

THE HARMS OF GENETIC ENGINEERING IN PLANTS BEHIND ITS BENEFITS: ISLAMIC BIOETHICS ACCORDING TO SŪRAH AL- NISĀ' VERSE 119^(*)

Abrar Muslim¹, Hamid Sidiq², Ikbal Sabarudin³, Mida Hardianti⁴,
Yahya Adel Ibrahim⁵

ABSTRACT

Technological advancements in agriculture have led to various innovations, including genetic engineering that produces genetically modified organisms (GMOs). However, from an Islamic bioethical perspective, such interventions raise significant concerns. *Allāh* created the universe, including the earth and all within it in perfect balance. The purpose of this study is to examine Islamic bioethics according to *Sūrah al-Nisā'* (4): 119, in relation to genetic engineering in plants that produces harm behind its benefits. In *Sūrah al-Nisā'* (4): 119 *Allāh* warns humanity not to follow Satan's deception to alter His creation that forms the foundation of Islamic bioethics. Using the library research method, and data were analyzed through qualitative content analysis employing a thematic (*maudhu'i*) approach, enabling a comprehensive and systematic exploration of the selected theme, and synthesizing interpretations from

^{*)} This article was submitted on: 17/07/2025 and accepted for publication on: 22/05/2026.

¹ Study Program of Qur'anic Studies and Tafsir, STAI Al Hidayah Tasikmalaya, West Java, Indonesia.

Department of Chemical Engineering, Universitas Syiah Kuala
Banda Aceh, Indonesia. (Corresponding author)

Email: abrar.muslim@usk.ac.id

² Study Program of Qur'anic Studies and Tafsir, STAI Al Hidayah Tasikmalaya, West Java, Indonesia.

Email: hmdsdq9@gmail.com

³ Study Program of Qur'anic Studies and Tafsir, STAI Al Hidayah Tasikmalaya, West Java, Indonesia.

Email: ikbalsabarudin@gmail.com

⁴ Study Program of Qur'anic Studies and Tafsir, STAI Al Hidayah Tasikmalaya, West Java, Indonesia.

Email: mida.hardianti@gmail.com

⁵ AlMaghrib Institute, Australia.

Email: Yahyaibrahim@almaghrib.org

classical and contemporary *tafsirs* and relate them to GMO bioethics. The interpretations of this verse found in *Tafsir Ibn Kathir*, *Tafsir al-Tabari*, *Tafsir al-Azhar*, and *Tafsir al-Misbah* suggest an implicit prohibition against genetic modification. A more explicit rejection of GMOs is presented in the Verse by Verse Qur'an Study Circle. It was found that the negative consequences of GMO crops include potential risks to human health and the extinction of heirloom varieties. Thus, the Islamic bioethics urges caution toward genetic engineering that disrupts God's natural order, emphasizing *maṣlahah* (public interest) and *sadd al-dhara'i* (blocking harm). These principles guide ethical judgments, ensuring actions promote benefit, prevent harm, and align with Islamic law's objectives, regarding complex issues like GMOs.

Keywords: *Islamic bioethics, Interpretation, Genetically modified organism, Heirlooms*

1.0 INTRODUCTION

Every Muslim believes that *Allāh* created the universe and its contents with great perfection and balance. All celestial bodies, the earth and moon, planets, stars and even galaxies look solid without physical support in the perfect control of the Almighty God. According to the Holy Qur'an [*Sūrah al-Mulk* (67): 3-4], *Allāh* created the seven-tiered, seven-layered heavens perfectly without flaw or imbalance. Man's vision of the heavenly bodies will return to himself, which *Allāh* also created with perfection and balance. Biodiversity is also one proof of the greatness of *Allāh's* perfect creation. *Allāh* created various living things, including all kinds of animals scattered on earth [*Sūrah al-Baqarah* (2): 164] and all kinds of plants [*Sūrah al-An'ām* (6): 99] with their own uniqueness and functions that complement each other in maintaining the balance of the ecosystem.

Each creature has an important role in life, such as plants that provide oxygen (Yan et al., 2024), animals that help pollinate (Simms, 2013), and microorganisms that play a role in recycling organic materials (Sayara et al., 2020). This diversity not only shows the greatness and power of *Allāh*, but also provides great benefits for humans in meeting their needs for food, clothing, medicine, and various other aspects of life. One of the forms of *Allāh's* creation that is full of wisdom is a variety of food crops [*Sūrah al-A'rāf* (7): 58]. Various types of plants with their genetic uniqueness have been provided to fulfill the needs of humans and other living things (Salgotra & Chauhan, 2023). This diversity not only provides variety in food sources, but also plays an important

role in maintaining the natural balance of the ecosystem. Each plant variety has different characteristics, both in terms of flavor [Sūrah ar-Ra'd (13): 4], and assortment of fruits [Sūrah al-An'ām (6): 141].

All indigenous crop varieties created by *Allāh* that have been passed down from generation to generation without the intervention of modern genetic engineering are called heirlooms. Heirlooms have their unique characteristics and distinctive flavors (Dwivedi et al., 2019). Technological developments in agriculture have brought various innovations, one of which is genetic engineering that produces genetically modified organisms (GMOs). This technology aims to increase productivity, pest resistance, and extend the shelf life of food crops (Kavhiza et al., 2022). Recent examples include genetically engineered varieties of soybeans, upland cotton and corn (U.S. Department of Agriculture, 2025), commercialize anthocyanin-enriched purple tomatoes (Martin & Butelli, 2025), potatoes (Waddell, 2024), and seedless blackberry (Zimmerman, 2024). However, behind its benefits, GMOs raise concerns about human health and heirlooms that have been created by *Allāh* with natural perfection.

Producing GMOs is believed to be very relevant to the words of *Allāh* in Sūrah al-Nisā (4): 119 (King Saud University, 2013c), as the basis of Islamic bioethics, which is as follows:

وَلَا ضَلَّئِهِمْ وَلَا مَنِيْنَهُمْ وَلَا مَرِّهَمْ فَلِيْبِتَكْنَ آذَانَ الْأَنْعَمِ وَلَا مَرِّهَمْ فَلِيْغِيْرًا
خَلَقَ اللهُ وَمَنْ يَتَّخِذِ الشَّيْطَانَ وَلِيًّا مِنْ دُونِ اللهِ فَقَدْ خَسِرَ خَسْرَانًا
مُبِيْنًا

And I will mislead them, and I will arouse in them [sinful] desires, and I will command them so they will slit the ears of cattle, and I will command them so they will change the creation of Allāh." And whoever takes Satan as an ally instead of Allāh has certainly sustained a clear loss.

Although in the verse, at first it is mentioned specifically in animals as *Ibn 'Abbās* said in *Tafsīr Katsīr* (Kathīr, 1998b), but then it is mentioned in general, namely *Allāh*'s creation which can include plants, in addition to humans and animals. *Allāh*'s warning about Satan's deception that encourages humans to change His creation so that it is not in accordance with their nature (Hashmi, 2012a).

Thematic interpretation plays a crucial role in understanding the central ideas of the Qur'an in a broader context (Kurniawan et al., 2024). Thematic

interpretation begins with social realities and current issues, compiling relevant verses to provide a solution-oriented thematic understanding. This approach emphasizes the coherence of Qur'anic themes through analysis of related verses to build a structured and holistic understanding in line with contemporary realities (Kaltsum & Amin, 2024). This method focuses on societal issues, legal principles, ethics, and communal life (Al-Ghazālī, 2000). Therefore, thematic interpretation is relevant for application in connecting Islamic jurisprudential principles such as *maṣlaḥah* with contemporary bioethics, including the issue of plant GMOs, through a synthesis of verses on the sentence “فَلْيَغَيِّرَنَّ خَلْقَ اللَّهِ”.

