



EFFICIENCY VS HALAL: MECHANICAL ANIMAL SLAUGHTER FROM A MASLAHAT PERSPECTIVE

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ABSTRACT

Mechanical animal slaughter is an innovation that has an impact on the efficiency of modern food industry production while maximizing the fulfillment of people's needs for meat. On the other hand, mechanical slaughter also creates problems related to its halalness. This study aims to analyze and identify aspects of Islamic law related to the halalness of mechanical slaughter and examine the considerations of Islamic law on its efficiency based on maslahat. As doctrinal research, this study is descriptive with an approach to the concept of maslahat and laws and regulations. Data related to the concept of halal animal slaughter and the concept of maslahat, which are integrated with applicable laws and regulations, are collected from the library, processed and analyzed comprehensively using qualitative methods. This study has implications for the use of mechanical slaughter methods to meet the halal standards set by Islam with consideration of the efficiency offered by the modern food industry. The results of the study indicate that mechanical animal slaughter can increase production efficiency, especially time and cost. This efficiency has challenges in ensuring the halalness of the product, especially those related to slaughtering according to sharia, mentioning the name of Allah and the state of consciousness of the animal. Based on the benefits, the use of technology is acceptable as long as there is certainty that the mechanical slaughtering process does not conflict with Islamic law. Mechanical slaughtering still requires stricter regulation and supervision to ensure that the efficiency of slaughtering carried out in the modern food industry is in accordance with the principles of halal.

Keywords: Efficiency. Halal, Animals, Benefit, Mechanical Slaughter.

1. INTRODUCTION

Data from the Agricultural Company Directory (DPP) of Slaughterhouses (RPH) and Slaughterhouses (TPH) in 2022 shows that the number of RPH/TPH in Indonesia is 1,644 spread across 34 provinces (DPP RPH/TPH, 2022). Based on a

study by the Halal Science Center of the Institute for Research and Community Service (HSC LPPM) IPB University, in 2021 more than 85% of RPHs in Indonesia did not have halal certificates and did not have halal slaughterers (IPB, 2021). There was an increase in 2025, as stated by the Head of BPJPH Ahmad Haikal Hasan who said that 50% of the number of RPHs in Indonesia had been halal certified (BPJPH, 2025). However, Prof. Khaswar Syamsu as Head of HSC IPB University stated that the number is dominated by Poultry RPH (livestock producing meat and eggs), while Ruminant RPH (a group of herbivorous mammals that chew the cud) that have halal certificates and Veterinary Control Numbers (NKV) are only around 13 percent, before the mandatory halal deadline is October 17, 2024 (IPB, 2024).

The number of RTH above has not been able to accommodate the halal meat needs of 241.7 million Indonesian Muslims (Ministry of Home Affairs, 2022). This figure increases along with population growth. The increase in the need for halal meat is projected to reach US\$ 282 billion in 2025, up 53% from US\$ 184 billion in 2020 (Reza, 2022). Along with the increasing need for halal meat, the modern animal slaughter industry is faced with significant challenges in aligning the demands of production efficiency with the halal principle which is a basic need of the Muslim community. Mechanical slaughtering using advanced technology brings benefits in the form of accelerated processes, cost efficiency, uniform results, and reduced psychological stress on animals, which has an impact on improving the quality and quantity of meat. However, there are still concerns regarding the validity of sharia, especially the use of sharp knives, perfect cutting of the respiratory tract and main blood vessels, and competent slaughterers (MUI, 2023).

The above reality makes efficiency and halalness an interesting study to be studied based on *maslahah mursalah* so that a proportional, implementable approach can be formulated that remains based on religious values. *Maslahat* in *fiqh* focuses on protecting public interests and preventing losses, especially in matters that are implicitly explained in the text. This concept opens up space for flexibility in Islamic law in responding to the dynamics of the times and technological advances. Mechanical slaughtering of animals has not received a detailed explanation in classical *fiqh* literature, so *maslahat* becomes a relevant framework for evaluating its legality and benefits. Along with the development, contemporary studies and fatwas of religious institutions in Muslim-majority countries have begun to utilize this approach as a normative basis for providing legal solutions that are contextual, responsive, and in line with the realities of modern industry (Syed & Ahmad, 2023). A number of recent studies indicate that mechanical slaughtering methods have the potential to meet halal criteria if the process is designed and carried out in accordance with sharia, such as ensuring that the cutting tool is able to cut the main blood vessels quickly and completely, and is carried out by individuals who understand the rules of halal slaughter. Al-

