs and one wing
	157	2:06	
	175	2:47	
2	212	1:09	Both legs and one wing
	240	1:40	
	244	2:18	
	252	2:31	
	NR	3:20	
3	NR	NR	Both legs and one wing
4	74	1:26	Both legs and one wing
	71	1:53	
	84	2:09	
	86	2:35	
	91	2:51	
	139	3:10	
	5	45	
40		1:50	
78		2:00	
65		2:17	
NR		2:30	
6	111	1:10	Both legs and one wing
	134	1:30	
	NR	2:00	
7	98	1:25	Both legs and one wing
	104	1:41	
	100	2:00	
	112	2:23	
	121	2:41	
	NR	2:54	
8	176	1:24	Both legs and one wing
	181	2:00	
	187	2:30	
	NR	2:45	
9	86	1:07	Both legs and one wing
	83	1:30	
	77	1:53	
	80	2:17	
	78	2:50	
	154	3:00	
10	103	1:26	Both legs and one wing
	113	1:40	
	118	1:55	
	115	2:40	
	137	3:00	

11	210	1:02	Both legs and one wing
	160	1:35	
	150	1:52	
	123	2:18	
	101	2:41	
	235	3:04	
12	140	1:29	Both legs and one wing
	NR	2:20	
13	115	1:00	Both legs and one wing
	250	1:45	
	315	1:51	
	272	2:22	
	NR	2:40	
	34	3:00	
14	242	1:10	Both legs and one wing
	250	1:23	
	255	1:42	
	96	1:53	
	93	2:22	
	86	2:36	
	89	2:50	
	90	3:00	
15	124	1:18	Both legs and one wing
	125	1:30	
		2:03	
	80	2:20	Both legs and one wing
16	170	1:05	
	173	1:30	
	169	1:53	
	67	2:37	
	NR	2:50	
	24	3:00	
17	268	1:14	Both legs and one wing
	263	1:33	
	220	1:53	
	NR	2:04	
18	97	1:00	Both legs and one wing
	212	1:13	
	100	1:28	
	222	1:45	
	208	2:00	
	184	2:24	
	101	3:00	
19	80	1:55	Both legs and one wing
	82	2:07	
	80	2:33	
	65	2:55	
20	70	1:08	Both legs and one wing
	83	1:26	
	195	1:55	
	131	2:06	
	62	2:36	
	65	3:03	

21	45	1:28	Both legs and one wing
	44	1:55	
	NR	2:07	
	NR	2:30	
	NR	3:00	
22	73	1:11	Both legs and one wing
	NR	2:27	
	NR	3:00	
23	27	1:09	Both legs and one wing
	176	1:22	
	93	2:02	
	192	2:18	
	120	2:34	
	66	2:45	
	57	2:56	
24	128	1:21	Both legs and one wing
	282	1:45	
25	30	1:54	Both legs and one wing
	82	2:10	
	NR	2:25	
	23	2:57	
26	83	1:26	Both legs and one wing
	NR	2:12	
	70	2:28	
27	200	1:15	Both legs and one wing
	205	1:34	
	195	1:52	
	210	2:09	
	214	2:33	
28	39	1:21	Both legs and one wing
	81	1:31	
	67	1:47	
	76	2:00	
	80	2:08	
	75	2:20	
	88	2:30	
	91	2:58	
29	240	1:49	
	73	2:01	
	165	2:25	
	201	2:40	
	200	3:00	
30	201	1:40	Both legs and one wing
	212	1:53	
	128	2:15	
	NR	2:28	
31	101	1:11	Both legs and one wing
	250	1:21	
	94	1:37	
	114	2:00	
	131	2:27	
	113	2:54	
	122	3:19	
	50	4:19	
	NR	4:33	