2.0 OBJECTIVES OF THE STUDY

The purpose of this study is to examine Islamic bioethics according to *Sūrah al-Nisā* (4): 119, in relation to genetic engineering in plants that produces harm behind its benefits. To achieve the purpose of this study, several research objectives are formulated as follows:

1. To obtain and analyze the interpretation of the sentence “فَلْيَغَيِّرَنَّ خَلْقَ اللَّهِ” in *Sūrah al-Nisā* (4): 119 by classical and contemporary *mufasssirs* (Quran interpreter). In this case, the *tafsīr* books used as primary data sources are *Tafsīr Ibn Kathīr* and *Tafsīr al-Tabarī* to represent classical *tafsīr*, and *Tafsīr al-Azhar*, *Tafsīr al-Misbāh* and the Verse by Verse Qur'an Study Circle to represent contemporary *tafsīrs*.
2. To analyze the results on the interpretations of classical and contemporary *mufasssirs*, and relate them to Islamic law in order to determine the limits of impermissibility of biological modification.
3. To identify the benefits of genetic engineering in plants for humans.
4. To identify the human risks and drawbacks of plant genetic engineering, and analyze its prohibition based on related thematic concept and Islamic bioethics.
5. To identify the disadvantages of genetic engineering in plants for heirlooms, and analyze its prohibition based on related thematic concept and Islamic bioethics.

3.0 METHODOLOGY

The library research method was used in this research, where various written sources such as books, journals, theses, theses, dissertations and electronic

databases (George, 2008). This research method used a descriptive qualitative approach to describe the sentence “فَلْيَغَيِّرَنَّ خَلْقَ اللَّهِ” which is part of *Sūrah al-Nisā* (4): 119 that is preserved in its authenticity. Data were analyzed through qualitative content analysis employing a *maudhu’i* (thematic) approach, enabling a comprehensive and systematic exploration of the selected theme (Al-Zahrani, 1990). Based on the review and referring to *al-Wāhidī’s Asbāb al-Nuzūl*, this do not have *asbāb al-nuzūl*, or specific historical contexts of revelation verses (Al-Wāhidī, 2008). The main focus is the theme of Islamic bioethics related to genetic engineering in plants, focusing on *Sūrah al-Nisā* (4): 119, namely the transformation of *Allāh’s* creation, and collecting relevant verses through a *maudhu’i* approach to the concept of the perfection of nature (*Sūrah al-Mulk* (67): 3-4) and its balance (*Sūrah al-An‘ām* 6): 99, *Sūrah al-An‘ām* (6): 141), biodiversity (*Sūrah al-Baqarah* (2): 164, *Sūrah al-A‘rāf* (7): 58, *Sūrah ar-Ra’d* (13): 4, in *Sūrah az-Zumar* (39): 21), *Sūrah al-Nahl* (16): 68-69), *halāl-ṭayyib* (*Sūrah al-Baqarah* (2): 168). Therefore, several *tafsīr* books were taken into account as primary data sources in this research, namely *Tafsīr Ibn Katsir* and *Tafsīr al-Tabarī* to represent classical *tafsīr*, and *Tafsīr al-Mishbāh* and *Tafsīr al-Azhar* to represent contemporary *tafsīr*.

Within the treasury of *tafsīr bi al-ma’thūr*, *Tafsīr al-Tabarī* and *Tafsīr Ibn Kathīr* highlight methodological excellence that distinguishes them from other commentaries on narrations (Aburrohman, 2018), making them highly relevant for contemporary Islamic bioethics studies. Unlike other *tafsīrs bi al-ma’thūr*, which simply compiled narrations without systematic evaluation, *al-Tabarī* documented a wide range of narrations from the companions and *tabi’in* while critically assessing linguistic evidence, context, and *sanad* to select the strongest interpretation (Lumah et al., 2025). *Ibn Kathīr* perfected this through rigorous *hadīth* criticism that weeded out weak narrations and minimized *isra’iliyyāt*. The transparency of *ikhtilāf*, the argumentative *tarjih* process, and this critical filtering formed a robust and epistemological framework (Zaman et al., 2023). This offers a reliable foundation for normative ethical reasoning regarding genetic engineering and the modification of *Allāh’s* perfect creation.

Compared to many contemporary *tafsīr*, *Tafsīr al-Mishbāh* and *Tafsīr al-Azhar* offer distinctive strengths that are particularly relevant for Islamic bioethical studies. *Tafsīr al-Mishbāh* is characterized by its systematic integration of classical exegetical sources with modern linguistic analysis (Kafrawi et al., 2025), and contemporary ethical challenges, enabling nuanced engagement with issues such as biotechnology, human responsibility, and moral consequences of scientific intervention (Ali & Isnaini, 2024). *Tafsīr al-Azhar* excels in its socio-ethical and reformist orientation, contextualizing Qur’anic guidance within lived

Muslim realities and moral dilemmas arising from modern science and development, including environmental concerns (Aziz, 2023) which is relevant for Islamic bioethical studies. Moreover, *Tafsīr al-Azhar* maintains a balance between textual fidelity, ethical reflection, and practical relevance (Saputri, 2023).

In addition, another primary data source is the interpretation of Verse by Verse Qur'an Study Circle. This interpretation model was developed from a commitment to read and understand the *Qur'ān* as it was revealed and to study each verse carefully with reference to classical *tafsīr* sources, primarily *Tafsīr Ibn Kathīr*, while using additional references when more detail is needed. In addition, the interpretations are adapted to address contemporary issues in the modern era. This practice strengthens the interpretive grounding of the study by emphasizing continuity, context, and relevance in the exploration of Qur'anic verses (Hashmi, 2012b). Evaluation, and analysis of the data was needed in synthesizing information to narrate the results of the interpretation of all the *mufasssirs* and the relationship between the data can be conveyed well related to GMO in accordance with the hypothesis.

4.0 RESULTS AND DISCUSSION

4.1 Interpretation by Classical and Contemporary Mufasssirs

Interpretation by Ibn Kathīr

Tafsīr al- Qur'ān al-'Aẓīm or *Tafsīr Ibn Kathīr* is the work of Ibn Kathīr whose full name is *Imād ad-Dīn Ismā'īl bin 'Umar bin Kathīr al-Qurasyī al-Buṣrawī*, born in 701 AH/1301 AD in Bashrah (Karimah, 2024). *Tafsīr Ibn Kathīr* relies heavily on *tafsīr bil-ma'thur* by developing a threefold methodology in interpreting the Qur'an, namely interpreting the Qur'an with the Qur'an, *hadīth*, and the sayings of the *sahabah* and *tabi'in* (Muhyin & Nasir, 2023). Although some argue that elements of *tafsīr bil-ra'yi* are also present, the former approach is more dominant, as evidenced by his extensive use of *hadīth* expertise in explaining verses (Rusli, 2021).

Ibn Kathīr's interpretation of the sentence “فَلْيَغْيِرَنَّ خَلْقَ اللَّهِ” in *Sūrah al-Nisā* (4): 119 is as follows (Kathīr, 1998b):

قال ابن عباس: يعني بذلك خصي الدواب، وقد روي عن ابن عمر
وأنس وسعيد بن المسيب وعكرمة وأبي عياض وقتادة وأبي صالح

والثوري، وقد ورد في حديث النهي عن ذلك (١).

وقال الحسن بن أبي الحسن البصري: يعني بذلك الوشم، وفي صحيح مسلم، النهي عن الوشم في الوجه، وفي لفظ: لعن الله من فعل ذلك، وفي الصحيح (٢) عن ابن مسعود أنه قال: لعن الله الواشمات والمستوشمات والنامصات والمتنمصات، والمتفلجات للحسن المغيرات خلق الله،

ثم قال: ألا ألعن (٣) من لعن رسول الله وهو في كتاب الله، يعني قوله: ﴿وما آتاكم الرسول

فخذوه وما نهاكم عنه فانتهوا﴾ [الحشر: ٧].

وقال ابن عباس في رواية عنه ومجاهد وعكرمة وإبراهيم النخعي والحسن وقتادة والحكم والسدي والضحاك وعطاء الخراساني في قوله: ﴿ولأمرهم فليغيرن خلق الله﴾ يعني دين الله عز.

