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A Review of the *Halal* Poultry Slaughtering from Welfare and Legal Perspectives: Analysis of Research Results

*Ocena uboju rytualnego drobiu z perspektywy dobrostanu i prawa.
Analiza wyników badań*

ABSTRACT

The subject of *halal* slaughtering is one of the most widely discussed issues of animal cruelty and animal welfare in the public sphere. The discrepancy in understanding the contemporary and religious laws pertaining to animal slaughtering does not fully publicize to Islamic and Muslim majority countries especially with respect to interpreting the use of stunning in animals. The electrical stunning is the cheapest, easiest, safest, and most suitable method for slaughtering that is widespread and developed. However, stunning on head of poultry before being slaughtered is a controversial aspect among the Islamic sects due to regulations of the European Union and some other countries. The current review highlights the instructions of *halal* slaughtering, legal legislation, and the effect of this global practice on poultry welfare and the quality of produced meat.

Keywords: poultry; animal welfare; *halal*; meat; law; slaughter

INTRODUCTION

It has been stated that Muslims will constitute approximately 30% (2.8 billion) of world population and their ratio in Europe will range between 5.9% to 10% by 2050.¹ Undoubtedly, an increase in the Muslim population will cause an increase in demand of *halal* meat and other products in global markets. It was found that *halal* meat is not only needed on the basis religious issues but also for community and commercial interests.²

Historically, welfare of poultry has been a public interest since the legislation of human law.³ In the last decades, there has been a widespread development in poultry industry depending on the account of accurate control of various factors including management, welfare,⁴ and slaughtering systems.⁵ Slaughtering is precisely defined as killing of animals for getting meat by various methods such as chemical materials, gases (carbon dioxide), electrical stunning, mechanical stunning (manual neck breaking) or decapitation, whatever slaughtering way is used, the birds must be desensitized during killing.⁶ In poultry, electrical stunning is globally acceptable,⁷

¹ T. Audi, *Muslim Population Projected to Nearly Match Christian by 2050*, "The Wall Street Journal" 2015, www.wsj.com/articles/study-projects-growth-shifts-in-worlds-muslim-christian-populations-1427983415 [access: 10.07.2021].

² S.Z.S. Marzuki, C.M. Hall, P.W. Ballantine, *Restaurant manager's perspectives on halal certification*, "Journal of Islamic Marketing" 2012, vol. 3(1), pp. 47–58.

³ D. Mota-Rojas, M.J. Maldonado, M.H. Becerril, S.C.P. Flores, M. González-Lozano, M. Alonso-Spilsbury, D. Camacho-Morfin, R.N. Ramírez, A.L. Cardona, L. Morfin-Loyden, *Welfare at Slaughter of Broiler Chickens: A Review*, "International Journal of Poultry Science" 2008, vol. 7(1), pp. 1–5.

⁴ M. Raj, *Welfare during stunning and slaughter of poultry*, "Poultry Science" 1998, vol. 77(12), pp. 1815–1819; D.J. Moura, L.A. Nääs, D.F. Pereira, R.B.T.R. Silva, G.A. Camargo, *Animal welfare concepts and strategy for poultry production: A review*, "Brazilian Journal of Poultry Science" 2006, vol. 8(3), pp. 137–148.

⁵ S.S. Nielsen, J. Alvarez, D.J. Bicout, P. Calistri, K. Depner, J.A. Drewe, B. Garin-Bastuji, J.L.G. Rojas, C.G. Schmidt, M.A.M. Chueca, H.C. Roberts, L.H. Sihvonen, H. Spooler, K. Stahl, A.V. Calvo, A. Viltrop, C. Winckler, D. Candiani, C. Fabris, Y.V. der Stede, V. Michel, *Slaughter of animals: poultry*, "EFSA Journal" 2019, vol. 17(11), p. 5849.

⁶ C.C. Contreras, N.J. Beraquet, *Electrical Stunning, Hot Boning, and Quality of Chicken Breast Meat*, "Poultry Science" 2001, vol. 80(4), pp. 501–507; V.A. González, G.E. Rojas, A.E. Aguilera, S.C. Flor Peinado, C. Lemus-Flores, A. Olmos-Hernández, M. Becerril-Herrera, A. Cardona-Leija, M. Alonso-Spilsbury, R. Ramírez-Necoechea, D. Mota-Rojas, *Effect of Heat Stress During Transport and Rest Before Slaughter, on the Metabolic Profile, Blood Gases and Meat Quality of Quail*, "International Journal of Poultry Science" 2007, vol. 6(6), pp. 397–402; D. Mota-Rojas, M.J. Maldonado, M.H. Becerril, S.C.P. Flores, M. González-Lozano, M. Alonso-Spilsbury, D. Camacho-Morfin, R.N. Ramírez, A.L. Cardona, L. Morfin-Loyden, *op. cit.*

