

Comparative Legal Analysis of Stunning Methods in Halal Animal Slaughter Between Muslim-Majority and Muslim-Minority Countries

Adityo Wiwit Kurniawan¹, Azhar Alam^{*2}, Wardah Yuspin³, Rizka⁴

^{1,2,3,4}Universitas Muhammadiyah Surakarta, Jl. A. Yani, Mendungan, Sukoharjo,
Central Java, Indonesia

*aa123@ums.ac.id

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ABSTRACT: *The global halal industry is growing rapidly, driven by the growth of the Muslim population and increasing demand for products that meet sharia standards and animal welfare. One of the central issues in this industry is the method of stunning in the slaughter of halal animals, which has sparked debate between sharia principles and modern animal welfare standards. This study conducts a comparative legal analysis of stunning methods in halal animal slaughter between majority Muslim countries (Indonesia, Malaysia, and Saudi Arabia) and minority Muslim countries (the United Kingdom, the United States, and Australia). The results show that Muslim-majority countries generally accept stunning methods with strict conditions in accordance with Sharia principles, such as MUI Fatwa No. 12/2009 and Malaysian Halal standards, which permit stunning as long as the animal remains alive during slaughter. Conversely, Muslim-minority countries require stunning to meet international animal welfare standards, although they grant exceptions for ritual halal slaughter in the interest of religious freedom. The study also revealed differences in fatwas, such as Aceh's ban on all forms of stunning, which is deemed contrary to the principle of ihsan and increases animal suffering. These regulatory differences reflect the challenges of harmonizing Sharia principles with modern animal welfare standards and global market demands. Therefore, interdisciplinary dialogue between religious scholars, scientists, and halal industry stakeholders is essential to develop evidence-based stunning standards, operator training, and consumer education to support the sustainable and globally trusted modernization of the halal industry.*

Industri halal global berkembang pesat, didorong oleh pertumbuhan populasi Muslim dan meningkatnya permintaan terhadap produk yang memenuhi standar syariah dan

kesejahteraan hewan. Salah satu isu sentral dalam industri ini adalah metode *stunning* (pemingsanan) pada proses penyembelihan hewan halal, yang memunculkan perdebatan antara prinsip syariah dan standar kesejahteraan hewan modern. Penelitian ini melakukan analisis komparatif hukum terhadap metode *stunning* dalam penyembelihan hewan halal antara negara mayoritas Muslim (Indonesia, Malaysia, dan Saudi Arabia) dan negara minoritas Muslim (Inggris, Amerika Serikat, dan Australia). Hasil penelitian menunjukkan bahwa negara mayoritas Muslim umumnya menerima metode *stunning* dengan syarat ketat sesuai prinsip syariah, seperti Fatwa MUI No. 12/2009 dan standar Halal Malaysia yang memperbolehkan *stunning* selama hewan tetap hidup saat disembelih. Sebaliknya, negara minoritas Muslim mewajibkan *stunning* untuk memenuhi standar kesejahteraan hewan internasional, meskipun memberikan pengecualian bagi penyembelihan ritual halal demi kebebasan beragama. Studi ini juga mengungkap perbedaan fatwa, misalnya Aceh yang melarang seluruh bentuk *stunning* karena dianggap bertentangan dengan prinsip ihsan dan meningkatkan penderitaan hewan. Perbedaan regulasi ini mencerminkan tantangan harmonisasi prinsip syariah dengan standar kesejahteraan hewan modern dan kebutuhan pasar global. Oleh karena itu, dialog lintas disiplin antara ulama, ilmuwan, dan pelaku industri halal sangat diperlukan untuk mengembangkan standar *stunning* yang berbasis bukti ilmiah, pelatihan operator, serta edukasi konsumen guna mendukung modernisasi industri halal yang berkelanjutan dan terpercaya secara global.

Keywords: *Stunning, Halal Slaughter, Animal Welfare, Fatwa and Regulation.*

I. INTRODUCTION

The global halal industry has grown rapidly, with a market value estimated to reach USD 3.2 trillion in 2022. It includes key sectors such as food, Islamic finance, cosmetics, pharmaceuticals, and halal tourism, with an annual growth rate of 8% ([Herianti et al., 2023](#); [Utari et al., 2022](#)), driven by a Muslim population of 1.8 billion and non-Muslim perceptions of the safety of halal products ([Saleh & Rajandran, 2024](#)).

Muslim consumer's purchase decisions have been influenced by halal certification and labels ([Abhinaya & Setyawan, 2024](#); [Giyanti & Indriastiningsih, 2019](#); [Habibie & Roesmara, 2020](#); [Millatina et al., 2022](#); [Siregar & Alam, 2018](#)). Muslim consumer compliance with the halal label is driven by the Theory of Planned Behavior (TPB) which emphasizes the role of positive attitudes, social norms, and behavioural control in purchasing decisions, with the halal label serving as a guarantee of sharia and product safety ([Salehudin & Luthfi, 2013](#); [Sani et al., 2023](#)). Studies in Indonesia and Malaysia show 83% of Muslim consumers avoid products without halal certification, emphasizing the importance of this label as it not only fulfils religious needs and signals quality but also becomes a global marketing strategy that integrates sharia principles and industrial modernity ([Akmal & Effendi, 2023](#); [Bakar et al., 2018](#); [Hanifah et al., 2025](#); [Pradana et al., 2024](#)).