*NR= No Reading

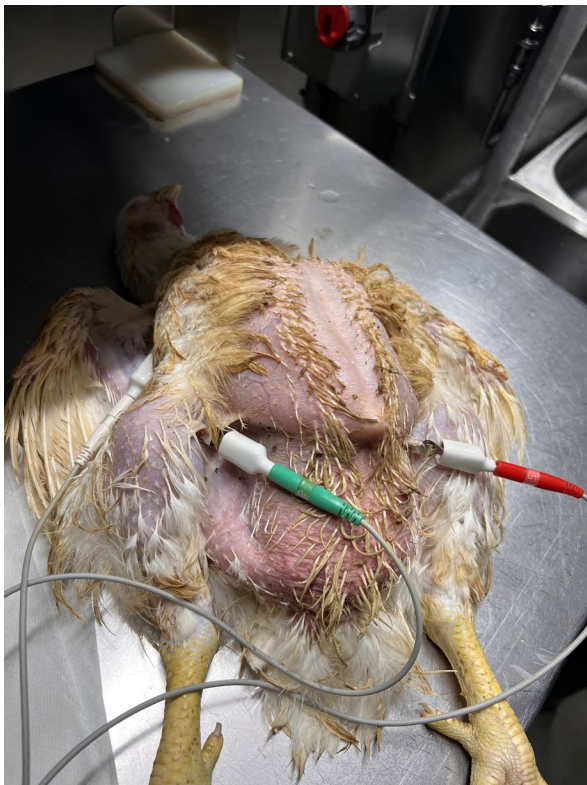
This test was conducted by Dr. Kathleen Long, the VP of Animal Care at Maple Leaf Foods along with an assistant of hers in the presence of two HMA personnel. Select birds were taken upon exiting the CAS station and were connected to a three-lead PC-VetChek wireless ECG monitor. It took approximately one minute for the birds to be taken from the hangers' station, brought to the test table and hooked up to the device. Hence, all readings began after the one-minute mark. The readings above were recorded by the HMA at different intervals, independent of Dr. Kathleen's readings. There were clear connection issues with the device being used as a heartbeat would disappear and reappear on the monitor regularly. Birds that didn't show a reading at the time of the recording were marked as NR. The birds were taken from the non-halal operation and were tested for a maximum of 3.5 minutes. Thereafter, they were returned to the line. The three-minute mark was chosen to be the cut-off for the testing as it is more than double the time it takes for a halal bird to be slaughtered post-CAS. The stunner again was set at 66% upon exit.

Upon concluding the tests, three birds were taken from the slaughter area, slaughtered and measured for blood drainage. The average bird size was 2.3 kg. The results were as follows:

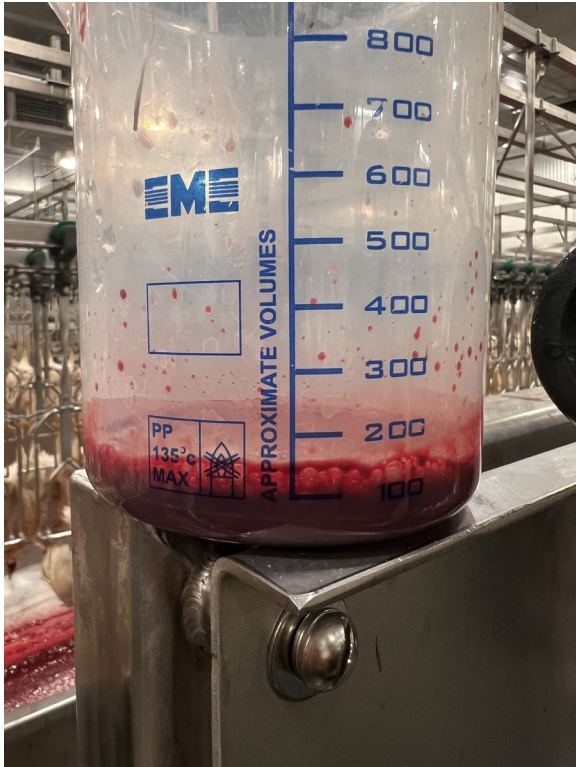
- Bird 1: 100 ml
- Bird 2: 98 ml
- Bird 3: 105 ml