(١) انظر مسند أحمد ٣ / ٣٧٨، ٣٨٢، ٣٨٣

(٢) صحيح مسلم (لباس حديث ١٢٠)

(٣) في صحيح مسلم: «وما لي لا ألعن من لعن رسول الله». وذلك أن امرأة من بني أسد يقال لها أم يعقوب وكانت تقرأ القرآن أتت ابن مسعود فقالت: ما حديث بلغني عنك أنك لعنت الواشمات ... إلخ. فأجابها بذلك. والواشمة: فاعلة الوشم. والمفعول بها ذلك هي الموشومة. فإن طلبت فعل ذلك فهي مستوشمة. والنامصة هي التي تزيل الشعر من الوجه. والمتنمصة هي التي تطلب فعل ذلك بها. والمتفلجات للحسن: مفلجات الأسنان، بأن تبرد الواحدة ما بين أسنانها، الثنايا والرباعيات. وتفعل ذلك العجوز إظهاراً للصغر، لأن هذه الفرجة اللطيفة بين الأسنان تكون للبنات الصغار.

Ibn 'Abbās said: What is meant by this verse is the castration of animals. This was also narrated from Ibn 'Umar, Anas, Sa'īd ibn al-Musayyib, 'Ikrimah, Abū 'Iyāḍ, Qatādah, Abū Ṣālih, and al-Thawri. In addition, there are traditions that prohibit such acts.(1)

Al-Hasan ibn Abī al-Hasan al-Baṣrī said: What is meant is tattooing. In Ṣaḥīḥ Muslim, there is a prohibition on tattooing the face, and in one of the passages it is stated: "Allāh curses the one who does this." In Ṣaḥīḥ(2), it is also narrated from Ibn Mas'ūd that he said: "Allāh curses the women who tattoo and ask to be tattooed, who pluck their eyebrows and ask to have them plucked, and who file their teeth for the sake of beauty, thereby altering the creation of Allāh."

Then he said(3): "Should I not curse those whom the Messenger of Allāh (peace and blessings be upon him) cursed, when it is in the Book of Allāh?" That is, His words: "And whatever the Messenger has given you, take it; and whatever he has forbidden you, refrain from it" [al-Hashr (59): 7].

Ibn 'Abbās, in one of his narrations, as well as Mujāhid, 'Ikrimah, Ibrāhīm al-Nakha'ī, al-Hasan, Qatādah, al-Hakam, al-Suddī, al-Ḍahḥāk, and 'Aṭā' al-Khurāsānī interpreted the words of Allāh, "I will command them so they will change the creation of Allāh," as meaning changing the religion of Allāh, the Glorious.

(1) See Musnad Ahmad 3/378, 382, 383.

(2) Ṣaḥīḥ Muslim (Book of Clothing, Hadīth no. 120)

(3) In Ṣaḥīḥ Muslim: "And why should I not curse those whom the Messenger of Allāh has cursed?" This refers to an incident in which a woman from the tribe of Banū Asad, named Umm Ya'qūb, who used to recite the Qur'an, came to Ibn Mas'ūd and said: "I have heard a report that you cursed women who get tattoos..." and so on. He responded to her accordingly.

The term al-wāshimah refers to a woman who performs tattooing, and the one on whom it is performed is called al-mushwamah. If she requests to have it done to herself, she is referred to as mustawshimah. An-nāmiṣah is a woman who removes hair from her face, and al-mutanammiṣah is a woman who requests this to be done to her. Al-mufallijāt lil-buṣn refers to women who file their teeth—specifically, filing the spaces between the incisors and canines. Elderly women do this to appear younger, because these small gaps between the teeth are characteristic of young girls.

Interpretation by al-Tabarī

Tafsīr Jāmi‘ al-Bayān ‘an Ta’wīl Āy al-Qur’ān or *Tafsīr al-Tabarī* is the monumental work of *Abū Ja‘far Muhammad ibn Jarīr al-Tabarī*, who was born in 224 AH/839 CE in Amol, Tabaristān. *Al-Tabarī* uses the *tafsīr bil-ma’tsūr* method, which prioritizes narrations from the Prophet Muhammad, the companions, and the *tabi‘in*, consistently citing the *sanad* (chain of transmission) for each opinion, thus ensuring the validity of the interpretation (Amir & Mahmud, 2024).

Al-Tabarī’s interpretation of the sentence “فَلْيُغَيِّرْ خَلْقَ اللَّهِ” in *Sūrah al-Nisā* (4): 119 is as follows (Al-Ṭabarī, 2001b):

قال أبو جعفر: اختلف أهل التأويل في معنى قوله: ﴿فَلْيُغَيِّرْ خَلْقَ اللَّهِ﴾؛ فقال بعضهم: معنى ذلك: ولأمرهم فليغيرن خلق الله من البهائم بخصائهم (٢) إياها.

ذكر من قال ذلك

حدثنا محمد بن بشار، قال: ثنا عبد الرحمن، قال: ثنا حماد بن سلمة، عن عمار بن أبي، عمار، عن ابن عباس، أنه كره الإخصاء وقال: فيه نزلت: ﴿ولأمرهم فليغيرن خلق الله﴾ (٣).

حدثنا ابن بشار، قال: ثنا عبد الله بن داود، قال: ثنا أبو جعفر الرازي، عن الربيع بن أنس، عن أنس، أنه كره الإخصاء، وقال: فيه نزلت: ﴿ولأمرهم فليغيرن خلق الله﴾ (٤).

حدثنا ابن وكيع، قال: ثنا أبي، عن أبي جعفر الرازي، عن الربيع بن أنس، عن أنس بن مالك، قال: هو الإخصاء، يعني قول الله: ﴿ولأمرهم فليغيرن خلق الله﴾ (٤).

(٢) في م: "بإخصائهم."

(٣) أخرجه ابن أبي حاتم في تفسيره ٤ / ١٠٦٩ (٥٩٨٤) من طريق

حماد به نحوه. وعزه السيوطي في الدر المنثور ٢ / ٢٢٣ إلى عبد بن

حميد وابن المنذر.

(٤) أخرجه ابن أبي شيبة ٢٢٦ / ١٢ عن وكيع به، وعبد الرزاق في مصنفه (٨٤٤٤) عن أبي جعفر الرازي به، وعزاه السيوطي في الدر المنثور ٢ / ٢٢٣ إلى عبد بن حميد وابن المنذر.

Abu Ja'far said: The scholars of tafsīr differed in opinion regarding the meaning of His statement (Words ("And I will command them so they will change the creation of Allāh."): Some of them said its meaning is: "And indeed I will command them so they will alter Allāh's creation in livestock by castrating them.")(2)

Those who said this include:

Muhammad bin Bashshār narrated to us, he said: 'Abdurrahmān narrated to us, he said: Hammād ibn Salāmah narrated to us, from 'Ammār ibn Abī, from Ibn 'Abbās, that he disliked castration, and said: Concerning that, the verse was revealed ("And I will command them so they will change the creation of Allāh.")(3)

Ibn Bashshār narrated to us, he said: 'Abdullāh ibn Dāwūd narrated to us, he said: Abū Ja'far ar-Rāzī narrated to us, from ar-Rabī' ibn Anas, from Anas, that he disliked castration, and said: Concerning that, the verse was revealed revealed ("And I will command them so they will change the creation of Allāh.")(4)

(2) In manuscript M: "by castrating them"

(3) Reported by Ibn Abī Hātim in his *Tafsīr*, vol. 4, p. 1069, narration no. 5984, through the chain of Hammād ibn Salamah with similar wording. It is also attributed by al-Suyūṭī in *ad-Durr al-Manthūr*, vol. 2, p. 223, to 'Abd ibn Humayd and Ibn al-Mundhir.

(4) Reported by Ibn Abī Shaybah (12/226) from *Wakī'*, with the same chain; and by 'Abd al-Razzāq in his *Muṣannaf* (no. 8444) from Abū Ja'far ar-Rāzī, with the same chain. Al-Suyūṭī attributed it in *ad-Durr al-Manthūr* (2/223) to 'Abd ibn Humayd and Ibn al-Mundhir.

Interpretation by Hamka

Tafsīr al-Azhar is a Qur'anic interpretation which was written by Haji Abdul Malik Karim Amrullah (Hamka), an influential historian, writer, scholar, and politician in Indonesia. He was born on February 17, 1908 in Maninjau, West Sumatra, and died on July 18, 1981 in Jakarta. Hamka has applied the *tafsīr bi al-ma'tsur* method by referring to the Qur'an, *hadīth*, and the opinions of the companions and *tabi'in* (Hidayati, 2018). He has also used *tafsīr bi al-ra'yi*

carefully while adhering to the principles of Islamic law (Izzan, 2021). *Tafsīr al-Azhar* is characterized by *adab al-ijtima'i*, which emphasizes the social relevance of the Qur'an in people's lives (Musyarif, 2019).