Halal certification increases export competitiveness, such as 60% of Australian meat exports targeting the Middle East market ([Sahari et al., 2024](#)), while strengthening brand

image through hygienic standards and transparency ([Aini & Tezara, 2025](#); [Angelita, 2024](#)). With the increasing global demand for halal meat, dialogue between animal welfare researchers, Islamic scholars, and halal certification bodies is essential to ensure sharia-compliant slaughtering practices while meeting animal welfare standards ([Fuseini, Wotton, et al., 2017](#)). This phenomenon shows that the halal industry is developing economically and continues to adapt to modern challenges in ethical and technological ([Bottoni, 2017](#); [Enggarani & Nugroho, 2020](#); [Okdinawati et al., 2021](#)).

Halal slaughter plays an important role in the halal industry as it ensures the halalness of the meat consumed by Muslims ([Aidaros, 2013](#)). Halal slaughter is an integral part of Islamic teachings that regulate the procedure for slaughtering animals according to sharia ([Rahman, 2017](#); [Sazili et al., 2023](#)). The halal slaughter method following Islamic law, is mentioned in QS. Al-An'am verse 119, which states that halal slaughter must meet several requirements involving the cutting involving the cutting of the trachea, esophagus, and carotid arteries while saying the name of Allah ([Roselia & Hafiz, 2024](#)). This practice fulfils the religious aspect, considers animal welfare, and becomes part of the halal food supply chain ([Wahyuni et al., 2021](#)).

Animal welfare is one of the main things in producing halal meat. The issue of animal welfare violations is a sensitive situation for the world community because it has an impact on the results of the slaughter ([Riyadhi et al., 2023](#)). Islamic law also emphasizes the humane treatment of animals during slaughter, which is in line with the principle of animal welfare. Animals must be alive and healthy at the time of slaughter, the knife must be sharp to prevent the animal from suffering, animals must be given rest and food before slaughter, slaughter must be performed with a single swift and compassionate movement, animals must not be tortured or treated harshly before slaughter, and the process must be hygienic and minimize stress and pain ([Barrasso et al., 2020](#); [Pitaloka et al., 2023](#); [Rahman, 2017](#)).

In countries with Muslim minorities such as the European Union and Australia, slaughter without stunning is still debated in terms of animal welfare ([Nakyinsige et al., 2013](#)). Based on research in the UK, there is political pressure to limit the practice of halal slaughter manually ([Fuseini, Wotton, et al., 2017](#)). As a result, halal slaughter in these countries requires animals to be stunned before slaughter to meet animal welfare standards and reduce suffering ([Nakyinsige et al., 2013](#); [Zuolo, 2015](#)). However, research by [Anil & Gregory \(2014\)](#) and [Franco & Lorenzo \(2014\)](#) revealed that stunning can reduce blood flow efficiency and affect meat quality.

Stunning methods are techniques used to render animals unconscious or insensitive to pain before or during slaughter so that they do not experience pain, distress, fear, or stress ([Nakyinsige, Sazili, et al., 2014](#)), with the aim of improving the efficiency of the slaughtering process ([Tetlow et al., 2022](#)). Stunning is considered halal if it is reversible. That is, animals can regain consciousness if they are not slaughtered and do not cause death or permanent injury before slaughter ([Nakyinsige, Fatimah, et al., 2014](#)). Common stunning methods include mechanical, electrical, and gas methods ([Velarde & Dalmau, 2017](#)).

This stunning method has given rise to debate among scholars and Muslim communities regarding the halalness of the meat produced ([Fuseini, Wotton, et al.](#), 2017). In the modern context, [Riaz et al.](#) (2021), in their research, said that the stunning is one of the controversial topics because it involves technology that is not explicitly mentioned in the Qur'an and Hadith. [Roselia & Hafiz](#) (2024) revealed that some countries provide exemptions for Muslim communities to carry out slaughter without stunning as long as it is under religious rules. In addition, a survey in Europe shows that the majority of Muslims prefer meat to slaughter without stunning for religious reasons ([Sazili et al.](#), 2023).

In Muslim countries such as Malaysia and Saudi Arabia, stunning is widely accepted because it meets strict halal standards ([Fuseini, Knowles, et al.](#), 2017; [Fuseini, Knowles, Lines, et al.](#), 2016). In Indonesia, the Fatwa of the Indonesian Ulema Council (*Majelis Ulama Indonesia/MUI*) Number 12 of 2009 allows the use of the method of stunning, provided that the stun does not cause death or permanent injury to the animal before slaughter ([MUI](#), 2009). This mechanism ensures that the meat produced remains halal and meets the principles of Courtesy in Islam ([Husna](#), 2021; [Nakyinsige, Fatimah, et al.](#), 2014). In contrast, the research conducted by [Nugraha](#) (2024) that the Aceh MPU Fatwa No. 6 of 2013 prohibits all forms of stunning, arguing that this method is considered incompatible with Islamic sharia principles because it can increase animal suffering. This difference of views reflects the complexity of applying Islamic law in the modern context.