PC-VetChek Wireless ECG Monitor



Bird being tested



Blood drainage of Bird 1

Test 5: ECG and Pulse Test

Location: Maple Leaf Foods, London ON

Date: August 29, 2023

Specimen	ECG Reading	Pulse Reading	Minutes
1	125	NR	1:27
	84	70	2:15
	28	NR	2:35
	NR	70	2:47
	NR	47	4:14
	NR	47	4:30
2	100	NR	1:24
	95	NR	2:00
	60	NR	2:39
	NR	51	2:56
	NR	52	3:36
	148	52	3:51
3	62	NR	1:24
	90	NR	1:35
	NR	142	2:20
	147	NR	2:40
	NR	123	3:40
	NR	123	4:00
4	164	NR	1:29
	105	39	1:34
	63	NR	2:05
	45	NR	2:22
	NR	49	3:07
5	26	NR	1:09
	169	NR	1:30
	171	NR	1:43
	165	NR	2:03
	71	53	2:30
	41	58	2:51
	86	58	3:14
6	205	NR	1:30
	208	NR	1:47
	51	NR	2:11
	NR	NR	2:19
	NR	96	2:43
	NR	96	3:15
7	45	NR	1:30
	NR	112	2:05
	NR	121	2:25
	73	NR	2:44
	111	NR	3:00
8	82	NR	1:04
	85	NR	1:30
	89	NR	1:49
	83	NR	2:00
	78	NR	2:21
	75	NR	2:50
	NR	51	3:30
9	220	NR	1:24
	80	NR	1:38
	75	NR	1:53
	96	113	2:03
	140	NR	2:18
	NR	165	2:40
	NR	165	3:06
10	154	Not Tested	1:11
	152		1:23
	130		1:47
	110		2:10
	NR		2:33

Dr. Kathleen Long along with an HMA representative conducted this test using both the PC-VetChek wireless ECG monitor and the CM560D-VET pulse oximeter. The purpose of this test was to observe whether absent readings from the ECG monitor were due to the absence of a heartbeat or a connection issue. All specimens were first connected to the ECG monitor prior to being connected to the pulse oximeter. Hence, the delay in the readings of the pulse oximeter in the results above. There was a clear discrepancy between the readings of both devices. The pulse oximeter typically had a lower reading than the ECG monitor however, it also had prolonged and consistent readings as opposed to the ECG monitor. One thing it did bring to light was that when the ECG was not picking a reading, the pulse oximeter was, which shows that the absence of an ECG reading is not necessarily due to the absence of a heartbeat.

Test 6: ECG and Pulse Test

Location: Maple Leaf Foods, Edmonton AB

Date: November 15, 2023

Specimen	ECG Reading	Pulse Reading	Minutes	Test Place
1	149	Not Tested	1:01	ECG: Both legs and right wing
	77		1:26	
	93		1:38	
	80		1:53	
	103		2:12	
	72		2:38	
	78		3:00	
	42		3:39	
	49		3:56	
	46		4:40	
	60		5:00	
	NR		5:29	
	2		NR	
177		NR	2:26	
NR		NR	4:00	
3	114	Not Tested	1:18	
	98		1:30	
	106		1:41	
	109		1:52	
	170		2:10	
	141		2:33	
	127		3:11	
	133		3:35	
	NR		3:54	
4	173	Not Tested	1:25	
	115		1:41	
	101		2:17	
	74		2:35	
	78		2:54	
5	237	112 95	0:38	
	282		1:15	
	237		1:28	
	130		1:53	
	171		2:37	
	120		3:38	
	76		4:16	
	58		5:02	
	52		5:25	
	55		5:47	
NR	6:00			
6	226	138	6:11	
	151		1:00	
	154		1:20	
	120		1:30	
	120		1:54	
	255		2:10	
	244		2:44	
	35		2:44	
7	NR	99	3:02	
	172		3:10	
	176		0:45	
	101		1:03	
	114		1:21	
	129		1:45	
	73		2:06	
8	103	Not Tested	2:21	
	91		2:21	
	104		2:58	
	136		0:44	
	137		1:08	
	110		1:25	
	117		1:57	
			2:18	
			2:44	
			3:00	