Qaradawi (2012) and the MUI Fatwa (2023) emphasize that the application of technology in the slaughtering process is in accordance with Islamic law, as long as protection of the welfare of the community and prevention of harm are maintained. This finding provides ample space for the halal industry sector to integrate modern slaughtering methods without having to sacrifice the integrity of the halal principle (Al-Qaradhawi, 2012).

The application of mechanical slaughtering methods can be a strategic alternative to meet the need for affordable and quality halal meat. In addition, it also contributes to the economic and social dimensions, through operational cost efficiency, increased animal production volume, and wider distribution of halal meat at affordable prices. Research conducted by Hassan et al. (2024) shows that the use of mechanical technology can reduce the duration of slaughter by up to 50 percent, while reducing stress levels in animals, which has an impact on improving meat quality and increasing consumer satisfaction. When viewed from a benefit perspective, this finding strengthens the argument that economic and social benefits play a significant role in formulating legal provisions for the use of technology in animal slaughter (Hassan et al., 2024).

Although it offers various advantages, the crucial challenge that needs to be overcome is ensuring compliance with strict standard operating procedures (SOPs) and ongoing supervision so that the process takes place according to halal principles. Research by Rahman and Sulaiman (2023) emphasizes the urgency of in-depth technical training for operators, as well as the importance of halal certification that is integrated with the technology system. In addition, contemporary fatwas emphasize the need for transparency in the halal audit process and mechanisms that can be accounted for as an effort to maintain the trust of the Muslim community in slaughtered products. Thus, collaboration between technological innovation, strict halal regulations, and the *maslahat* approach becomes a strategic element in supporting the implementation of mechanical slaughter that is not only efficient but also in line with sharia demands. Various recent studies on mechanical slaughter show the dynamics of discourse and the development of halal standards, especially stunning (stunning before slaughter) and the use of mechanical devices in the slaughtering process.

In Indonesia, the MUI Fatwa stipulates that the use of stunning is permitted as long as it only causes temporary loss of consciousness of the animal and does not result in death or permanent injury, and facilitates the slaughtering process in *ihsan* and not violence (Husna, 2021; Saputro, 2021). However, there are differences of opinion among scholars regarding the legality of stunning and mechanical slaughtering methods, which are influenced by the interpretation of the texts of the texts, as well as considerations of animal welfare and the interests of the food industry (Abdullah et al., 2019; Sandela et al., 2023). Furthermore, the formulation of halal standards in Indonesia is not only shaped by theological aspects, but is also influenced by non-religious variables such as demands for

efficiency in national meat production and protection of the sustainability of the domestic livestock sector (Suryawan et al., 2019). Based on the explanation above, this study aims to analyze and identify aspects of sharia related to the permissibility of mechanical slaughter and fiqh considerations based on maslahat.

2. RESEARCH METHOD

This type of research is doctrinal research which aims to understand, analyze, and interpret written legal materials, both primary and secondary. The approaches used are conceptual and statute approaches. The conceptual approach is used to analyze the efficiency and permissibility of mechanical animal slaughter based on the study of fiqh and maslahat. While the statute approach, examines and analyzes the regulations related to the procedures for mechanical and halal animal slaughter, as well as the provisions contained in Indonesian laws and regulations. (Marzuki, 2005) The primary legal material used is Law Number 34 of 2014 concerning Halal Product Assurance along with all its implementing regulations. While secondary legal materials are in the form of articles, books, journals, and fiqh texts that are relevant to the efficiency and permissibility of mechanical animal slaughter. Primary and secondary legal materials are collected through literature and then processed and analyzed using qualitative methods. This method was chosen because it can provide a broad space to explore mechanical animal slaughter from an economic and legal perspective, which is then narrated descriptively and then arranged systematically and comprehensively.