A comparison between Muslim-majority countries and Muslim-minority countries, according to [Tsalitsah](#) (2022), shows differences in approaches to accommodating religious needs and modern industry standards. This study aims to examine differences in regulations on stunning methods of halal slaughter and animal welfare in both groups of countries. By systematically analyzing inter-country legal documents, this study examines the application of stunning methods in various legal and cultural contexts.

This comparative legal analysis is important for understanding how Islamic law adapts to diverse cultures and political dynamics, as well as the challenges faced by the global halal industry in balancing religious demands, modernization, and international regulations. This study is expected to provide a deeper understanding of the implementation of Islamic law regarding stunning halal slaughter within a diverse global context.

II. METHOD

This research methodology uses normative legal research with a comparative legal analysis approach to analyze the regulation and application of stunning laws in halal slaughter in countries with Muslim majorities and Muslim minorities. This method is a scientific method in legal studies that compares legal systems from two or more jurisdictions to identify similarities, differences, and relevant legal implications in a particular context ([Priatna et al.](#), 2023). This approach does not merely focus on normative or textual descriptions but emphasizes a functional and structural analysis of the applicable legal rules and how these rules are implemented in legal practice in each country ([Van Hoecke](#), 2016; [Yustianingsih et al.](#), 2024).

The research began with the identification of the legal objects to be compared, namely regulations and the application of stunning methods in halal slaughter in Muslim-majority and Muslim-minority countries. These objects were selected based on their relevance to positive law, doctrine, and implementation practices directly related to Islamic sharia principles and international animal welfare standards ([Majeed](#), 2022).

Furthermore, this study uses a functional approach that assumes that different legal systems face similar legal problems and seek functionally equivalent solutions so that the comparison focuses on the legal function and purpose behind the rules rather than just textual or terminological differences ([Eberle](#), 2011). This approach enables researchers to understand how each legal system effectively accommodates religious needs and animal welfare in accordance with the social and cultural context of each country.

Structural analysis was also applied to examine how the legal structure and classification of norms related to halal slaughter and stunning methods are regulated in different legal systems, both from an internal (insider view) and external (outsider view) perspective. It is important to understand the historical, social, and political contexts that influence the formation and implementation of these regulations ([Samuel](#), 2021).

In the process of data collection and analysis using a descriptive-qualitative approach, this study examined primary legal documents such as laws, government regulations, fatwas, and related policy documents from the six countries under study, three Muslim minority countries (the United Kingdom, the United States, and Australia) and three Muslim-majority countries (Indonesia, Malaysia, and Saudi Arabia). Seven sources of legal documents were obtained from these six countries. Academic literature reviews and official reports complement this approach to provide a comprehensive overview of the application of law and practices on the ground ([Kitchenham et al.](#), 2009).

Table 1. Country name and number of documents

Information	Number of Documents	Country Name	Document Name
Muslim Minority	3 Documents	English	Welfare of Animals at the Time of Killing (England) Regulations 2015
		United States	Humane Methods of Slaughter Act 85-765
		Australia	Australian Animal Welfare Standards and Guidelines
Muslim Majority	4 Documents	Indonesia	- MUI Fatwa No. 12 of 2009 - Aceh MPU Fatwa No. 06 of 2013
		Malaysia	MS 1500:2009 - Halal Food-Production, Preparation, Handling and Storage-General Guidelines (Second Revision)
		Saudi Arabia	GSO 993/1998: Animal

Slaughtering Requirements
According To Islamic Law

The analysis was conducted qualitatively by grouping data based on main themes, such as halal requirements, animal welfare standards, and acceptance of stunning methods, then comparing the functions and effectiveness of these legal regulations in the context of each country. Researchers also conducted a critical evaluation of the suitability and impact of regulations on product halal status and animal welfare, as well as identifying challenges and opportunities for international legal harmonization.

This comparative legal analysis method is expected to provide a comprehensive overview of how stunning laws are applied in various countries with different political, cultural, and legal backgrounds ([Nelken](#), 2016). This study highlights the importance of an evidence-based approach in evaluating stunning regulations and their implementation. This study provides important insights for policymakers in formulating global rules that are in line with understanding the differences in perspectives between countries and their implications for halal meat and animal welfare. Additionally, this study aims to identify gaps in previous research and offer practical recommendations for aligning Islamic Sharia principles with modern halal industry standards.

III. RESULT AND DISCUSSION

Stunning Requirements in Muslim-Majority Countries

An analysis of legal documents and fatwas from Indonesia, Malaysia, and Saudi Arabia shows that stunning is generally accepted with strict conditions to comply with Islamic sharia principles ([Fuseini, Knowles, Hadley, et al.](#), 2016; [Sazili et al.](#), 2023). For example, the Fatwa of the Indonesian Ulema Council No. 12 of 2009 allows reversible stunning as long as it does not cause death or permanent injury to animals before slaughter and aims to simplify the slaughter process, following Islamic Sharia rules ([MUI](#), 2009; [Nugraha](#), 2024). This fatwa emphasizes that stunning must be carried out in a manner that is to the principles of animal welfare in Islam.