⁷ D.E.F. McKeegan, S.M. Abeyesinghe, M.A. McLeman, J.C. Lowe, T.G.M. Demmers, R.P. White, R.W. Kranen, H. van Bommel, J.A.C. Lankhaar, C.M. Wathes, *Controlled atmosphere stunning of broiler chickens. II. Effects on behaviour, physiology and meat quality in a commercial processing plant*, "British Poultry Science" 2007, vol. 48(4), pp. 430–442.

and the most widely performed stunning method in *halal* slaughtering important for high production level.⁸

Traditional slaughter procedures have dealt basically with aspects that secure both safety and qualitative characteristics of the meat. In this regard, the safety indicates both the physiological and psychological attributes of the meat including wholesomeness, religious and aesthetic concerns.⁹

Around the world, cultures and religions use many slaughter methods, among which commercially common are *halal* (lawful) and *kosher* (ritually pure) methods conducted by Muslims and Jews respectively.¹⁰ These two procedures of slaughtering affect meat quality during pre-slaughter, slaughter, and post-slaughter stages with respect to tactile, aesthetic, masticatory, nutritional, soundness, convenience, and environmental profiles.¹¹

Law of humane slaughter of animals is adopted in most developed countries. These laws are regulated to ensure that animals are desensitized, unconscious and killed quickly and harmlessly before being slaughtered.¹² Based on these laws, poultry must also be electrically or gaseously stunned before killing with practical, economic, and safe way for personnel.¹³ This review aims to explore the influences of *halal* poultry slaughtering method and its practice in poultry commercial operations with special emphasis on welfare and legislative laws as well as impacts on meat quality.

CONCEPT AND REQUIREMENTS OF *HALAL* SLAUGHTERING

Halal is an Arabic universal word which means lawful or permitted, and unlike *halal* is *haram*, which means forbidden, prohibited or unlawful.¹⁴ The Arabic word of *halal* slaughter is *Zabiha* which means animal carcass after being killed according to Islamic ritual slaughter or Islamic criteria for meat production.¹⁵ Based on Islamic rules, types of animals which considered not *halal* (*haram*) are dead animals, pigs,

⁸ Y.B. Che Man, A.Q. Sazili, *Food production from the halal perspective*, [in:] *Handbook of Poultry Science and Technology: Primary Processing*, ed. I. Guerrero-Legarreta, vol. 1, New Jersey 2010.

⁹ D.L. Fletcher, *Recent advances in poultry slaughter technology*, "Poultry Science" 1999, vol. 78, pp. 277–281; F.A.A. Abdullah, G. Borilova, I. Steinhäuserova, *Halal Criteria Versus Conventional Slaughter Technology*, "Animals" 2019, vol. 9(8).

¹⁰ M.M. Farouk, H.M. Al-Mazeedi, A.B. Sabow, A.E.D. Bekhit, K.D. Adeyemi, A.Q. Sazili, A. Ghani, *Halal and Kosher slaughter methods and meat quality: A review*, "Meat Science" 2014, vol. 98(3), pp. 505–519.

¹¹ M.M. Farouk, *Advances in the industrial production of halal and kosher red meat*, "Meat Science" 2013, vol. 95(4), pp. 805–820; F.A.A. Abdullah, G. Borilova, I. Steinhäuserova, *op. cit.*

¹² M.N. Riaz, M.M. Chaudry, *Halal Food Production*, Boca Raton 2004.

¹³ *Ibidem*.

¹⁴ *Ibidem*.

¹⁵ *Ibidem*; F.A.A. Abdullah, G. Borilova, I. Steinhäuserova, *op. cit.*

animals slaughtered without the name of Allah, animals with long pointed tusks or teeth, primates, amphibians, reptiles, donkeys, mules, insects, aquatic animals harmful to human, and animal blood and food mixed with or processed from blood.¹⁶

All the guidelines concerning multiple steps of *halal* poultry meat production are derived from the Noble Quran, the sayings of Prophet Muhammad peace be upon Him (Hadiths or Sunnah), and doctrines.¹⁷ *Halal* principles are mentioned in the Quran mostly in the chapters under the title Al-Baqarah (The Cow), Al-An'am (The Cattle), and Al-Maidah (The Table Spread). One example of what was stated in the Quran regarding that: "O mankind! Eat of that which is lawful and wholesome and follow not the footsteps of the devil. Lo! He is an avowed enemy of you".¹⁸

N.G. Gregory¹⁹ stated that the removal of the whole blood and preventing the delivery of blood to brain quickly is the main concern in humane slaughtering of animal. Besides, the stopping of flowing blood is important because it is considered as impure material from the Judeo-Islamic point of view.

The *halal* slaughtering action starts with making an incision under the glottis on the neck. Then, throat cutting is done to cut the esophagus, trachea and major vessels (carotid arteries and jugular veins) without head removal or severance spinal cord in the procedure²⁰ as shown in Figures 1 and 2. The cutting knife strokes the neck with three single directions at maximum with different depths on neck for each chicken as shown in the schematic diagram (Figure 3).