3. RESULT AND ANALYSIS

Principles of Halalness in Animal Slaughter

Animal slaughter in Islam, in addition to being a technical activity, is also an inseparable part of the worship system that contains spiritual, ethical, and legal dimensions. The halalness of slaughtered meat is highly dependent on the fulfillment of the requirements set out in the Qur'an, Sunnah, and ijma', including aspects of the slaughterer, the tools used, and the cutting method. The implementation of slaughter must be carried out within the framework of obedience to Allah's commands, while upholding ihsan towards animals and paying attention to the principle of maslahat. This activity reflects compliance with the sharia, maintaining the dignity of living beings, and fulfilling consumption in a halal and thayib manner.

Allah emphasizes in the Qur'an the prohibition of consuming carcasses, blood, pork, meat of animals slaughtered in the name of other than Allah and died from strangulation, being hit, falling, being gored or attacked by wild animals, unless they have time to be slaughtered. Allah also forbids the meat of animals slaughtered for idols (QS. al-Maidah: 3). The affirmation of the obligation to mention the name of Allah is also stated in the letter of al-An'am verse 121. The

two verses above are strengthened by the hadith of Bukhari, which states that animals whose blood flows by mentioning the name of Allah may be eaten, except those slaughtered with teeth and nails (Bukhari, 2002).

The MUI Fatwa (2009) based on this text, states that slaughtering is only permissible for animals that are halal for consumption. The animal to be slaughtered must be alive at the time of the slaughtering process. In addition, the animal must meet the health requirements set by the authorized body or authority in supervising animal welfare. The slaughterer must be Muslim, have reached puberty, master the slaughtering procedure according to sharia, and have slaughtering expertise. The principle of slaughtering does not only pay attention to the animal being slaughtered and the slaughterer. The tools used must also meet the requirements so that the process is in accordance with sharia. The following are the criteria for slaughtering tools in Islam.

First, the slaughtering tool must be sharp enough so that the cutting can be done quickly and efficiently, thus reducing pain for the animal. Using a blunt tool can cause prolonged suffering for the animal and is contrary to *ihsan*. According to Al-Qaradhawi (2012) and Wahbah (1985), the slaughtering tool with one cut must be able to cut the neck, including the respiratory tract (trachea), food tract (esophagus) and main blood vessels (jugular vein and carotid artery), and ensure that it does not cause excessive physical damage to the animal's body (Nawawi, n.d.).

Second, the slaughtering tool does not come from materials that are prohibited by sharia, such as animal bones or nails, because they risk causing wounds that are not in accordance with the principles of proper slaughtering. Based on the views of scholars, the slaughtering tool must not contain elements or properties that can contaminate the meat or cause potential contamination that is detrimental to the quality and halalness of the slaughtered results (Hassan et al., 2024).

Third, the slaughtering tools must be kept clean and made of materials that are resistant to corrosion, easy to clean, and do not pose a risk of contaminating the meat. In addition, in the modern slaughtering industry, the implementation of equipment sanitation standards is very crucial to ensure the quality and halalness of the final product. In addition to the technical requirements related to the tools, the slaughtering procedure is also an important element in the sharia standards. The animal slaughtering procedure is a series of actions that are carefully designed to fulfill the principles of sharia and ethics towards living things (Fauzan et al., 2024). The procedure is not only technical, but also spiritual and moral, which emphasizes that humans as caliphs must treat animals with *ihsan* (Grandin, 2010). The preparation stage before the slaughtering process is a very crucial part. The animal to be slaughtered must be ensured to be in good health, not seriously disabled, and still alive when the slaughtering process begins. A clear life is indicated by movement, heartbeat or breathing, (Abdullayeva, 2024) is called

hayat mustaqirrah. Animals that are seriously ill or die before slaughter are prohibited for consumption (Garcia et. al., 2023).