Hamka's interpretation of the sentence “فَلْيُغَيِّرَنَّ خَلْقَ اللَّهِ” in Sūrah al-Nisā (4): 119 is as follows (Amrullah, 1989b):

In the second interpretation, altering Allāh's creation, according to the interpretation of Ibn 'Abbās also, which was narrated by 'Abd ibn Hunayf, is castrating animals. Anas also interpreted it this way. According to a report from Imām Ahmad, the Messenger of Allāh (ṣallā Allāhu 'alayhi wa sallam) forbade castrating horses and other animals. And according to the narration of al-Tabarānī from 'Abdullāh ibn Mas'ūd: "The Prophet forbade castrating his fellow son of Adam." According to another hadīth narrated by Imām Ahmad from Abū Hurayrah: "The Prophet forbade washam." Washam is the skin pierced with a fine needle and then colored blue or red, given a flower or other images, which is usually called orang tatu, or cacah... The same applies to the teeth, as was the custom of the Jāhiliyyah in Batak Karo two generations ago; the teeth of girls were broken. This was because it was good for the eyes of the people in those days. Or removing the hair on a woman's face, for example, to make her forehead look wider. Or, as was the custom of Chinese women in the past, the soles of women's feet were tightly bandaged to make them look small, which prevented them from walking. Of course, we can also consider the issue of correcting a bad face or a nose that is too hunched over. This is because the intention is not to change what Allāh has done, but to change it. Because of modern research into the psyche of the wicked, it has been found that a person's face is too ugly for his psyche to be ugly. But it is clear that castration, which is cutting off a man's genitals or cutting off his testicles so that he can no longer perform his duties as a man, is strictly forbidden by religion.

Interpretation by Shihab

Tafsīr al-Misbāh is a work of Haji Muhammad Quraish Shihab, a scholar, writer, Arabic linguist, and political figure. He was born on February 16, 1944 in Rappang, South Sulawesi. *Tafsīr al-Misbāh* is a work of Qur'anic interpretation written by Haji Muhammad Quraish Shihab, a scholar, writer, Arabic linguist, and political figure. He was born on February 16, 1944 in Rappang, South Sulawesi (Subagja & Khoiruddin, 2023). *Tafsīr al-Misbāh* leans towards social interpretation by using the *adabi Ijtima'i* method. Shihab has used the *tafsīr bi*

al-ra'yi method, which prioritizes personal *ijtihad* and refers to the thoughts of classical and contemporary *mufasssirs* from various schools, including *Sunni*, *Shi'ah*, and *Mu'tazilah* (Boulu, 2014).

Shihab's interpretation of the sentence “فَلْيَغْيِرَنَّ خَلْقَ اللَّهِ” in *Sūrah al-Nisā* (4): 119 is as follows (Shihab, 2002a):

He said: And I will tell them to cut off the ears of the livestock, and they will actually cut them off. This refers to the custom they had of certain animals to sacrifice to their idols. The cutting off of the ears was a sign that their animal should be left free as it belonged to the Allāh, not to be disturbed. “His Word: Altering Allāh's creation, in addition to the above, also includes piercing the eyes of camels that they have been riding for a long time, or getting tattoos as decoration, but the essence is to disfigure the face or body. Also included in the definition of this word is the use of Allāh's creatures against their true function, such as deifying the stars, and or making them signs for the course of human life (astronomy) or understanding solar and lunar eclipses as signs of certain events. It also includes altering Allāh's creation by castration, homosexuality, and lesbianism, as well as practices that are not in accordance with human nature.

Interpretation in Verse by Verse Quran Study Circle

Verse by Verse Quran Study Circle is a work compiled by Farhat Naseem Hashmi, an Islamic scholar born in Sargodha, Punjab, Pakistan on December 22, 1957. She is the founder of Al-Huda International Welfare Foundation, which was established in 1994 to educate women in understanding the Quran and *hadīth* (Hashmi, 2020). Verse by Verse Quran Study Circle has been written to provide an in-depth understanding of the verses of the Qur'an in a systematic manner. The method includes a literal reading of the verse with word-by-word translation, contextual explanation of each verse, as well as the relevance of the verse to the daily lives of Muslims (Waraich et al., 2021).

The interpretation of the sentence “فَلْيَغْيِرَنَّ خَلْقَ اللَّهِ” in *Sūrah al-Nisā* (4): 119 in Verse by Verse Quran Study Circle is as follows (Hashmi, 2012a):

The word ghayyirunna is from the root letters ghayn-ya-ra, and it means alter or change a thing for the worse, corrupt, taint, infect, adjust, repair, etc. Shaytan is swearing that he will make sure that people alter Allāh's creation. If we look around ourselves, we are eating genetically modified crops and getting our looks changed

through plastic and cosmetic surgery. We are torturing our bodies and getting fancy or awful tattoos made. What is this? Are we not pleased by what Allāh has created; the way He created things to be? Aren't we being ungrateful when we bring about changes in natural things? Some women get surgery done so that they are not able to conceive any more children. They are altering something that Allāh Subhānahu wa Ta'ālā decided for them. A woman's body was designed to bear children.... Today's world portrays that Satan is indeed getting successful in his plan. But we as Muslims should analyze our actions. What kind of food are we purchasing? Are we too obsessed with our looks that we want to get them altered? Everything that Allāh has created has some logic behind it...

4.2 Interpretation Evaluation Results

There is an explicit prohibition of changing *Allāh's* creation in the interpretation of the sentence “I will command them that they change *Allāh's* creation.” in *Sūrah al-Nisā* (4): 119 in *Tafsīr Ibn Kathīr*, *Tafsīr al-Tabarī* and *Tafsīr al-Azhar* with the object of prohibition in the form of animals and humans. *Tafsīr Ibn Kathīr* and *Tafsīr al-Tabarī* include valid *hadīth* evidence in their interpretation, while *Tafsīr al-Azhar* does not include evidence in their interpretation. *Tafsīr al-Misbāh Tafsīr* and Verse by Verse Quran Study Circle implicitly forbids various forms of biological alteration of *Allāh's* creation because these actions are respectively a deviation from *fiṭrah* with the object of prohibition in the form of animals and humans, and disbelief in *Allāh's* creation with the object of prohibition in the form of plants and humans. The main reason for both the explicit prohibition and the implicit prohibition of biological alteration of *Allāh's* creation is that it is one of the efforts of Satan to mislead people.

All interpretations explicitly do not allow biological changes from *Allāh's* creation, except for *Tafsīr al-Azhar* which gives room for *ijtihād* related to necessary aesthetic improvements, such as surgery to repair physical defects to restore biological functions as far as it does not cause negative effects. This surgery does not contradict the principles of bioethics from the Islamic perspective, which is then referred to as Islamic bioethics (Daar & al Khitamy, 2001). The room for *ijtihād* also is consistent with contemporary Islamic legal of *Fatwā* of the Indonesian Council of Ulama No. 51 of 2020. The use of stem cells for medicinal purposes is permitted by this *fatwa* (Majelis Ulama Indonesia, 2020). The *fatwā* and recommendations of International Islamic Fiqh Academy (IIFA) allows restoring biological functions such as organ transplantation for patient welfare and the preservation of life (International Islamic Fiqh Academy, 1988).

In contrast, genetic modifications pursued for commercial efficiency, such as enhancing physical traits for profit or productivity without medical necessity, are generally regarded as ethically problematic. Organ commercialization (selling organs commercially) is also prohibited according to the IIFA's *fatwā*. This distinction is emphasized in contemporary Islamic bioethics, which upholds human dignity and the preservation of natural balance while acknowledging the permissibility of interventions that serve a clear therapeutic purpose and do not involve exploitation or corruption of creation.