Malaysia also regulates stunts through the MS1500:2009 standard, which requires that stunts must be reversible (temporary loss of consciousness without causing death or permanent injury) and not violate halal principles ([Abdullah et al.](#), 2019; [Federation of Malaysia](#), 2009). The stunning procedure must be carried out by trained professionals, with supervision from halal supervisors, to ensure compliance with the standards ([Artadita & Lestari](#), 2019; [Federation of Malaysia](#), 2009). If an animal is known to have died due to the stunning process, then the animal cannot be considered halal and must be removed from the halal system ([Fuseini, Knowles, Hadley, et al.](#), 2016).

Saudi Arabia has strict regulations regarding stunning methods of animal slaughter based on the GSO 993/1998 standard passed by the Gulf Cooperation Council (GCC). This fatwa prohibits the use of electricity for stunning on poultry because it is considered to cause death before slaughter, which is contrary to the principles of Islamic law ([Kingdom of Saudi Arabia](#), 1998; [Sazili et al.](#), 2023). The GSO 993/1998 standard also affirms that the stunning method used on animals other than poultry must be reversible. This means that

animals must remain alive and be able to regain consciousness if they are not slaughtered immediately. Stunning is only allowed if it is intended to facilitate the slaughter process without causing permanent injury or death before slaughter is carried out ([Fuseini, Knowles, Hadley, et al.](#), 2016). In addition, the stunning tool used must not cause excessive pain or torture to the animal ([Sazili et al.](#), 2023).

Meanwhile, the Aceh MPU Fatwa Number 06 of 2013 expressly prohibits the use of stunning methods in animal slaughter. This fatwa was issued after an in-depth study by Acehese scholars that involved discussions with animal health experts and anesthesiologists. In the fatwa, stunning is considered contrary to the principles of Islamic sharia because it is considered to increase the suffering of animals and does not follow the concept of *Ihsan* (kindness) towards animals as taught in Islam ([MPU Aceh](#), 2013; [Nugraha](#), 2024). In addition, stunning is also thought to affect the quality of meat because the blood does not completely come out of the animal's body, which has the potential to reduce nutritional value and increase the risk of disease ([Husna](#), 2021; [Rawanita](#), 2024).

This fatwa contains eight main points that govern the law related to stunning and other methods of animal slaughter. Some of them stated that stunning on animals is haram and the consumption of meat from animals slaughtered using the stunning method is also haram. In addition, poisoning or shooting animals with firearms before slaughter is also prohibited. Not only that, the sale of food, cosmetics, and medicines containing harmful substances such as formalin or borax is also declared haram in this fatwa.

Stunning Requirements in Muslim Minority Countries

In countries with Muslim minorities such as the United Kingdom, the United States, and Australia, it is mandatory by regulation to ensure animal welfare according to international standards rather than adherence to religious principles ([Fuseini, Knowles, Lines, et al.](#), 2016). In the UK, the Welfare of Animals at the Time of Killing (England) Regulations 2015 (WATOK) require stunning before slaughter, except for ritual slaughter such as halal and kosher which are exempt under certain conditions ([Department for Environment Food and Rural Affairs](#), 2015; [Downing](#), 2015). In this context, the Muslim and Jewish communities can carry out slaughter without stunning as long as they comply with rules aimed at minimizing animal suffering. Stunning must be done quickly and effectively, carried out by a certified person with a Certificate of Competence, and supported by backup tools to ensure that the procedure runs correctly.

In the United States, the Humane Methods of Slaughter Act (HMSA) which regulates humane methods of slaughtering animals requires that farm animals such as cows, goats, sheep, and pigs must be made painless before slaughter ([The 85th United States Congress](#), 1958). This process can be done through stunning methods such as captive bolt firing, electric current, or carbon dioxide gas. Stunning must be done quickly and effectively so that the animal loses consciousness before it is cut, removed, or further processed. However, HMSA provides exceptions for ritual slaughters such as halal and kosher, which are considered to meet the "humane slaughter" standard because animals lose consciousness due to brain anaemia caused by the simultaneous cutting of the carotid artery with a sharp tool ([Mariucci](#), 2008).

In Australia, the Australian Animal Welfare Standards and Guidelines stipulate that stunning is a mandatory part of the slaughter procedure for all animals to ensure animal welfare ([Australian Capital Territory](#), 2023; [Department of Agriculture Fisheries and Forestry](#), 2025). Stunning is done so that the animal loses consciousness before slaughter to reduce pain and stress during the process ([Australian Veterinary Association](#), 2024). The stunning methods applied include the use of electricity, mechanical (non-penetrative), or carbon dioxide gas, depending on the type of animal being slaughtered. This process must be carried out by trained personnel with appropriate equipment to be effective and not cause permanent injury or death before slaughter. Nonetheless, ritual slaughter without stunning is allowed under certain conditions as an exception to the general rule ([Animals Australia Team](#), 2015).