The religious guidelines for *halal* slaughtering of poultry using manual or mechanical methods have been stated by the Department of Standards Malaysia:²¹

1. Slaughtering must be performed by a Muslim butcher of sound mind and maturity. Also, it may be done with permission by women or followers of other faiths (Christians and Jews) who understand the fundamental rules

¹⁶ A. Benzertiha, B. Kierończyk, M. Rawski, A. Józefiak, J. Mazurkiewicz, D. Józefiak, M.S. Messikh, S. Świątkiewicz, *Cultural and practical aspects of halal slaughtering in food production*, "Medycyna Weterynaryjna" 2018, vol. 74(6), pp. 371–376.

¹⁷ F.A.A. Abdullah, G. Borilova, I. Steinhäuserova, *op. cit.*

¹⁸ Surah Al-Baqarah (The Cow), verse 168.

¹⁹ N.G. Gregory, *Animal Welfare and Meat Production*, Wallingford 2007; N.G. Gregory, M. von Wenzlawowicz, K. von Holleben, H.R. Fielding, T.J. Gibson, L. Mirabito, R. Kolesar, *Complications during shechita and halal slaughter without stunning in cattle*, "Animal Welfare" 2012, vol. 21 (suppl. 2), pp. 81–86.

²⁰ M. López, M. Carrilho, M. Campo, R. Lafuente, G. Xicato, A. Trocino, S. Lukefahr, *Halal slaughter and electrical stunning in rabbits: effect on welfare and muscle characteristics*, [in:] *Proceedings of the 9th World Rabbit Congress*, Verona, Italy, 10–13 June 2008, pp. 1201–1206; M.M. Farouk, *op. cit.*

²¹ Department of Standards Malaysia, *Halal Food – Production, Preparation, Handling and Storage: General Guidelines*, Selangor 2004; Y.B. Che Man, A.Q. Sazili, *op. cit.*; I.A. Shahdan, J.M. Regenstein, A.S.M. Shahabuddin, M.T. Rahman, *Developing control points for halal slaughtering of poultry*, "Poultry Science" 2016, vol. 95(7), pp. 1680–1692.

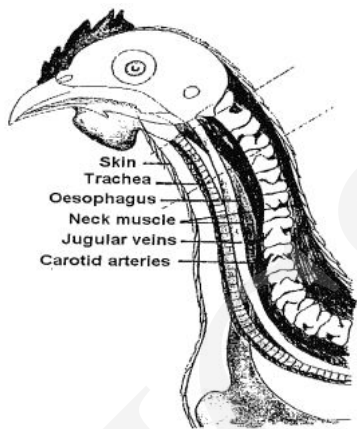


Figure 1. Slaughtering region in the bird

Source: Department of Standards Malaysia, *Halal Food – Production, Preparation, Handling and Storage: General Guidelines*, Selangor 2004.

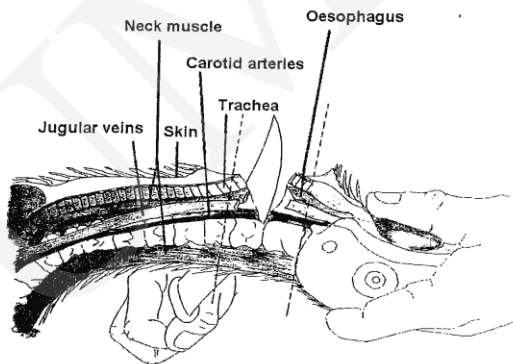


Figure 2. Slaughtering method of birds

Source: Department of Standards Malaysia, *Halal Food – Production, Preparation, Handling and Storage: General Guidelines*, Selangor 2004.

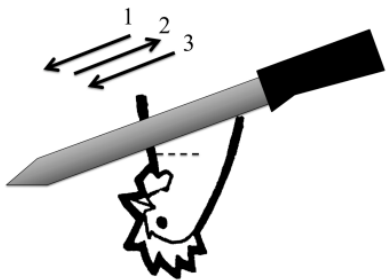


Figure 3. Illustration for direction of neck cutting (solid arrows) and depths of necks cutting (dashed line)

Source: I.A. Shahdan, J.M. Regenstein, M.T. Rahman, *Critical limits for the control points for halal poultry slaughter*, “Poultry Science” 2017, vol. 96(6), pp. 1970–1981.

pertaining of this process under regular supervision of *halal* certification body and competent Islamic authority.