Tafsīr Ibn Kathīr and *Tafsīr al-Tabarī* do not include biological changes from *Allāh's* creation in the form of GMOs. This is very reasonable because GMOs have begun to be developed in the 20th century, while *Tafsīr Ibn Kathīr* and *Tafsīr al-Tabarī* had been written in the 10th century and 14th century, respectively (Kramkowska et al., 2013). *Tafsīr al-Azhar* also does not relate to GMOs because the writing of *Tafsīr al-Azhar* was completed in 1966, which was 7 years before GMOs began to be developed. Although *Tafsīr al-Misbāh* was written in 1999-2002, GMO was also not included in its interpretation. However, because GMOs can cause changes in the biology of animals such as greater baby weight, abnormalities affecting tissues and organs and even cause complications in offspring and mothers, and plants such as the size and shape of seeds (Ormandy et al., 2011), the four *tafsīrs* also implicitly prohibit GMOs. Meanwhile, *tafsīr Verse by Verse Quran Study Circle* explicitly states that GMOs are a form of biological change from *Allāh's* creation. Specifically from the analysis of these interpretations and the previous study, it can be concluded that GMOs are at least implicitly prohibited due to harmful biological alteration of *Allāh's* creation, even if not explicitly discussed by *Tafsīr Ibn Kathīr*, *Tafsīr al-Tabarī*, *Tafsīr al-Azhar* and *Tafsīr al-Misbāh*.

5.0 THE BENEFITS OF GENETIC ENGINEERING IN PLANTS FOR HUMANS

GMOs are living things whose genetic material has been altered through genetic engineering techniques in the laboratory. Plant genetic changes occur rapidly in GMOs. Genetically modified (GM) products are growing rapidly due to high demand and their role in food security amidst limited land (Caradus, 2023). In GMOs, genes from other species are inserted directly into the organism's DNA. For example, genes derived from the bacterium *Bacillus thuringiensis* (Bt), known for their ability to kill insect larvae, are inserted into corn plants to make them resistant to pests (Vercesi et al., 2006). Genetic engineering affects the activity of the *polygalacturonase* enzyme in GM tomatoes (*Tomato Flavr Savr*) so that they have a longer shelf life (Kramer & Redenbaugh, 1994). GM potatoes with the Bt

gene from *Bacillus thuringiensis* became resistant to potato beetle pests and produced higher yields (Keshavareddy & Kumar, 2016). GM maize has been modified to express traits for both herbicide tolerance and insect resistance (Naegeli et al., 2018). RNA-guided genome editing has resulted in virus resistance in plants (Khatodia et al., 2017). GM tomato has tolerance to cold temperatures, and resistance to drought and salinity (Wai et al., 2020). An increase in β -carotene has been achieved in GM oranges (Pons et al., 2014). New GM potato varieties have been developed with enhanced levels of carbohydrates, vitamins, lipids, proteins, and more (Bagri et al., 2018). The protein content and digestibility of GM sorghum have also been improved (Liu et al., 2019).

GMOs are different from ordinary crosses, where ordinary crosses use natural or artificial selection methods without going through genetic engineering techniques. For example, cross-pollination or interbreeding between individuals within the same species or those that are still closely related genetically. However, ordinary pollination of dates trees assisted by humans in the Prophet's time has been used as an argument to legalize genetically modified plant products in the 20th century while still taking into account the potential harms of GMOs (Majelis Ulama Indonesia, 2013). Meanwhile, the International Islamic Fiqh Academy (IIFA) permits genetic engineering, including GMOs, on plants, animals, and microorganisms if *shari'ah* principles are upheld, ensuring the products are *halāl* and *tayyib* (wholesome and beneficial) without causing harm to humans, animals, or the environment (Idris et al., 2020).

6.0 THE HUMAN RISKS AND DRAWBACKS OF PLANT GENETIC ENGINEERING

GMOs mutations in GM plants occur due to genetic modifications. These mutations cause GM plants to contain harmful genetic material. For example, the genetic material in herbicide-resistant GM soybeans can transfer to human gut bacteria and eventually becomes present in the human gut. The GM tomato that has been tested on rats may pose a life-threatening risk to humans due to toxins resulting from genetic engineering (Verma, 2011). GM peas that have been tested on rats are suspected to potentially cause fatal allergic reactions in humans (Remington et al., 2018). GM food proteins can cause allergies such as circulatory system, respiratory and serious health effects. The most minimal effects are skin disorders (Ladics et al., 2011). For example, allergic symptoms such as vomiting, diarrhea and nausea headaches were suffered by consumers after eating products containing GM corn (Cabelkova et al., 2024). GM food is considered unsafe because it can cause and allergic reaction in the gastrointestinal tract and organ damage (Faisal et al., 2019).

Therefore, by knowing the risks and harms to humans from genetically engineered plants, the harm of GMOs should be a concern for every Muslim, as a command from *Allāh* in *Sūrah al-Baqarah* (2): 168 as follows (King Saud University, 2013b):

يَأْتِيهَا النَّاسُ كُلُّوا مِمَّا فِي الْأَرْضِ حَلَالًا طَيِّبًا وَلَا تَتَّبِعُوا
خُطَوَاتِ الشَّيْطَانِ إِنَّهُ لَكُمْ عَدُوٌّ مُبِينٌ

O mankind, eat from whatever is on earth [that is] lawful and good and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy.

Ibn Kathīr in his *tafsīr* states (*Kathīr*, 1998a):

He allowed them to eat from what is on earth, so long as it is lawful from the side of Allāh and thayyib (good), i.e. naturally pleasing, not harmful to body or mind.

Al-Ṭabarī in his *tafsīr* states (*Al-Ṭabarī*, 2001a):

The dishes that I have forbidden through the words and deeds of the Prophet Muhammad, not those that you have forbidden to yourselves such as bahā'ir, sawā'ib, waṣā'il, and the like, even though I have not forbidden them". That is different from what I have indeed made forbidden to you - namely carrion, blood, pork, and anything dedicated to other than Me - which I have abolished absolutely.

Hamka in his *tafsīr* states (*Amrullah*, 1989a):

In this verse, it is mentioned that which is lawful and good. Halāl food is the opposite of the haram; the haram have also been mentioned in the Qur'an, namely that which is not slaughtered, pork, blood, and that which is slaughtered for idols. If there is no such abstinence, it is lawful to eat. But let it also be good even if it is halāl. The limits of what is good can certainly be considered by humans.

Shihab in his *tafsīr* states (*Shihab*, 2002b):

This command is addressed to all people, whether they believe in Allāh or not. It is as if Allāh is saying: O disbelievers, eat what is lawful, act in accordance with the law, for it benefits you in your worldly life. However, not all halāl food is automatically good. This is because there are four kinds of halāl: obligatory, sunnah, permissible and makruh. Activities are the same. There are activities that, although halāl, are makrooh or highly disliked by Allāh, such as the breaking of a relationship. Furthermore, not everything that is halāl is suitable for each condition. There is halāl that is good for person A who has a certain

health condition, and there is also something that is not good for him, even though it is good for others. There is food that is halāl, but not nutritious, and then it becomes bad. What is commanded by the verse above is that which is halāl again good.

Meanwhile, this verse has not been interpreted by Hashmi in his Verse by Verse Quran Study Circle. All four *mufasssirs*, *Ibn Kathīr*, *al-Tabarī*, Hamka, and Quraish Shihab converge on the interpretation that the Qur'anic injunction to consume what is *halāl* (lawful) and *ṭayyib* (good) goes beyond mere legal permissibility, emphasizing the ethical and beneficial nature of what is consumed. *Ibn Kathīr* highlights that food must not only be lawful according to *Allāh's* decree, but also inherently good and non-harmful to the body or mind. *Al-Tabarī*, citing *Abu Ja'far*, distinguishes between what *Allāh* has explicitly forbidden such as carrion, blood, pork, and offerings to others besides *Allāh* and what people mistakenly prohibit themselves without divine sanction, thereby affirming the central role of divine legislation. Hamka reinforces this by underlining that while the Qur'an specifies the haram, anything outside that prohibition is *halāl*, provided it also meets the criterion of being good, which is discernible through human judgment. Quraish Shihab expands the concept further by categorizing *halāl* into degrees obligatory, recommended, neutral, and disliked and stressing. While a food item may be classified as *halāl*, it does not necessarily meet the criteria of *ṭayyib* for all individuals. Certain lawful foods may still be inappropriate or detrimental for individuals with specific health conditions.