1. Fatwas and Regulations Related to Stunning

Fatwas and regulations show the difference in social, political, and cultural dynamics in the application of Islamic law related to halal slaughter and animal welfare priorities ([Salamano et al.](#), 2013). Muslim-majority countries emphasize halal compliance with reversible and non-lethal pre-slaughter. In contrast, Muslim-minority countries place more emphasis on animal welfare standards without fully understanding the principles of halal slaughter despite the exception of religious rituals. This difference marks the challenge of harmonizing religious law and modern welfare standards globally. Therefore, a more intensive dialogue between religious and scientific stakeholders is urgently needed to find solutions that meet both aspects.

2. Stunning Impact on Halal Meat and Animal Welfare

Scientific research shows that properly performed stunning, such as head-only electrical stunning, can improve animal welfare without violating halal principles because animals remain alive until slaughtered and blood can come out perfectly ([Riaz et al.](#), 2021; [Sazili et al.](#), 2023). However, technical errors such as overvoltage can lead to death before slaughter, so the meat becomes non-halal ([Abdullah et al.](#), 2019). Surveys in Europe show Muslim consumers' preference for unscathed beef for religious reasons, so strict education and supervision are needed ([Halawa](#), 2022; [Sazili et al.](#), 2023).

3. Overview Comparative Legal Analysis

As explained in Table 2, in Muslim-majority countries, stunning is allowed under strict conditions, such as the animal must regain consciousness and not die before slaughter. Their main focus is on the halalness of the meat according to Islamic law, ensuring the animal remains alive before slaughter, and halal certification bodies carry out supervision. Religious principles are prioritized in the regulation of slaughter in these countries.

In contrast, in Muslim minority countries, stunning is required by law for animal welfare, although there are exceptions for ritual slaughter such as halal and kosher. Emphasis is placed on international animal welfare standards rather than halal principles. Supervision is carried out by certified operators with strict procedures, and exceptions for halal slaughter are regulated as a form of religious freedom protection despite often facing socio-political pressure from non-Muslim groups.

Table 2. Summary of results of legal source documents studied

Legal Aspects Studied	Muslim-majority countries (Indonesia, Malaysia, Saudi Arabia)	Muslim Minority Countries (United Kingdom, United States, Australia)
Application of the Stunning Method	Allowed under strict conditions, such as being restorable and not causing death before slaughter	It is required to use stun by law to ensure animal welfare, although there are exceptions for ritual/religious slaughter
Halal Meat	Focus more on the halalness of meat following Islamic law, ensuring that the animal remains alive (<i>hayat mustaqirrah</i>) before slaughter.	Emphasizing animal welfare based on international standards without always having to understand halal principles
Supervision and Certification	Supervision is carried out by halal certification bodies that ensure compliance with Islamic sharia (Indonesia)	Supervision is more focused on animal welfare with certified operators (Certificate of Competency) and strict SOPs (UK and US)
Freedom of Religion	Prioritizing religious principles in slaughter regulations.	Exceptions are made for halal slaughter as a form of protection for religious freedom, but it often faces socio-political pressure from non-Muslim groups.

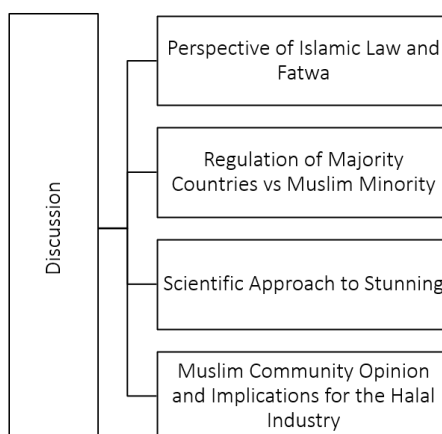


Figure 1. Summary of discussion on legal analysis of stunning methods

Perspective of Islamic Law and Fatwa

The difference in fatwas regarding the use of stunning methods in the slaughter of halal animals between Saudi Arabia, Indonesia, Malaysia, and Aceh reflects the complexity of the interpretation of Islamic sharia which is greatly influenced by the cultural, social, and technological context in each region. In Saudi Arabia, Indonesia, and Malaysia, fatwas issued generally accept the use of reversible stunning methods, which are stunning methods that do not cause death or permanent injury to animals before slaughter is performed. This approach is considered to follow halal principles because the animals remain alive (*hayat mustaqirrah*) when slaughtered and the blood production process runs optimally so that the meat produced still meets halal requirements.