Mechanical Slaughter Practices in Modern Industry

Animals in traditional slaughter will go through simple stages such as tying, laying down and reciting prayers without stunning. Meanwhile, in the modern industry, stunning is an important alternative before slaughter. Stunning is a technique to weaken the physical condition of an animal by making it unconscious before the slaughter process, with the aim of minimizing the animal's movement during slaughter (halalmui.org, 2020). However, the stunning process is a controversial practice in the halal industry, because it has no explicit basis in the text, thus raising doubts about its suitability with sharia. The main concerns relate to the potential for death before the slaughter process, as well as the suboptimal blood loss due to stunning intervention (Kohilavani et al., 2013). Based on European Union Council Regulation (EC) No. 1099/2009, the implementation of stunning on animals before slaughter is a mandatory legal provision in the European region, with the aim of making the animal lose consciousness (EC, 2009). Stunning in the regulation is defined as an act intentionally carried out to remove the consciousness and sensitivity of an animal without causing pain, including methods that result in instant death (EC, 2009). The main purpose of this procedure is to prevent the animal from feeling anxiety, pain, suffering, and psychological stress both before and during the slaughter process (Velarde et al., 2014).

Stunning was initially developed as a method to simplify and speed up the slaughter process (Bergaud & Blacker, 2007), especially in large-scale slaughterhouses that require high efficiency. However, in recent decades, this practice has also begun to be analyzed from an animal welfare perspective, considering that stunning can minimize the pain and suffering of animals during the slaughter process (Fletcher, 1999).

There are several stunning methods used according to the type of animal to be slaughtered, including: First, penetrating bolt and non-penetrating bolt. penetrating bolt is a stunning method using a bolt that penetrates the skull and damages brain tissue, resulting in an instant unconscious condition. The tool used is The Captive Bolt Pistol (CBP) or Stunning Gun which functions to shoot metal bolts into the animal's head so that brain damage occurs quickly and causes the animal to become unconscious. CBP is applied to livestock such as cows, goats, sheep, and horses which are considered more animalistic because they are able to produce unconsciousness quickly, although its use requires special skills and training in order to be applied properly and safely. Meanwhile, non-penetrating bolt is a method of using blunt bolts that cause trauma to the skull without penetrating it, usually applied to small or young animals (Husna, 2021). Second, electric head-only stunning which is a stunning technique by flowing electric

current directly into the animal's head to eliminate consciousness without causing instant death. The Department of Standards Malaysia and BPJPH call this method electrical stunning. This method is generally applied to animals such as goats, sheep, and cows. Electrodes are positioned on both sides of the head so that the electric current that is passed triggers muscle contractions and makes the animal unconscious. To ensure the halal and effectiveness of the process, slaughter must be carried out immediately after the animal is stunned to prevent the possibility of regaining consciousness (Muhammad, 2023).

LPPOM MUI (2012), establishes guidance on electrical stunning according to the type of animal to be slaughtered, namely:

Types of animals	Duration (Detik)	Electric current (ampere)
<i>Lamb</i>	0.8 – 3.0	0.5 – 0.9
<i>Sheep</i>	1.0 – 3.0	0.7 – 1.2
<i>Goat</i>	2.0 – 3.0	0.7 – 1.0
<i>Cow</i>	2.5 – 3.5	2.0 – 3.0
<i>bobby calf</i>	1.0 – 3.0	0.5 – 1.5
<i>Steer</i>	1.0 – 3.0	0.7 – 1.2
<i>Buffalo</i>	1.0 – 3.0	0.7 – 1.2
<i>Bull</i>	1.0 – 3.0	0.7 – 1.2

Third, electrical waterbath stunning is a stunning method by immersing the animal in water with an electric current to weaken the animal (poultry) before slaughter. The electric current used must be carefully regulated so as not to cause the death of the animal before slaughter. Referring to the 2016 Indonesian National Standard (SNI) concerning the procedures for halal slaughtering of poultry, the procedure for stunning with electric current is carried out using a voltage of between 15 and 80 volts, with an electric current ranging from 0.1 to 0.5 amperes, and an exposure duration of between 3 and 22 seconds (SNI, 2016). Furthermore, according to the latest SNI in 2022 concerning poultry slaughterhouses, the regulation of the electric current must be adjusted to the characteristics of the poultry, such as species, body weight, and age (SNI, 2022). The electrical stunning applied must be reversible, namely a condition in which the poultry can regain consciousness within a maximum of 45 seconds after stunning, and there is a time gap of less than 10 seconds between stunning and slaughter, so that the animal remains alive when slaughtered according to sharia principles (Prastyawan, 2023).