Therefore, the command in *Sūrah al-Baqarah* (2): 168 emphasizes that food should not only be *halāl* (lawful) but also *ṭayyib* (good, wholesome). *Ṭayyib* refers to food that is naturally pleasing, beneficial, and not harmful to the body or mind. While *halāl* defines the lawfulness of a food item, *ṭayyib* assesses its quality, healthiness, and suitability. Humans, through reason and experience, are capable of discerning what *ṭayyib* for their specific conditions is. Not everything *halāl* is automatically *ṭayyib* for everyone: a food may be lawful but unsuitable or even harmful for a person with particular health needs. Therefore, GM foods that may harm human health should be banned for Muslims to consume. This is closely related to *Sūrah al-Nisā* (4): 119, which describes Satan's strategy to mislead humans, one of which is by altering *Allāh's* creation, including plants that serve as a source of food for humankind.

7.0 THE DISADVANTAGES OF GENETIC ENGINEERING IN PLANTS FOR HEIRLOOMS

Allāh has created the universe in balance, the earth with all its contents including heirlooms. All heirloom seeds that grow by themselves on earth which are then planted or cultivated by humans which are utilized as foodstuffs and other benefits are the creation of *Allāh*, as *Allāh* says in *Sūrah al-An‘ām* (6): 95 as follows (King Saud University, 2013a):

إِنَّ اللَّهَ فَالِقُ الْحَبِّ وَالنَّوَىٰ ۖ يُخْرِجُ الْحَيَّ مِنَ الْمَيِّتِ وَمَخْرِجُ الْمَيِّتِ مِنَ الْحَيِّ ۗ ذَٰلِكُمْ اللَّهُ فَآتَىٰ تَوْفِكُونَ

Indeed, Allāh is the cleaver of grain and date seeds. He brings the living out of the dead and brings the dead out of the living. That is Allāh; so how are you deluded?

Heirlooms with their own genetic material (DNA) have been created by *Allāh* so that there are various types and colors of Heirlooms with color variations in leaves, flowers, and fruits. The superiority of plants both in terms of quantity and taste and aroma of different fruits is the decree of *Allāh* even though they get the same environmental influences. It is *Allāh* who determines the levels and advantages of each according to His wisdom, as *Allāh* says in *Sūrah az-Zumar* (39): 21, as follows (King Saud University, 2013d):

أَلَمْ تَرَ أَنَّ اللَّهَ أَنزَلَ مِنَ السَّمَاءِ مَاءً فَسَلَكَهُ يَنْبِيعٌ فِي الْأَرْضِ ثُمَّ يُخْرِجُ بِهِ زَرْعًا مُّخْتَلِفًا أَلْوَانُهُ ثُمَّ يَهِيجُ فَتَرَاهُ مَصْفُورًا ثُمَّ يُجْعَلُهُ حُطَمًا ۚ إِنَّ فِي ذَٰلِكَ لَذِكْرًا لِأُولَى الْأَلْبَابِ

Do you not see that Allāh sends down rain from the sky and makes it flow as springs [and rivers] in the earth; then He produces thereby crops of varying colors; then they dry and you see them turned yellow; then He makes them [scattered] debris. Indeed in that is a reminder for those.

GMOs and hybrid crops are often perceived as less attractive and less flavorful than heirloom varieties. For example, GMO or hybrid tomatoes are often bland and sour, while heirloom tomatoes are rich in shape, color, flavor and nutrients. Heirloom seeds adapt to the environment, making them pest-resistant, hardy and suitable for organic farming. Decades of natural pollination allow them to survive in various conditions and support ecosystem resilience (Willows, 2024). Although GMOs and hybrid crops are commonly perceived to lack the

visual appeal and taste of heirloom varieties, for reasons related to biotechnology development, increased food production, environmental resilience, and other factors including economic benefits, GMOs has continued to expand. GMOs were initially developed by Jewish scientists such as Paul Berg, Stanley Cohen, and Rudolf Jaenisch, as well as Christian scientists such as Herbert Boyer (Pradhan, 2021). The commercialization of GMOs was initially carried out by Western Corporations (United States, Canada, and Western Europe) such as Monsanto, DuPont, and Syngenta (Ruskin, 2015).

GMOs raise concerns for the preservation of heirlooms (all native plant varieties) that have been created by *Allāh* with natural perfection. The vast majority (88%) of corn in the US is now GMO, causing contamination of non-GMO, organic and heirloom corn, thus destroying its genetic purity, and even heirloom corn (Navajo Robin's Egg) that has been adapted for thousands of years as an indigenous American heritage has been lost. Baker Creek tested 200 varieties of corn and planted 100 for seed, but high GMO contamination made it difficult to find pure seed (Pfoutz, 2014). India a few decades ago had around 100,000 different traditional rice varieties, but by 2018/2019 the rice-growing land in India had lost 80% of these varieties to hybrids and GMOs (Léonet, 2019). Due to cross-pollination by insects, wind, or farmer error, non-GMO and organic crops that may be heirlooms have been contaminated with GMOs. This contamination is disastrous for farmers who must meet export standards or non-GMO certification (Green America, 2024). The preservation of traditional seeds (heirloom seeds) has declined due to shifting food preferences and the lack of Ghanaian government policies to control the use of hybrid seeds and GMOs (M. C., 2024).

Thus, the Islamic bioethics approach demands caution and often rejects genetic engineering practices that undermine the natural order of God's creation. This caution is rooted in the broader ethical concern that such interventions may constitute an unwarranted alteration of the divine design, which is a recurring theme in Islamic scholarship on biotechnology and genetic modification (Alsomali & Hussein, 2021). The principle of tampering with God's creation is frequently cited as a basis for prohibiting practices that are not clearly justified by necessity or public benefit, especially when the long-term consequences are unknown or potentially harmful (Ibrahim et al., 2019). Thus, the Islamic bioethics approach demands caution and may reject genetic engineering practices that undermine the natural order of God's creation. This caution is rooted in the ethical concern that interventions lacking clear necessity or public benefit may represent unwarranted alteration of the divine design, particularly when long-term consequences are uncertain. From this perspective, cases of genetic

contamination and the decline of traditional seed diversity serve as real-world illustrations of how biotechnology can lead to irreversible ecological and cultural losses, reinforcing the need for stricter ethical evaluation and precaution.

This stance is further reinforced by foundational jurisprudential principles in Islamic law. The concept of *maslahah* (public interest) is central to Islamic bioethics, emphasizing the promotion of benefit and the prevention of harm in accordance with the objectives of Islamic law, which include the preservation of life, lineage, intellect, religion, and property. Any bioethical issue, including genetic engineering, is assessed based on its intention, method, and outcome, with a focus on whether it upholds or undermines these objectives (Isa et al., 2020). For instance, gene editing for therapeutic purposes may be permissible by the IIFA's *fatwā* if it clearly prevents harm or treats disease, and it must be safe, not contrary to Islamic principles, and not harmful to health (International Islamic Fiqh Academy, 2025). Although the IIFA's *fatwā* focuses on animal products, the principle of "no harm/damage" can be used to strengthen the argument that GMO crops that destroy traditional agricultural systems are *mafsadah* (social harm) and are generally prohibited.

Additionally, the principle of *sadd al-dhara'i* (blocking the means to harm) plays a crucial role in Islamic legal reasoning. This principle mandates the prevention of actions that, while permissible in themselves, may lead to harmful or morally unacceptable outcomes (Isa, 2021). In the context of genetic engineering, this means that even if a particular intervention is not explicitly forbidden, it may still be restricted if there is a strong likelihood that it will result in social, ethical, or biological harms, such as cross-contamination of organic and heirloom crops by GMOs through wind, insects, or farmer error, which jeopardizes seed purity, export standards, and non-GMO certification. The application of *sadd al-dhara'i* thus acts as a safeguard, ensuring that actions permitted in principle do not serve as conduits for greater and more widespread harm."