For example, the Fatwa of the Indonesian Ulema Council No. 12 of 2009 allows stunning as long as the method does not cause the death of the animal before slaughter and aims to facilitate the slaughter process while still adhering to the principles of animal welfare

in Islam ([MUJ](#), 2009). Malaysian halal standard MS1500:2009 also stipulates that stunning must be reversible and carried out by experts supervised by halal certification bodies ([Federation of Malaysia](#), 2009). In Saudi Arabia, GSO regulation 993/1998 prohibits the use of electric stunning on poultry as it is considered to cause death before slaughter but allows reversible stunning on other animals provided that the animal remains alive until slaughter ([Kingdom of Saudi Arabia](#), 1998). Fatwas in Saudi Arabia also stipulate that slaughter must be carried out by Muslims or scribes (Jewish or Christian) who understand the rules of Islamic law. God's name must be mentioned during the slaughter process, and the tools used must be sharp and clean so that the slaughter proceeds quickly and efficiently. If an animal dies from stunning before slaughter, the meat is considered non-halal and must be removed from the halal system ([Foreign Agricultural Service](#), 2021).

On the other hand, in Aceh, the Fatwa of the Ulema Consultative Assembly (*Majelis Permusyawaratan Ulama/MPU*) No. 6 of 2013 expressly prohibits all forms of stunning. This fatwa is based on an in-depth study involving scholars, animal health experts, and anesthesiologists, who conclude that stunning adds to animal suffering and is contrary to the principle of *Ihsan* (kindness and compassion for animals) in Islam ([MPU Aceh](#), 2013). In addition, this fatwa also highlights that stunning can interfere with the process of blood production perfectly, which has the potential to reduce the quality and halalness of meat.

This difference of views shows the dynamics of *ijtihad*—the process of reinterpreting Islamic law—that continues to evolve along with technological advances and local cultural differences ([Rawanita](#), 2024; [Rohmah et al.](#), 2020). Countries such as Indonesia, Malaysia, and Saudi Arabia tend to adopt more flexible *ijtihad* by considering the benefits of stunning technology in improving animal welfare without sacrificing halal principles. Meanwhile, Aceh maintains a conservative approach that emphasizes manual traditions and strong local values.

This phenomenon also reflects the global challenge of harmonizing Islamic sharia principles with the demands of modernizing the halal industry and international animal welfare standards ([Fuseini et al.](#), 2022). The study underscores the need for cross-disciplinary dialogue between scholars, scientists, and halal industry stakeholders to find solutions that are religiously acceptable while meeting modern animal welfare standards.

Regulation of Majority Countries vs Muslim Minority

Muslim-majority countries such as Indonesia, Malaysia, and Saudi Arabia place a primary focus on adherence to halal principles in animal slaughter regulations, including the use of stunning methods. Fatwas and halal certification standards in these countries generally allow stunning with strict conditions, namely stunning must be reversible (the animal remains alive and can regain consciousness if not slaughtered immediately) and does not cause death or permanent injury before the slaughter process. This approach aims to maintain the halalness of meat while paying attention to the welfare of animals according to Islamic principles that emphasize *ihsan* (kindness and compassion) for animals during the slaughter process ([Yani et al.](#), 2020).

In contrast, in countries with Muslim minorities such as the United Kingdom, the United States, and Australia, regulations focus more on strict animal welfare standards. Stunning is required by law to reduce animal suffering during slaughter, although exceptions are made for ritual slaughter such as halal and kosher to maintain religious freedom. In this context, Muslim minority countries seek to strike a balance between the protection of animal welfare and the constitutionally guaranteed right to religious liberty ([Mariucci, 2008](#)).

Regulations in the UK, in WATOK, also stipulate that slaughter must involve cutting the carotid artery and major blood vessels to ensure the rapid death of the animal. Business actors must have a Standard Operating Procedure (SOP) that covers the entire process of handling, stunning, and slaughtering ([Department for Environment Food and Rural Affairs, 2015](#)). The regulation reflects the UK's efforts to balance animal welfare and religious freedom. However, some have criticized the regulation for adding to the administrative burden without significant impact on animal welfare.

In addition, the law in the United States, HMSA, also regulates the handling of animals before slaughter to ensure their welfare. Animals should be treated in a manner that does not cause pain or injury, including the design of the enclosure and safe transportation routes ([The 85th United States Congress, 1958](#)). Although HMSA sets high standards for animal welfare, the law does not cover poultry and is often criticized for its weak enforcement ([Mariucci, 2008](#)). USDA inspectors have the authority to stop operations at slaughterhouses in the event of a serious violation of HMSA ([Becker, 2009](#)). However, in the context of ritual slaughter, including halal and kosher, exceptions are granted to protect religious freedom as per the First Amendment of the U.S. Constitution.

In the context of halal slaughter, Australia accommodates the needs of the halal market by using reversible stunning methods, such as non-penetrative mechanical stunning (stunning punch). Halal authorities approve of this method because the animal remains alive (*hayat mustaqirrah*) before slaughter. This procedure is closely monitored to ensure compliance with halal standards while meeting animal welfare regulations. These standards are designed to balance the demands of religion and international animal welfare standards, making Australia one of the world's leading exporters of halal meat ([Syadida, 2024](#)).