2. Avoid posing any form of stress to the birds.
3. Humane treatment during handling and group the birds gently in transportation cages and lairage. Also, birds must be calm before being killed though preventing to expose birds into high intensity of light.
4. Efficient supply for feed, water, and ventilation to birds during transportation from farm to slaughterhouse especially during heat stress time.
5. Animal must not be restrained and shackled after neck cutting.
6. The gentle handling must be taken into consideration while the bird is being slaughtered, and prevention the painful handling which can causes legs bruises during shackling in slaughterhouse.
7. Animal killing is done only by neck cutting with stunning on head to kill. However, death in chickens may result from stunning.
8. Profusion of blood flow following the neck cutting.
9. Commitment to recite *tasmiyah* (In the Name of Allah) loudly on each individual bird without any noise to allow hearing it. Moreover, it is not allowed to slaughter in the name of anything or anyone except Allah.
10. Using sharp slaughtering knife that has no nicks or scratches with facing animal in the direction of *kaaba* during slaughtering.
11. Sharpening the knife must not be done in front of chickens to be slaughtered.
12. Severing major veins for high blood loss.
13. Killing of birds by suffocation in a scalding tank is prohibited.
14. Washing and packaging of processed meat in clean condition without adulteration with mixed blood and swine casings or any harmful or toxic substances.

HALAL SLAUGHTERING AND POULTRY WELFARE

Treatment of birds during slaughtering in the slaughter plant affects welfare. Therefore, the validity methods in postmortem inspection in case of finding the traumatic injuries in bird carcass can be influenced by welfare indicators such as handling, lairage, transport, loading, and stunning procedures.²² The most common practices and events in producing poultry meat begin with the following gradual steps:

1. Rearing in farm.
2. Transportation from farm.

²² C. Grilli, A.R. Loschi, S. Rea, R. Stocchi, L. Leoni, F. Conti, *Welfare indicators during broiler slaughtering*, "British Poultry Science" 2015, vol. 56(1), pp. 1–5.

3. Pre-slaughter handling in lairage.
4. Shackling in slaughterhouse.
5. Stunning of live birds.
6. Neck cutting (slaughtering).
7. Carcass scalding.
8. Evisceration (removal of internal organs).
9. Carcass washing.
10. Carcass chilling.
11. Carcass packaging for shopping.

Performing the hand slaughter without stunning to produce *halal* meat is unable to meet the high demand for meat production compared with high speed of standard processing procedures in slaughterhouses²³ where slaughtering is performed between 140 to 180 broilers per minute²⁴ One problem related to poultry welfare during no *halal* slaughtering is possibility of unsuitable incision of neck by a rotating blade in slaughterhouse that causes an undesirable influence of blood loss and animal torment.²⁵ As a consequence, some birds may bleed to death if neck is not cut appropriately after the birds regain their consciousness and suffer from cruel distress when entered into the scalding tank.²⁶ Thus, monitoring of accurate neck position while slaughtering by persons or through using closed-circuit television is effective to solve this problem.²⁷ The removal of blood as fast as possible and getting rid of the oxygen amounts delivered to the brain is the goal of effective and humane slaughtering.²⁸ Removal of blood following killing is an important thing due to its impurity and dangerous source of contamination from the Judeo-Islamic point of view. Using another method for killing birds in non-*halal* conditions such as head decapitation results in induction of asphyxia, suffocation, and prolonged death time due to disturbance of the nervous system while the *halal* method separates the jugular veins and carotid arteries and prevents this case.²⁹ Killing in non-*halal* way leads to distress in animal such as blood aspiration into the lungs.³⁰

²³ M. Chandia, J.M. Soon, *The variations in religious and legal understandings on halal slaughter*, "British Food Journal" 2018, vol. 120(3), pp. 714–730.

²⁴ D. Mota-Rojas, M.J. Maldonado, M.H. Becerril, S.C.P. Flores, M. González-Lozano, M. Alonso-Spilsbury, D. Camacho-Morfin, R.N. Ramirez, A.L. Cardona, L. Morfin-Loyden, *op. cit.*

²⁵ I.A. Shahdan, J.M. Regenstein, A.S.M. Shahabuddin, M.T. Rahman, *op. cit.*

²⁶ D. Mota-Rojas, M.J. Maldonado, M.H. Becerril, S.C.P. Flores, M. González-Lozano, M. Alonso-Spilsbury, D. Camacho-Morfin, R.N. Ramirez, A.L. Cardona, L. Morfin-Loyden, *op. cit.*

²⁷ I.A. Shahdan, J.M. Regenstein, A.S.M. Shahabuddin, M.T. Rahman, *op. cit.*

²⁸ N.G. Gregory, *Animal Welfare...*, *op. cit.*

²⁹ K. Davis, *Prisoned Chickens, Poisoned Eggs: An Inside Look at the Modern Poultry Industry*, Summertown 2009.

³⁰ N.G. Gregory, *Recent concerns about stunning and slaughter*, "Meat Science" 2005, vol. 70(3), pp. 481–491; T. Grandin, *Auditing animal welfare at slaughter plants*, "Meat Science" 2010, vol. 86(1), pp. 56–65.

On the other hand, the *halal* slaughtering of animals without stunning before painful neck cutting and exsanguination is a controversial topic of many opinions and may interfere with welfare issue and meat quality.