8.0 CONCLUSION

Genetic engineering in crops, while offering certain benefits, poses significant negative impacts from an Islamic bioethical perspective. Based on the interpretation of Q.S. al-Nisā (4): 119, genetic modification is seen as a form of alteration of God's creation that is warned against in the Qur'an. A review of various commentaries shows a tendency to reject this practice as it contradicts the principle of the perfection of God's creation. Practically speaking, the use of GMO crops risks harming human health and threatens the preservation of heirloom plant varieties. Thus, the Islamic bioethics approach demands caution

and rejection of genetic engineering practices that undermine the natural order of God's creation. This stance can be further strengthened by integrating foundational jurisprudential principles such as *maslahah* (public interest), which emphasizes promoting benefit and preventing harm in line with the objectives of Islamic law, including the preservation of life, lineage, and intellect, and *sadd al-dhara'i* (blocking the means to harm), which aims to prevent permissible actions that may lead to morally or socially harmful consequences. Together, these principles provide a firmer and more systematic basis for ethical judgment within Islamic legal thought, particularly in navigating complex issues like GMOs.

REFERENCES

- Aburrohman, A. (2018). Methodology of al-Ṭabarī in Jāmi' al-Bayān fi Ta'wīl al-Qur'ān. *Kordinat: Journal of Communication among Islamic Higher Education Institutions*, 17(1), 65–88. <https://doi.org/https://doi.org/10.15408/kordinat.v17i1.8096>
- Al-Ghazālī, S. M. (2000). *A Thematic Commentary on the Qur'an*. International Institute of Islamic Thought. <https://doi.org/10.2307/j.ctvh4zgz9>
- Al-Ṭabarī. (2001a). *Jāmi' al-Bayān 'an Ta'wīl Āy al-Qur'ān (Commentary on Sūrah al-Baqarah (2): 168)*. Dar Hajar. <https://shamela.ws/book/7798/1687>
- Al-Ṭabarī. (2001b). *Jāmi' al-Bayān 'an Ta'wīl Āy al-Qur'ān (Commentary on Sūrah al-Nisā (4): 119)*. Dar Hajar. <https://shamela.ws/book/7798/5059>
- Al-Wāhidī, A. ibn A. (2008). *Asbāb al-Nuzūl al-Qur'ān* (Y. Meri (ed.)). Royal Aal al-Bayt Institute for Islamic Thought Amman. [https://www.altafsir.com/Books/Asbab Al-Nuzul by Al-Wahidi.pdf](https://www.altafsir.com/Books/Asbab%20Al-Nuzul%20by%20Al-Wahidi.pdf)
- Al-Zahrani, A. bin A. (1990). *Tafsīr Mauḍu'ī al-Qur'an al-Karīm wa Namādhij Minhu* (22nd ed.). Universitas Islam Madinah al-Munawwarah. <https://shamela.ws/book/4185/2>
- Ali, R., & Isnaini, S. N. (2024). Digitising interpretation: Transforming Tafsir Al-Mishbah in the context of the living Quran. *Jurnal Studi Ilmu-Ilmu Al-Qur'an Dan Hadis*, 25(1), 1–23. <https://doi.org/10.14421/qh.v25i1.5186>
- Alsomali, N., & Hussein, G. (2021). CRISPR-Cas9 and He Jiankui's Case: an Islamic Bioethics Review using Maqasid al-Shari'a and Qawaid Fighiyah. *Asian Bioethics Review*, 13(2), 149–165. <https://doi.org/10.1007/s41649-021-00167-1>
- Amir, U. A. ulfah, & Mahmud, B. (2024). Analysis of al-Thabari's Interpretation of Tabarruj Verses. *Al-Bayan: Jurnal Ilmu Al-Qur'an Dan Hadist*, 7(2), 291–305. <https://doi.org/10.35132/albayan.v7i2.776>

- Amrullah, A. M. K. (1989a). *Tafsir Al-Azhar, Jilid 1 (Sūrah al-Baqarah (2): 168)*. Pustaka Nasional PTE LTD. <https://archive.org/details/tafsir-al-azhar/Tafsir Al-Azhar 01/page/374/mode/2up>
- Amrullah, A. M. K. (1989b). *Tafsir al-Azhar 02 (Sūrah An-Nisā (4): 119)*. Pustaka Nasional PTE LTD. <https://archive.org/details/tafsir-al-azhar/Tafsir Al-Azhar 02/page/1436/mode/2up?view=theater>
- Aziz, M. (2023). Building an environmental awareness paradigm through eco-theology in Tafsir al-Azhar. *Proceeding of International Conference on Quranic Studies*. <https://proceeding.iainkudus.ac.id/index.php/ICQS/article/view/422>
- Bagri, D. S., Upadhyay, D. C., Jain, S. K., & Upadhyay, C. P. (2018). Biotechnological improvement of nutritional and therapeutic value of cultivated potato. *Frontiers in Bioscience (Scholar Edition)*, 10(2), 217–228. <https://doi.org/10.2741/S510>
- Boulu, F. (2014). Konsep Anak Menurut M. Quraish Shihab dan Implikasinya terhadap Pendidikan. *Jurnal Pembaharuan Pendidikan Islam*, 1(1), 54–65. <https://journal.iaingorontalo.ac.id/index.php/aj/article/view/664>
- Cabelkova, I., Sanova, P., Hlavacek, M., Broz, D., Smutka, L., & Prochazka, P. (2024). The moderating role of perceived health risks on the acceptance of genetically modified food. *Frontiers in Public Health*, 11. <https://doi.org/10.3389/fpubh.2023.1275287>
- Caradus, J. (2023). Impacts of growing and utilising genetically modified crops and forages – a New Zealand perspective. *New Zealand Journal of Agricultural Research*, 66(5), 389–418. <https://doi.org/10.1080/00288233.2022.2077380>
- Daar, A. S., & al Khitamy, A. B. (2001). Bioethics for clinicians: 21. Islamic bioethics. *Canadian Medical Association Journal*, 164(1), 60–63. <http://www.ncbi.nlm.nih.gov/pubmed/11202669>
- Dwivedi, S., Goldman, I., & Ortiz, R. (2019). Pursuing the Potential of Heirloom Cultivars to Improve Adaptation, Nutritional, and Culinary Features of Food Crops. *Agronomy*, 9(8), 441. <https://doi.org/10.3390/agronomy9080441>
- Faisal, M., Saeed, M. A., Aslam, M. M., & Raheem, M. A. (2019). Impact of Genetically Modified Food on Human Health. *Middle East Journal of Applied Science & Technology*, 2(3), 75–86. <https://ssrn.com/abstract=3446367>
- George, M. W. (2008). *The Elements of Library Research*. Princeton University Press. <https://doi.org/10.1515/9781400830411>
- Green America. (2024). Other GMO Issues. *Green America*. <https://www.greenamerica.org/gmos-case-precaution/other-gmo-issues>