This difference in focus reflects a complex socio-political reality, where the interests of animal welfare and religious freedom interact with different dynamics in each country. Muslim-majority countries prioritize compliance with Islamic law and ulama fatwas as the main basis for regulation, while Muslim-minority countries are more influenced by social and political pressure from non-Muslim groups that prioritize modern animal welfare standards. This poses challenges in the harmonization of global regulations, especially in the international halal industry, which requires cross-cultural and religious dialogue to harmonize the principles of Islamic sharia with the demands of animal welfare and international regulations.

Scientific Approach to Stunning

In the practice of animal slaughter, stunning is used to ensure that animals lose consciousness before slaughter so that pain and stress can be minimized ([Sazili et al., 2023](#)). Various stunning methods have developed and are commonly used according to the type of animal and operational needs. One of the most widely used methods is captive bolt stunning, which is a technique that uses a special gun-like tool that shoots a blunt iron (bolt) at the animal's head ([Anil et al., 2006](#)). This method causes animals to lose consciousness instantly without directly causing death and is generally applied to large animals such as cows, goats, and sheep. To maintain the welfare of the animal, the use of captive bolts must be followed by an immediate slaughter process so that the animal remains unconscious until it dies due to blood loss.

In addition to captive bolts, electrical stunning is also very popular, especially in modern slaughterhouses ([Sazili et al., 2023](#)). This method utilizes electrical currents clamped on the animal's head or body to induce depolarization of neurons in the brain so that the animal becomes unconscious of pain ([Humane Slaughter Association, 2013](#)). Electrical stunning can be reversible if applied only to the head or irreversible if an electric current is passed throughout the body and heart. This method is widely used in cattle, goats, sheep, and poultry because it is efficient, easy to automate, and can improve animal welfare if done correctly.

Recent research confirms that reversible stunning is an effective method to improve animal welfare while maintaining meat halalness. One of the techniques that stand out is Head-Only Electrical Stunning (HOES) with a current parameter of 1-2.5A and a voltage of 50-400V for 2-4 seconds ([Contreras-Jodar et al., 2025](#); [Rosyidi & Saputro, 2021](#)). This method meets halal criteria because it ensures that the animal remains alive (*hayat mustaqirrah*) until slaughter, as evidenced by EEG activity that shows reversibility of consciousness within 20-40 minutes if the animal is not slaughtered ([Sazili et al., 2023](#)). Malaysia's MS1500:2009 standard and Australian halal certification have adopted HOES with strict requirements, such as trained Muslim operators, a time gap between stunning and slaughter of no more than 15 seconds, as well as separation of equipment for halal and haram animals ([ANIC Halal Authority Australia, 2025](#)).

Regulations on stunning in Indonesia aim to ensure that meat remains halal and meets animal welfare standards ([Muhammad et al., 2023](#)). In practice, stunning is often used in modern slaughterhouses (RPH) to simplify the slaughter process and reduce stress on animals. However, some scholars in Indonesia still question the suitability of this method with Islamic Sharia principles due to the potential risk of permanent injury or death before slaughter.

However, the implementation of HOES also has risks, such as premature death if the voltage exceeds 3A or current exposure for more than 5 seconds, as well as potential cross-contamination of equipment ([Rosyidi & Saputro, 2021](#)). To address this, evidence-based solutions include certified operator training with a minimum of 40 hours of practice, a real-time audit system using ECG sensors, and shared protocols for stunning parameters between countries ([Damayanti & Hasanah, 2023](#)). This approach encourages global regulatory harmonization, as seen in New Zealand's success in reducing mortality

below 0.1% through an integrated halal assurance system ([Annisa](#), 2022; [Phi Ro et al.](#), 2017).

In poultry, the stunning water bath method is often used, in which the bird's head is dipped in electrically supplied water causing unconsciousness ([Klaaborg](#), 2020). However, this method requires strict supervision of the voltage and duration of the electric current, as improper parameters can lead to the death of the poultry before the slaughter process. In addition, there is also the gas stunning method, which uses gases such as carbon dioxide (CO₂) to render animals unconscious ([British Veterinary Association](#), 2024). Stunning gas is widely used in pigs and poultry to reduce stress and make it easier to handle animals before slaughter ([Atkinson et al.](#), 2020; [Mace & Knight](#), 2025). Although effective in improving animal welfare, stunning gas also requires supervision so as not to cause premature death before slaughter.

The main principle of all these stunning methods is to ensure that the animal loses consciousness quickly and temporarily without causing permanent injury or death before slaughter. This aims to make the cutting process easier and prevent the animal from feeling excessive suffering. The selection of the right stunning method must take into account the species of the animal, the regulation of animal welfare, and adherence to applicable religious principles ([Chao](#), 2020).

Thus, the combination of scientific research, strict supervision, and collaboration between scholars and scientists is the main key in aligning the principles of Islamic sharia with modern industry standards so that the stunning method not only maintains animal welfare but also ensures the halalness of meat products.