HALAL SLAUGHTERING VS. ELECTRICAL STUNNING AND POULTRY MEAT QUALITY

Meat quality is an important topic in poultry industry. *Halal* meat production is an Islamic method to produce permissible or lawful meat based on religious way derived from basic principles of the Quran and the Hadiths. This practice should meet the administrative, economic, and health perspective all over the world.³¹

In a comparative study between stunned and non-stunned poultry on meat quality,³² it was found that stunned meat had higher protein solubility and tougher texture than non-stunned meat. Moreover, non-stunned meat showed lower lightness and yellowness values with higher redness and chroma values compared with stunned meat. In *Halal* slaughtering of animal, the whole blood can drain out of the carcass efficiently. S.M. Ibrahim³³ found that there was a decrease in contamination risk with food borne pathogens represented by coliforms, *E. coli*, salmonella in meat and sausages of broiler chickens slaughtered by *halal* method. Similar results were declared by S.A.M. Ali³⁴ while making a comparison among three ways of slaughtering the male broiler chickens (Islamic traditional way, Islamic hanging way, and electrical stunning). They concluded that the best method to reduce the microbial count on the carcass was achieved by Islamic hanging way 48 and 96 hours postmortem and the high bled blood weight was recorded by the same method. Recently, it was shown that chickens subjected to slaughtering by Islamic rules contained less residual blood in the meat accompanied by lowered bleeding time and death time which led to a decrease in bacterial counts, consequently lengthened shelf life in postmortem stage.³⁵

³¹ I.A. Shahdan, J.M. Regenstein, A.S.M. Shahabuddin, M.T. Rahman, *op. cit.*

³² W.M.M. Ashton, *The effect of non-stunned and stunned halal slaughter method on broiler breast meat quality*, "MOJ Food Processing and Technology" 2015, vol. 1(3), pp. 56–63.

³³ S.M. Ibrahim, M.A. Abdelgadir, A.M.E. Sulieman, *Impact of halal and non-halal slaughtering on the microbiological characteristics of broiler chicken meat and sausages*, "Food and Public Health" 2014, vol. 4(5), pp. 223–228.

³⁴ S.A.M. Ali, H.O. Abdalla, I.M. Mahgoub, *Effect of slaughtering method on the keeping quality of broiler chickens' meat*, "Egyptian Poultry Science" 2011, vol. 31(4), pp. 727–736.

³⁵ L.I. Hakim, N.M.M. Isa, S.M. Tahir, E.B. Ibitoye, *Effect of Halal and Non-Halal Slaughtering Methods on Bacterial Contamination of Poultry Meat*, "Sains Malaysiana" 2020, vol. 49(8), pp. 1947–1950.

However, M.M. Farouk³⁶ mentioned that stun only head in *halal* pre-slaughtering prior neck severance has been implicated in poor meat quality such as slow decline in blood pressure, blood splash (ecchymosis) in many organs and muscles, in addition to hemorrhages, broken bones, bruising and skin discoloration in poultry carcass. Besides, the electrical stunning could cause low efficiency of bleeding, incidence of blood blisters and produce tough meat due to rigor mortis phenomenon.³⁷ Moreover, electrical stunning could induce muscular contraction,³⁸ incidence of red wing tips and hemorrhages of wing veins³⁹ with negative effects on meat quality and downgrading of boilers carcass. N.G. Gregory and L.J. Wilkins⁴⁰ noted the occurrence of inefficient bleeding and high hemorrhages followed by death case resulted from heart fibrillation (irregular heartbeat) of broiler exposed to high voltage of stunning. Similar results were achieved by V.A. Hindle et al.⁴¹ with respect to lowering of carcass characteristics of ducks, hens, and broilers subjected to increased amperage during stunning. Nevertheless, it was observed that stunned chicken with low voltage did not influence blood loss 90 to 120 seconds (exsanguination time) although less early blood loss was recorded. In addition, S.M. Abeyesinghe et al.⁴² stated that overhead line shackling of conscious birds whether it is applied in *halal* slaughtering or not is involved in considerable damage of final meat product, strenuous working, and offense to animal welfare.

³⁶ M.M. Farouk, H.M. Al-Mazeedi, A.B. Sabow, A.E.D. Bekhit, K.D. Adeyemi, A.Q. Sazili, A. Ghani, *op. cit.*

³⁷ J. Summers, *Fact Sheets of the Poultry Industry*, no. 14, Toronto 2006.

³⁸ L. Wilkins, N.G. Gregory, S. Wotton, I.D. Parkman, *Effectiveness of electrical stunning applied using a variety of waveform-frequency combinations and consequences for carcase quality in broiler chickens*, "British Poultry Science" 1998, vol. 39(4), pp. 511–518; M. Mouchoniere, G. Le Pottier, X. Fernandez, *The effect of current frequency during waterbath stunning on the physical recovery and rate and extent of bleed out in turkeys*, "Poultry Science" 1999, vol. 78(3), pp. 485–489.