9	205	81	0:46
	176		1:05
	180		1:30
	42		2:22
	NR		2:37
10	77	Not Tested	0:42
	240		1:05
	272		1:21
	64		1:52
	68		2:04
	88		2:26
	77		2:41
	52		3:01
11	138	Not Tested	1:01
	220		1:18
	100		1:53
	129		2:14
	141		2:27
	107		2:42
	85		3:04
12	162	103	0:57
	190		1:24
	50		1:37
	NR		1:48
	NR		2:25
13	90	Not Tested	1:17
	43		1:28
	180		1:38
	64		1:51
	NR		1:53
	42		2:12
	NR		2:20
14	94	Not Tested	0:54
	78		1:08
	150		1:29
	86		1:45
	181		2:03
	77		2:39
	88		2:56
15	176	Not Tested	0:33
	121		1:06
	121		1:30
	73		1:40
	42		1:50
	NR		2:00
16	177	99	0:39
	163		0:59
	177		1:26
			1:37
	179		1:58
	169		2:37
	198		2:58
17	222	Not Tested	1:08
	244		1:36
	222		1:57
	154		2:17
	NR		2:27

18	42	Not Tested	0:29	
	137		0:48	
	131		1:01	
	153		1:37	
	158		1:51	
	167		2:11	
	186		2:23	
	198		2:40	
	133		2:53	
	135		3:00	
19	76	Not Tested	0:39	
	83		2:02	
	62		2:19	
	57		2:34	
	64		2:49	
	40		3:03	
20	79	Not Tested	0:49	
	29		1:47	
	29		2:05	
	27		2:30	
	27		2:46	
	35		2:55	
21	101	Not Tested	0:55	
	110		1:13	
	131		1:35	
	47		1:50	
	NR		1:58	
Live Bird 1	275			Average BPM
Live Bird 2	320			Average BPM
DOA 1	NR			Flatline
DOA 2	NR			Flatline

Similar to the test that was conducted in London ON on August 29, 2023, this test was carried out by Dr. Kathleen Long along with two HMA representatives using both the PC-VetChek wireless ECG monitor and the CM560D-VET pulse oximeter. The results mimicked that of London while the size of the bird, the line speed and the amount of Co2 employed in the CAS stunner were identical to the test conducted at this very facility on October 15, 2019.

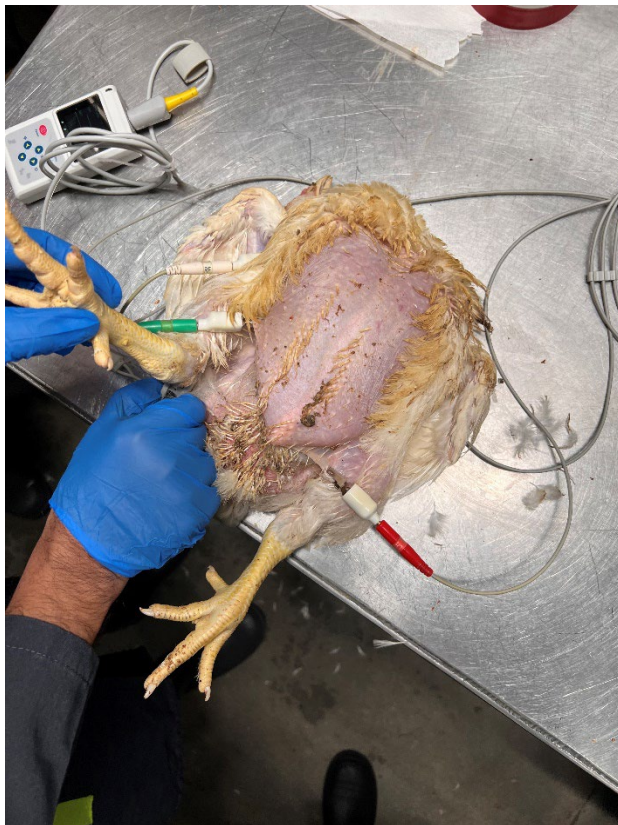
Dr. Kathleen's reports on the tests conducted at both the Edmonton and London facilities were sent over to Poultry Health Services¹⁶ for peer review. Upon studying her reports, the agency's conclusion was as follows:

"These reports demonstrate that heartbeats are routinely present in birds that have been exposed to controlled atmosphere stunning at these facilities, which is considered a sign of life.