Muslim Community Opinion and Implications for the Halal Industry

The Muslim community's opinion on the use of stunning methods in halal slaughter is significantly divided, influenced by Sharia interpretation, animal welfare considerations, and geographical context ([Hakim & Amaliyah](#), 2024; [Rawanita](#), 2024). In Indonesia, the MUI through Fatwa No. 12/2009 allows reversible stunning that does not cause death before slaughter, because it reduces animal stress and increases the efficiency of the process ([MUI](#), 2009). However, this fatwa is contrary to the view of the MPU No. 06/2013 which prohibits all forms of stunning because it is considered contrary to the principle of *Ihsan* (doing good) and has the potential to increase animal suffering ([MPU Aceh](#), 2013). These differences reflect the internal dynamics of the Muslim community in response to the modernization of the meat industry.

In Europe, 85% of Muslims prefer uncooked meat despite the pressure of animal welfare regulations ([Soon & Wallace](#), 2017). This preference is driven by the belief that manual slaughter without stunning is more by Islamic law, especially the principle of *dzabihah* which requires animals to remain alive when slaughtered ([Sazili et al.](#), 2023). A survey in the UK showed that 72% of Muslim consumers were willing to pay 15-20% more for non-stunned products, creating a niche market that exporters from Brazil and South Africa took advantage of ([Miele et al.](#), 2024). On the other hand, countries such as Australia and Malaysia are adopting reversible stunning to meet international animal welfare standards while maintaining global market access ([Sazili et al.](#), 2023; [Schipf & Sheridan](#), 2013).

The implications for the halal industry include three main aspects ([Marnita](#), 2024):

1. Certifications and Regulations

Certification bodies face challenges in aligning sharia standards with market demands ([Rawanita](#), 2024). For example, Australia implements a dual certification system: HCA (Halal Certified Australia) for domestic markets that requires stunning, and MUI for exports to Asia which allows for non-stunned methods ([Cekindo](#), 2021). Transparency in the certification process is key to maintaining consumer trust, especially regarding blockchain traceability technology to trace the origin of products ([Alourani & Khan](#), 2024; [Riaz et al.](#), 2021).

2. Technological Innovation

The development of reversible stunning methods such as head-only electrical stunning and pneumatic stunning (air pressure) is a compromise solution ([Beausoleil et al.](#), 2024). This technology ensures that animals do not die before slaughter and maintains a *mustaqirrah* (stable life) life for 45-60 seconds, meeting halal criteria ([Halawa](#), 2022). Research in Germany shows that 68% of Muslim consumers lack an understanding of this mechanism, so education through mosques and social media is needed to reduce resistance ([Albarracín](#), 2020).

3. Economic Impact

The implementation of stunning increases production costs by 8-12% due to investment in tools and human resource training but also opens up access to 15 European countries that require stunning ([European Commission Directorate General for Health and Consumers & Study](#), 2012). The 2023 data shows that reversible stunning adopter countries such as Malaysia and Australia have experienced a 22-25% increase in halal meat exports to the Middle East compared to traditional methods ([Loyer et al.](#), 2020). However, market segmentation persists, with demand for non-stunned products remaining high in the religious community ([Fuseini, Knowles, Hadley, et al.](#), 2016).

Scientific references reinforce the complexity of this issue. [Sazili et al.](#) (2023) emphasized that halal-compliant stunning must be reversible, not inhibit blood production, and monitored by trained halal officers. Meanwhile, Fuseini, Knowles, Hadley, et al. (2016) emphasized the importance of dialogue between scholars, scientists, and industry to harmonize sharia principles with scientific evidence related to animal welfare. There is a need for global standardization that regulates voltage limits, stunt duration, and training protocols ([Labelling](#), 2016).

Thus, multidisciplinary collaboration is key to bridging the gap between religious preferences and the demands of modern industry without sacrificing the basic principles of Islamic law.

IV. CONCLUSION

This study uses a comparative legal analysis approach to examine differences in the application of stunning methods in halal slaughter between Muslim-majority countries

(Indonesia, Malaysia, Saudi Arabia) and Muslim-minority countries (United Kingdom, United States, Australia). In Muslim-majority countries, stunning is accepted under strict conditions, namely that it must be reversible and not cause death before slaughter to comply with Islamic principles. Conversely, in Muslim-minority countries, stunning is mandatory to meet international animal welfare standards, although there are exceptions for ritual halal slaughter to protect religious freedom. Research findings indicate that proper stunning, such as head-only electrical stunning, can improve animal welfare without compromising the halal status of meat. However, technical risks such as excessive voltage can cause premature death of animals, rendering the meat non-halal, which raises concerns among Muslim consumers, particularly in Europe, where non-stunned products are preferred. Differences in fatwas and regulations between countries reflect the challenges of harmonizing Sharia principles with modern animal welfare standards and global market needs, making interdisciplinary dialogue between religious scholars, scientists, and industry essential. Based on these findings, it is recommended that the halal industry and regulators adopt scientifically-based stunning standards with reversible and non-lethal protocols before slaughter, enhance operator training and technical oversight, and develop consumer education to reduce resistance toward stunning products. Additionally, harmonization of international halal standards, including revisions to the Codex Alimentarius, should be promoted to expand global market access and maintain consumer trust. This collaborative approach is expected to align religious principles with animal welfare requirements and the sustainable modernization of the halal industry.

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