Fourth, Controlled Atmosphere Stunning (CAS) which is carried out using a combination of gases, but the most common method is using carbon dioxide (CO₂). In the first stage, the poultry is exposed to relatively low levels of CO₂ (less than 40% of the air volume) until it loses consciousness. After that, it is exposed to higher levels (around 80%–90%) to maintain the unconscious condition until the slaughter process is complete (Berg, 2015).

Based on the Decree of the Head of BPJPH No. 77 of 2023 concerning Guidelines for the Implementation of a Halal Product Assurance System in the Slaughter of Ruminant Animals and Poultry, there are two stunning methods permitted for ruminant livestock, non-penetrative mechanical stunning and electrical. Meanwhile, for poultry, the only permitted method is water bath electrical stunning. Meanwhile, MUI Fatwa Number 12 of 2009 concerning Halal Slaughter Standards, only explains that stunning is permitted if it facilitates the slaughtering process and is temporary, without causing death and permanent injury before slaughter (MUI, 2009). The stunning equipment used must be able to guarantee that halal slaughter standards are met according to sharia. In addition, the operator of the cutting machine in the slaughtering process must be a Muslim who is mature, of sound mind, and has skills in slaughtering animals according to sharia. Saying the basmalah is an obligation that must be carried out by the slaughterer immediately before or when operating the cutting machine. If the machine is stopped and will be turned on again, the slaughterer is required to repeat the mention of the basmalah (MUI, 2021).

Mechanical slaughtering must ensure that the four main channels are cut, namely the respiratory tract (hulqum), the food tract (mari'), and the two large blood vessels in the neck (wadajain) so that the slaughter is considered valid according to sharia. The stunning tool must also not be used alternately with forbidden animals such as pigs to avoid contamination of impurities (LPPOM MUI, 2008). The selection of the type of tool, stunning procedure and technical implementation must be carried out under the supervision of an expert who understands the requirements for valid slaughter according to sharia.

Comparison of the Effectiveness of Manual and Mechanical Slaughter

The effectiveness of mechanical slaughter can be analyzed through a number of indicators, such as process speed, cost efficiency, and consistency of slaughter results. First, process speed. Research by Yayuk Nurjanah and Alisnawati (2020) explains that the production capacity of manual poultry slaughter is 286 heads/hour, 2000 heads/day, 52,000 heads/month and 624,000 heads/year. While mechanical slaughter is 2000 heads/hour, 14,000 heads/day, 364,000 heads/month and 4,368,000 heads per year (2020). Mechanical slaughter is much more efficient in terms of speed, almost 10 times faster than manual (1000%).

Second, cost efficiency. The indicators used in comparing the costs of manual and mechanical slaughter are (1) Direct labor. The cost required for manual slaughter is IDR 638/head. While mechanical slaughter is IDR. 170/head. (2) Factory Overhead Costs (BOP) direct labor, manual slaughter Rp. 75/head while mechanical Rp. 36/head. (3) Fuel, manual slaughter Rp. 600/head and mechanical Rp. 60/head. (4) Auxiliary materials (ice blocks and plastic packaging), manual Rp. 306/head and mechanical Rp. 231/head (Nurjanah & Alisnawati, 2020). Mechanical slaughter is much more efficient in terms of cost, 30.69% of manual.

Third, the accuracy of cutting in manual slaughter depends on the skills of the slaughterer, while in mechanical slaughter the consistency is better maintained until the final cut. (Gregory & Grandin, 2007). Manual slaughter has advantages in two aspects, animal welfare and compliance with sharia. In terms of animal welfare, the animal's stress response to manual slaughter is lower and animal consciousness is easier to ensure. While in mechanical slaughter, the stress level of the animal is higher and requires stricter control to ensure that the slaughtered animal is still alive. While the aspect of conformity with sharia, the fulfillment of halal standards in manual slaughter is easier to control while mechanical requires a stricter supervision system.