³⁹ A. Ali, M.A. Lawson, A.H. Tauson, J.F. Jensen, A. Chwalibog, *Influence of electrical stunning voltages on bleed out and carcass quality in slaughtered broiler chickens*, "Archiv für Geflügelkunde" 2007, vol. 71(1); D. Mota-Rojas, M.J. Maldonado, M.H. Becerril, S.C.P. Flores, M. González-Lozano, M. Alonso-Spilsbury, D. Camacho-Morfin, R.N. Ramirez, A.L. Cardona, L. Morfin-Loyden, *op. cit.*

⁴⁰ N.G. Gregory, L.J. Wilkins, *Effect of stunning current on downgrading in Turkeys*, "British Poultry Science" 1989, vol. 30(4), pp. 761–764.

⁴¹ V.A. Hindle, E. Lambooi, H.G.M. Reimert, L.D. Workel, M.A. Gerritzen, *Animal welfare concerns during the use of the water bath for stunning broilers, hens, and ducks*, "Poultry Science" 2010, vol. 89(3), pp. 401–412.

⁴² S.M. Abeyesinghe, D.E.F. McKeegan, M.A. McLeman, J.C. Lowe, T.G.M. Demmers, R.P. White, R.W. Kranen, H. van Bommel, J.A.C. Lankhaar, C.M. Wathes, *Controlled atmosphere stunning of broiler chickens. I. Effects on behaviour, physiology and meat quality in a pilot scale system at a processing plant*, "British Poultry Science" 2007, vol. 48(4), pp. 406–423.

HALAL SLAUGHTERING VS. ELECTRICAL STUNNING AND LEGAL LEGISLATION

For more than 1,400 years ago, the basic religious laws and regulations in *halal* meat production were legislated.⁴³ The spiritual quality of produced meat from point of view of Islam and Judaism is a topic of concern to meet the religious compliance of these religious communities. Thus, this topic is strongly related with traditional slaughtering of animal.⁴⁴ The legislative authorities of *halal* certification may differ in understandable explaining of this method which creates differences in requirements and standards. For instance, while electrical head-only stunning (reversible stunning) of pre-slaughter (prior to the neck cut) is allowed based on *halal* standards for some *halal* certifying authorities, others may not permit such procedure.⁴⁵ This is due to the belief that ecchymosis which occurs in many muscles of killed animals is positively correlated with electrical stunning of animal head.⁴⁶

Precise monitoring and elaborate standards are required for *halal* slaughtering to prevent the problems related to integrity of *halal* meat products. Therefore, many non-governmental organizations in some countries have legislated guidelines and standards regarding production of *halal* meat where use various stages in the slaughter operations (on farm, pre-slaughter, on slaughter and post-slaughter). These organizations and communities involve the following:⁴⁷

1. Quarantine and Inspection Service (AQIS) in Australia.
2. Arab Gulf Cooperation Council (GCC)/GCC Standard in Arab Gulf.
3. Indonesian Council of Ulama (MUI) in Indonesia.
4. Department of Islamic Development Malaysia (JAKIM) or Malaysian Standard/MS 1500:2009 in Malaysia.
5. Islamic Religious Council of Singapore (MUIS) in Singapore.
6. Central Islamic Committee of Thailand/THS 24000:2552 in Thailand.
7. *Halal* Monitoring Committee in the United Kingdom.
8. Halal Food Standards Alliance of America (HFSA) in the United States.
9. CODEX Alimentarius CAG/GL 24–1997 legislated by the World Trade Organization (WTO).

⁴³ F.A.A. Abdullah, G. Borilova, I. Steinhauserova, *op. cit.*

⁴⁴ M.M. Farouk, H.M. Al-Mazeedi, A.B. Sabow, A.E.D. Bekhit, K.D. Adeyemi, A.Q. Sazili, A. Ghani, *op. cit.*

⁴⁵ K. Nakyinsige, Y.B. Che Man, Z.A. Aghwan, I. Zulkifli, Y.M. Goh, F. Abu Bakar, H.A. Al-Kah-tani, A.Q. Sazili, *Stunning and animal welfare from Islamic and scientific perspectives*, "Meat Science" 2013, vol. 95(2), pp. 352–361; S.S. Nielsen, J. Alvarez, D.J. Bicut, P. Calistri, K. Depner, J.A. Drewe, B. Garin-Bastuji, J.L.G. Rojas, C.G. Schmidt, M.A.M. Chueca, H.C. Roberts, L.H. Sihvonen, H. Spoolder, K. Stahl, A.V. Calvo, A. Viltrop, C. Winckler, D. Candiani, C. Fabris, Y.V. der Stede, V. Michel, *op. cit.*, p. 5849.