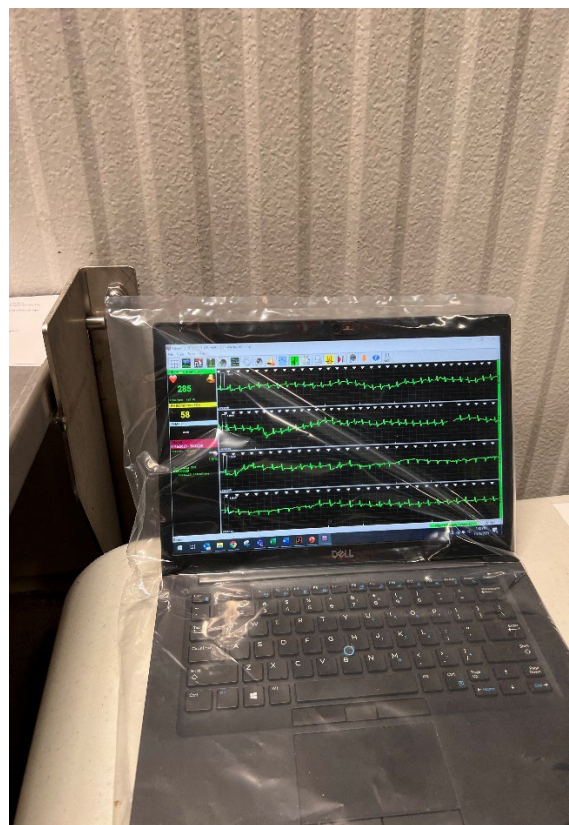
¹⁶ <https://poultryhealth.ca/>

The birds are irreversibly stunned but physiologically maintain heart activity and blood pressure consistent with and comparable to other approved forms of stunning (electrical low voltage, high amperage and low atmospheric pressure).

[...] In addition to the findings of this report, it is worth noting that any bird which was dead at the time of cutting would not have adequate blood pressure to bleed out and would be removed from the line as a DOA carcass (dark bird). We have no additional recommendation on improvements to be made to the trial or methodology.”



Live bird being tested.





DOA 1 being tested. Again, the bird is red and stiff.

Test 7: ECG Test

Location: Maple Leaf Foods, London ON

Date: May 15, 2024

1	78	Not Tested	1:20	ECG: Both legs and right wing
	74		1:40	
	91		2:01	
	110		2:15	
	90		2:30	
2	82	Not Tested	0:57	
	111		1:15	
	120		1:30	
	171		1:45	
	125		1:57	
	112		2:13	
	130	2:27		
3	108	Not Tested	0:50	
	72		1:03	
	89		1:17	
	103		1:31	
	190		1:51	
	114		2:20	
	272		2:34	
4	240	Not Tested	0:57	
	244		1:07	
	222		1:45	
	269		1:59	
	NR		2:23	
5	198	Not Tested	0:56	
	102		1:10	
	104		1:20	
	105		1:35	
	77		1:45	
	57		1:58	
	61		2:23	
	258		2:24	
6	113	Not Tested	0:40	
	113		0:57	
	107		1:07	
	105		1:20	
	103		1:39	
	106		1:56	
	113		2:08	
	103		2:20	
	112		2:29	
7	141	Not Tested	0:52	
	118		1:11	
	88		1:32	
	84		1:44	
	89		2:01	
	158		2:28	
8	100	Not Tested	0:47	
	102		1:00	
	127		1:12	
	300		1:35	
	292		1:52	
	200		2:07	
	187		2:18	
	136		2:31	
9	200		Not Tested	0:56
	198	1:08		
	134	1:18		
	130	1:36		
	282	1:48		
	228	1:11		
	124	2:26		
10	244	Not Tested	0:54	
	210		1:18	
	196		1:33	
	166		1:50	
	161		2:01	
	134		2:17	
	132		2:28	