Benefit Analysis of Mechanical Slaughter

Maslahat can be interpreted as anything that is considered beneficial and prevents harm according to common sense. As-Syatibi emphasized that everything that is considered maslahat must be in accordance with the main objective of Islamic law (maqāṣid al-syarī'ah) (Abdussalam & Shodiq, 2022), namely maintaining and realizing goodness for humans through the establishment of relevant and contextual laws (Ghazali, n.d.). Maslahat is the main instrument in bridging the need between maintaining traditional values and the demands of development and renewal in the modern era. This concept allows the integration of normative sharia with contemporary reality, thus creating harmony between Islamic law and innovation in various aspects of life (Dalimunthe et al., 2024). Efficiency in the modern food industry is very important to ensure food security and meet the need for halal meat in large quantities in a fast and hygienic manner. Mechanical slaughtering is present as a solution with various significant advantages. The use of machines in the slaughtering process allows for mass production, where thousands of animals can be processed in a short time, significantly increasing productivity. In addition, machines also reduce reliance on manual labor, which saves costs and labor. With time efficiency, distribution becomes more organized, preventing stockpiling, and accelerating the flow of products to the market. The technology used in mechanical slaughtering also supports more consistent quality standards, as the slaughtering process becomes more controlled and measurable according to established hygiene and quality standards.

The efficiency achieved in mechanical slaughtering is in line with the values of maslahat from a sharia perspective, namely maintaining and protecting property (hifz al-māl) and protecting human life and health (hifz al-naḥs). With the implementation of an efficient slaughtering system, the sustainability of halal meat consumption is guaranteed, and hygiene and consumer safety standards are maintained. However, efficiency alone is not enough without a guarantee that the slaughtering process still meets the halal requirements set by sharia.

The halalness of slaughtering is not only a matter of cutting techniques, but is also related to fulfilling sharia requirements. The slaughterer must be a Muslim who has reached puberty and understands the rules of slaughtering well. The slaughterer must say basmalah before starting the process, including when the machine is turned off and on again. During the slaughtering process, four main channels, namely the respiratory tract, the digestive tract, and two large blood vessels must be cut, and the slaughter must be carried out while the animal is still alive. Mechanical slaughtering is acceptable as long as it meets very important requirements, so that it is not only efficient but also remains in accordance with the provisions of halal as regulated in fiqh.

First, the efficiency achieved through mechanical slaughtering must not sacrifice the specified halal requirements. Second, strict supervision of the implementation of mechanical slaughtering is very crucial. This supervision is carried out by a competent halal auditor to ensure that the entire slaughtering process is in accordance with sharia. This strict supervision not only includes technical inspections, but also ensures that the implementation of the slaughter is carried out in the correct manner according to established procedures. Halal auditors play an important role in maintaining the integrity and credibility of the slaughtering process so that it remains within the framework of halal.

Third, training for machine operators is an important element in ensuring that mechanical slaughtering can be carried out properly. Trained operators will be able to operate the machine properly, ensuring that every procedure is carried out according to the Shari'a, including the recitation of the basmalah and the cutting that meets the requirements of halal. With adequate training, the risk of error in the slaughtering process can be minimized, so that efficiency and halalness can go hand in hand. Overall, mechanical slaughtering can be accepted within the framework of *maslahah* if it meets three main requirements. First, the slaughter is in accordance with the text and fiqh. Second, mechanical slaughtering must be able to meet the needs of Muslims for halal meat. Third, mechanical slaughtering must support *maqāṣid al-syarī'ah*, which includes protection of religion, life, mind, descendants and property. Thus, efficiency and halalness can be met in the form of *maslahah* that benefits humanity, and is in accordance with the broader principles of sharia.

4. CONCLUSION

Mechanical animal slaughtering methods play a significant role in increasing production effectiveness in the modern food industry. This technological innovation allows the implementation of the slaughtering process at high speed and on a large scale, so that it is better able to meet the community's need for meat products optimally. However, the application of this technology also raises a number of challenges that cannot be underestimated, especially related to the

halal aspect which must be carried out strictly in accordance with sharia provisions. Maslahat is an important basis that confirms that the use of technology in mechanical slaughtering is acceptable if it does not conflict with sharia principles and is able to produce wider benefits for the community. Therefore, strict regulations and ongoing supervision are needed to ensure that increasing production efficiency through mechanical slaughtering does not sacrifice compliance with halal standards. Thus, the balance between technological innovation and sharia principles can be maintained harmoniously, so that the modern food industry can develop sustainably without neglecting the underlying sharia values.

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