⁴⁶ V.A. Hindle, E. Lambooj, H.G.M. Reimert, L.D. Workel, M.A. Gerritzen, *op. cit.*

⁴⁷ I.A. Shahdan, J.M. Regenstein, A.S.M. Shahabuddin, M.T. Rahman, *op. cit.*

Only the Australian and Malaysian governments have their own monitoring for their pertaining agencies about *halal* meat production and integrity. For local and export products, only JAKIM oversees this issue while the Australian government has its monitoring system for *halal* exported only. HFSA in the United States is one of the important authority for the *halal* certification and follow the education and monitoring issues for poultry farming and slaughter places, although absence the *halal* certification guidelines in a single standard. The Arab Gulf Cooperation Council's standard and CODEX Alimentarius was admitted by the United States Department of Agriculture (USDA) for supply *halal* slaughter as an essential role of their meat export policy.⁴⁸

The stunning of animal before slaughtering raises concerns about full performing for conditions of *halal* killing. Based on scientific Islamic concept, the stunned animal is not probably alive at the time of slaughter and thus blood is not completely drained out and some birds may reach in delay time for slaughter process.⁴⁹ Also, the currents of electric stunning will stimulate cardiac arrest which is correlated with occurrence of red wing tips in broiler and reducing the carcass quality.⁵⁰

To killing birds with minimizing the quality disadvantages and emphasize on drain out of whole blood, the alternative method used is to apply a stunning current through the bird's head only. The birds become insensible and unconscious after being stunned on head with pin electrodes and expose for 0.5 second to current 190 ± 30 mA.⁵¹ It was confirmed that after stunning, that is 11% of birds appeared its rhythmic breathing. Although, some stunned birds (15%) appeared its rhythmic breathing after neck severance, and 5% of birds recurred this reflex 30 seconds later.⁵² However, the identification for absence of consciousness is not dependent on movement lack of rhythmic breathing in birds.⁵³ Increased levels of rhythmic breathing for stunned birds, it is might relate to inadequacy of electrical current

⁴⁸ *Ibidem*.

⁴⁹ J. Lever, M. Miele, *The growth of halal meat markets in Europe: An exploration of the supply side theory of religion*, "Journal of Rural Studies" 2012, vol. 28(4), pp. 28–537; I.A. Shahdan, J.M. Regenstein, M.T. Rahman, *Critical limits for the control points for halal poultry slaughter*, "Poultry Science" 2017, vol. 96(6), pp. 1970–1981.

⁵⁰ W.D. McNeal, D.L. Fletcher, R.J. Buhr, *Effects of stunning and decapitation on broiler activity during bleeding, blood loss, carcass, and breast meat quality*, "Poultry Science" 2003, vol. 82(1), pp. 163–168; A. Ali, M.A. Lawson, A.H. Tauson, J.F. Jensen, A. Chwalibog, *op. cit.*, pp. 35–40.

⁵¹ E. Lambooi, *Electrical stunning*, [in:] *Encyclopedia of Meat Sciences*, eds. M. Dikeman, C. Devine, vol. 3, San Diego 2014.

⁵² A. Velarde, P. Rodriguez, A. Dalmau, C. Fuentes, P. Llonch, K.V. von Holleben, M.H. Anil, J.B. Lambooi, H. Pleiter, T. Yesildere, B.T. Cenci-Conga, *Reli Religious slaughter: Evaluation of current practices in selected countries*, "Meat Science" 2014, vol. 96(1), pp. 278–287.

⁵³ M.I. Anastasov, S.B. Wotton, *Survey of the incidence of post-stun behavioural reflexes in electrically stunned broilers in commercial conditions and the relationship of their incidence with the applied water-bath electrical parameters*, "Animal Welfare" 2012, vol. 22(2), pp. 247–256.

which make differences in the stunning system. Therefore, to avoid the individual variation in resistance of stunning, the recommended current is 250 mA.⁵⁴ It was religiously suggested by the Department of Islamic Development Malaysia⁵⁵ that using 2.50–10.50 voltage for 3.00–5.00 seconds is recommended for broilers with weights ranged from between 2.40–2.70 kg.

There are different points of view among Islamic sects regarding stunning on head without inducing injury to birds, e.g., Malaysia accepted the idea while Pakistan refuses it.⁵⁶ The rejection in Pakistani society is on grounds that it is opposite to Islamic rules, which causes a painful induction and incomplete blood loss. Lying of animal on its left flank facing the *Qibla* is followed method of slaughtering in Pakistan because this way allows to maximal draining all blood while killing through the pressure of body on heart.⁵⁷ There is also an assumption regarding predetermined electrical stunning correlated with determined body weight for each bird, however, this may depend on bearing the current applied.⁵⁸

The Council Directive 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing⁵⁹ applies to protective activities of animal reared for meat, fur or skin or other products during times of movement, lairing, restraint, stunning, killing, and slaughtering. It explains and focuses that animals shall be avoided from irritation, pain or suffering with its activity through those times. To ensure compliance with the conditions of this Directive, this is belong to function of competent authority which is the central authority of a Member State or other authorities that have been delegated vocational competence by the central authority. The practice of *halal* slaughtering is under speciality of the religious authority in EU (European Union) Member States which permit to monitor and apply the special provisions for this kind of animal killing according to religious conditions and under official supervision by veterinarian who oversee the slaughter action in slaughterhouse.