11	171	Not Tested	0:35
	210		1:00
	240		1:11
	226		1:20
	180		2:36
	201		1:58
	170		2:13
	181		2:29
12	230	Not Tested	0:55
	160		1:24
	132		1:43
	150		1:57
	103		2:10
	112		2:21
	112		2:21
13	193	Not Tested	0:47
	187		1:02
	104		1:12
	205		1:20
	51		1:35
	38		1:46
	72	1:58	
14	192	Not Tested	0:47
	214		1:06
	158		1:17
	126		1:28
	127		1:38
	113		1:55
	105		2:14
	134		2:23
	94		2:30
15	122	Not Tested	0:44
	201		0:56
	244		1:20
	216		1:40
	176		1:59
	181		2:11
	134		2:22
	134		2:30
16	129	Not Tested	0:49
	106		1:08
	51		1:33
	87		1:41
	88		1:55
	110		2:02
	201		2:16
	175		2:25
	328		2:36
	328		2:36
17	104	Not Tested	0:55
	72		1:11
	41		1:21
	75		1:30
	94		1:44
	87		1:55
	98		2:06
	129		2:22
	82		2:31
	82		2:31
18	134	Not Tested	0:51
	134		1:04
	203		1:27
	206		1:43
	228		1:54
	230		1:29
	230		2:21
	237		2:31
19	84	Not Tested	1:05
	78		1:16
	77		1:23
	80		1:33
	90		1:56
	192		2:08
	289		2:22
	198		2:31
20	141	Not Tested	0:43
	196		0:58
	98		1:09
	103		1:26
	206		1:36
	201		1:57
	187		2:13
	196		2:29

Since there were a total of seven birds that did not have a regular heart rate observable by electrocardiography out of all the ECG tests that were conducted prior and Dr. Kathleen Long had recommended to test with different lead connectors, such as alligator clips to improve the reliability of the ECG collection, the HMA decided to act upon this recommendation and conducted this test. The objective was to observe whether there would be improved ECG readings in the test birds or not, and to determine whether the birds that failed to display a regular heartbeat in previous tests was due to the weakness of the lead connectors or truly because there was a cessation of a heartbeat within them.

Hence, in the presence of two HMA representatives, Dr. Kathleen Long conducted ECG tests on 20 birds using the same PC-VetChek wireless ECG monitor as before however, instead of using low-force electrode clips as in all the tests prior, alligator electrode clips were used on this occasion as per her recommendation in her report dated December 10, 2023.

The stunner was set at 61% upon exit while the line speed was set at 250 chickens per minute. This made the distance between the first hanger and the last slaughterer an average of 1:15 minutes. The bird size was an average of 2.3 kg.

All 20 test birds not only showed a regular heart rate observable by electrocardiography but far stronger readings than in previous tests as can be observed in the recorded results above. This led us to conclude that the birds that failed to show a regular heart rate in the tests prior was due to the weakness of the low force electrode clips and not due to its heartbeat being absent because of mortality, especially when the same birds had readings on the CM560D-VET pulse oximeter that was used on them.

Conclusion

The series of tests that have been conducted thus far clearly show that CAS birds are not dead at the time of slaughter. Their body temperature, flaccidity, the amount of blood they drain and the way they drain, the constant readings of their ECG's and pulse all give us the assurance that the criterion of the birds being alive at the time of slaughter is being met without compromise. No shariah guideline is being violated thus resulting in the deliberate or inadvertent labelling of a non-halal bird as halal. As a result, the HMA has accepted the use of CAS for halal poultry slaughter provided it is regulated and meets all the criterion set forth by the organization.

Although the East has generally dismissed the permissibility of CAS for halal slaughter, countries that face similar challenges as Canada can benefit from this ongoing study and thus bring ease to their communities by making more halal chicken available for their markets. As the testing continues in the future, the HMA will make results publicly available and will be willing to assist any organization that requires CAS to become shariah complaint.

It should be noted and emphasized that the HMA does not accept CAS in an unrestricted manner. It only allows it when all its set guidelines are met. To date, the HMA has been engaged with four CAS operations and has only accepted two. A full-time HMA inspector is onsite daily for the entire operation to ensure continued compliance with all HMA guidelines. Birds that are unfit to qualify as halal are removed by the inspector from the line without company interference. Hangers are also trained at both facilities on halal guidelines and on how to identify dead birds. This enables them to remove dead birds post CAS with efficiency.

With Halal SOPs developed for both facilities, every safeguard and measure has been taken to ensure that the integrity of halal is always maintained.



Birds removed from the line by the HMA Inspector