Based on stated in Article 2 of Council Directive 64/433/EEC,⁶⁰ the official veterinarian shall be appointed by the central authority of the EU Member States and

⁵⁴ E. Lambooj, *op. cit.*

⁵⁵ Department of Islamic Development Malaysia, *Malaysian protocol for the halal meat and poultry production*, 2011, www.halal.gov.my/v4/images/pdf/protocol%20halal%20meat%20poultry.pdf [access: 10.07.2021].

⁵⁶ J. Lever, M. Miele, *op. cit.*

⁵⁷ J.A. Awan, M. Sohaib, *Halal and humane slaughter: Comparison between Islamic teachings and modern methods*, "Pakistan Journal of Food Science" 2016, vol. 26(4), pp. 234–240.

⁵⁸ M. Chandia, J.M. Soon, *op. cit.*

⁵⁹ OJ L 340, 31.12.1993, pp. 21–34.

⁶⁰ Council Directive 64/433/EEC of 26 June 1964 on health problems affecting intra-Community trade in fresh meat (OJ L 121, 29.07.1964, pp. 2012–2032); Council Directive 93/119/EC; Council Regulation (EC) no. 1099/2009 of 24 September 2009 on the protection of animals at the time of killing (OJ EU L 303/1, 18.11.2009).

he responsible on religious authority to carry out the slaughtering action. The Directive also shows that stunning procedure shall not implement to animals exposed to slaughtering methods illustrated by religious way, however, the slaughtering has to take place in a general slaughterhouse.⁶¹

In England, there are further requirements for unstunned birds. Birds must be slaughtered in fast, uninterrupted movement with knife of sufficient size.⁶² Statistical information indicated that have been high rates in the number of domesticated animals (sheep, goats and poultry) killed without pre-stunning since 2015 in the United Kingdom.⁶³ However, some European countries such as Iceland, Sweden, Denmark, Norway and Switzerland, and outside of the EU, e.g. New Zealand, considers the killed birds without stunning as illegal procedure.⁶⁴ Therefore, it was found that some countries within EU allow Muslim communities to practice their religious rites for killing without stunning animal before slaughtering and with legal dispensation. On the other hand, other European countries consider that as illegal practice and they would like to change the *halal* meat concept where the Muslim communities live in minor populations. This leads to various interpretations and creates different rules.

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⁶¹ Council Directive 93/119/EC; Council Regulation (EC) no. 1099/2009.

⁶² Department for Environment, Food and Rural Affairs, *The Welfare of Animals at the Time of Killing (England), Regulations 2015. Schedule 1 Additional Requirements for Slaughterhouses*, www.legislation.gov.uk/ukxi/2015/1782/pdfs/ukxi_20151782_en.pdf [access: 12.06.2021].

⁶³ FSA Food Standards Agency, *Food Standards Agency Board Meeting – 20 September 2017: Animal Welfare Update. Annex 2*, 2017, www.food.gov.uk/about-us/board-meeting-agenda-20-september-2017 [access: 11.07.2021].

⁶⁴ S. Kern, *Europe goes Halal*, 2011, <https://kern.pundicity.com/8614/europe-goes-halal> [access: 11.07.2021]; M.H. Anil, N.G. Gregory, *Slaughter, ethics and the law*, [in:] *Encyclopedia of Meat...*

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ABSTRAKT

Ubój *halal* jest jednym z szerzej dyskutowanych w przestrzeni publicznej zagadnień dotyczących okrucieństwa wobec zwierząt i dobrostanu zwierząt. W krajach islamskich i w krajach o większości muzułmańskiej rozbieżności w interpretowaniu współczesnego prawa stanowionego i prawa religijnego dotyczącego uboju zwierząt nie są dostrzegane, szczególnie w odniesieniu do interpretacji zapisów dotyczących ogłuszania zwierząt. Ogłuszanie elektryczne jest najtańszą, najprostszą, najbezpieczniej-

szą i najodpowiedniejszą metodą uboju, która została opracowana i jest szeroko rozpowszechniona. Jednakże ogłuszanie drobiu przez porażenie głowy ptaka przed ubojem budzi wśród sekt islamskich kontrowersje ze względu na regulacje Unii Europejskiej i niektórych innych krajów. W niniejszym opracowaniu zwrócono uwagę na instrukcje dokonywania uboju *halal*, odpowiednie ustawodawstwo oraz wpływ tej szeroko stosowanej praktyki na dobrostan drobiu i jakość produkowanego mięsa.

Słowa kluczowe: drób; dobrostan zwierząt; *halal*; mięso; prawo; ubój