- Hashmi, F. (2012a). *Verse by Verse Qur'an Study Circle: Tafseer Surah an-Nisa Ayah* 119. <https://versebyversequranstudycircle.wordpress.com/2012/11/29/tafseer-surah-an-nisa-ayah-119/>
- Hashmi, F. (2012b). *Verse by Verse Qur'an Study Circle*. <https://versebyversequranstudycircle.wordpress.com/about/>
- Hashmi, F. (2020). *Dr. Farhat Hashmi – At A Glance*. <https://www.farhathashmi.com/profile-section/dr-farhat-hashmi-at-a-glance/>
- Hidayati, H. (2018). Methodology of Contextual Tafsir Al-Azhar by Buya Hamka. *El-Umdah: Jurnal Ilmu Al-Quran Dan Tafsir*, 1(1), 25–42. <https://journal.uinmataram.ac.id/index.php/el-umdah/article/view/407/169>
- Ibrahim, A. H., Rahman, N. N. A., Saifuddeen, S. M., & Baharuddin, M. (2019). Maqasid al-Shariah Based Islamic Bioethics: A Comprehensive Approach. *Journal of Bioethical Inquiry*, 16(3), 333–345. <https://doi.org/10.1007/s11673-019-09902-8>
- Idris, S. H., Abdul Majeed, A. B., & Chang, L. W. (2020). Beyond Halal: Maqasid al-Shari'ah to Assess Bioethical Issues Arising from Genetically Modified Crops. *Science and Engineering Ethics*, 26(3), 1463–1476. <https://doi.org/10.1007/s11948-020-00177-6>
- International Islamic Fiqh Academy. (1988). *Resolution No. 26 (1/4): A human receiving the organs of another human, dead or alive (Organ transplantation)*. <https://iifa-aifi.org/en/32287.html>
- International Islamic Fiqh Academy. (2025). *Resolution No. 266 (11/26) Shari'ah Ruling on the Consumption and Marketing of Genetically Modified Foods of Animal Origin*. <https://iifa-aifi.org/en/56090.html>
- Isa, N. M. (2021). Human Germline Gene Editing from Maslahah Perspective: The Case of the World's First Gene Edited Babies. *Journal of Bioethical Inquiry*, 18(2), 349–355. <https://doi.org/10.1007/s11673-021-10101-7>
- Isa, N. M., Zulkifli, N. A., & Man, S. (2020). Islamic Perspectives on CRISPR/Cas9-Mediated Human Germline Gene Editing: A Preliminary Discussion. *Science and Engineering Ethics*, 26(1), 309–323. <https://doi.org/10.1007/s11948-019-00098-z>
- Izzan, A. (2021). Pergeseran Penafsiran Moderasi Beragama Menurut Tafsir Al-Azhar dan Tafsir Al-Misbah. *Al-Bayan: Jurnal Studi Al-Qur'an Dan Tafsir*, 6(1), 129–141. <https://doi.org/10.15575/al-bayan.v6i2.17714>
- Kafrawi, K., Zamsiswaya, Z., & May, A. (2025). Arabic Linguistic and Literary Approaches in Interpreting Educational Verses: A Study of The Tafsirs of Al-Misbah. *Dinasti International Journal of Education Management and*

- Social Science*, 6(5), 3659–3680.
<https://doi.org/10.38035/dijemss.v6i5.4618>
- Kaltsum, L. U., & Amin, A. S. (2024). The Development of Qur'anic Thematic Exegesis in Indonesia: Historical Landscape and Shifts of Authority. *Jurnal Studi Ilmu-Ilmu Al-Qur'an Dan Hadis*, 25(2), 296–319.
<https://doi.org/10.14421/qh.v25i2.5422>
- Karimah, M. F. E. (2024). Ad-Dakhil Dalam Tafsir; Metode dan Aplikasi Kritik Tafsir Ibnu Katsir Terhadap Israiliyat. *Al Ashriyyah*, 10(2), 135–146.
<https://alashriyyah.stai-nuruliman.ac.id/index.php/alashriyyah/article/download/199/141/>
- Kathīr, I. (1998a). *Tafsīr al-Qur'ān al-'Azīm (Commentary on Sūrah al-Baqarah (2): 168)*. Dār al-Kutub al-'Ilmiyya.
<https://shamela.ws/book/23604/344#p1>
- Kathīr, I. (1998b). *Tafsīr al-Qur'ān al-'Azīm (Commentary on Sūrah al-Nisā (4): 119)*. Dār al-Kutub al-'Ilmiyya. <https://shamela.ws/book/23604/936#p1>
- Kavhiza, N. J., Zargar, M., Prikhodko, S. I., Pakina, E. N., Murtazova, K. M.-S., & Nakhaev, M. R. (2022). Improving Crop Productivity and Ensuring Food Security through the Adoption of Genetically Modified Crops in Sub-Saharan Africa. *Agronomy*, 12(2), 439.
<https://doi.org/10.3390/agronomy12020439>
- Keshavareddy, G., & Kumar, A. R. V. (2016). *Chapter 14 - Bacillus thuringiensis* (B. T.-E. P. M. for F. S. Omkar (ed.); pp. 443–473). Academic Press.
<https://doi.org/https://doi.org/10.1016/B978-0-12-803265-7.00014-2>
- Khatodia, S., Bhatotia, K., & Tuteja, N. (2017). Development of CRISPR/Cas9 mediated virus resistance in agriculturally important crops. *Bioengineered*, 8(3), 274–279. <https://doi.org/10.1080/21655979.2017.1297347>
- King Saud University. (2013a). *The Noble Qur'an – English Translation: Surah al-An'am Verse 95*. https://quran.ksu.edu.sa/index.php?l=en#aya=6_95
- King Saud University. (2013b). *The Noble Qur'an – English Translation: Surah al-Baqarah Verse 168*. https://quran.ksu.edu.sa/index.php?l=en#aya=2_168
- King Saud University. (2013c). *The Noble Qur'an – English Translation: Sūrah An-Nisa Verse 119*. https://quran.ksu.edu.sa/index.php?l=en#aya=4_119
- King Saud University. (2013d). *The Noble Qur'an – English Translation: Surah az-Zumar Verse 21*.
- Kramer, M. G., & Redenbaugh, K. (1994). Commercialization of a tomato with an antisense polygalacturonase gene: The FLAVR SAVR™ tomato story. *Euphytica*, 79(3), 293–297. <https://doi.org/10.1007/BF00022530>
- Kramkowska, M., Grzelak, T., & Czyżewska, K. (2013). Benefits and risks associated with genetically modified food products. *Annals of Agricultural and Environmental Medicine*, 20(3), 413–419. <https://www.aem.pl/pdf->

71952-9179

- Kurniawan, E., Kurniawan, E., & Mustaniruddin, A. (2024). The unity of Qur'anic Themes: Historical Discourse and Contemporary Implications for Tafsīr Al-Maw ḍ ū'ī Methodology. *TAJIDID: Jurnal Ilmu Ushuluddin*, 23(2), 674–698. <https://ojs3.tajdid.uinjambi.ac.id/index.php/tajdid/article/download/559/222#:~:text=Abstract,tafsīr al-mawḍū'ī>
- Ladics, G. S., Cressman, R. F., Herouet-Guicheney, C., Herman, R. A., Privalle, L., Song, P., Ward, J. M., & McClain, S. (2011). Bioinformatics and the allergy assessment of agricultural biotechnology products: Industry practices and recommendations. *Regulatory Toxicology and Pharmacology*, 60(1), 46–53. <https://doi.org/10.1016/j.yrtph.2011.02.004>
- Léonet, A. (2019). *Save The Seeds: The Impact of the Disappearance of Traditional Seeds on the Right to Adequate Food* [UNIVERSITY OF SEVILLA]. <https://repository.gchumanrights.org/server/api/core/bitstreams/5a188bbf-99ca-45c7-83ab-d4a00464f9f0/content>
- Liu, G., Gilding, E. K., Kerr, E. D., Schulz, B. L., Tabet, B., Hamaker, B. R., & Godwin, I. D. (2019). Increasing protein content and digestibility in sorghum grain with a synthetic biology approach. *Journal of Cereal Science*, 85, 27–34. <https://doi.org/10.1016/j.jcs.2018.11.001>
- Lumah, D. D., Nasrullah, N., Salsabila, B. A., & Almaliki, F. (2025). How did Imam al-Ṭabari's tafsīr bi alma'thūr influence Qur'anic exegesis and Muslim scholarship during the Abbasid era? *QiST: Journal of Qur'an and Tafseer Studies*, 4(1), 151–170. <https://doi.org/10.23917/qist.v4i1.7948>
- M. C. (2024). Ghana's indigenous seeds at risk of extinction amidst GMO and hybrid seed influx. *The Vaultz News*. <https://thevaultznews.com/business/agribusiness/ghanas-indigenous-seeds-at-risk-of-extinction-amidst-gmo-and-hybrid-seed-influx/>
- Majelis Ulama Indonesia. (2013). *Fatwa of the Indonesian Council of Ulama (Majelis Ulama Indonesia) Number 35 of 2013 concerning Genetic Engineering and Its Products*. <https://halalmui.org/wp-content/uploads/2023/06/No.-35-Rekayasa-Genetika-dan-Produknya-1.pdf>
- Majelis Ulama Indonesia. (2020). *Fatwa MUI Nomor 51 Tahun 2020 tentang penggunaan stem cell (sel punca) untuk tujuan pengobatan*. <https://mui.or.id/baca/fatwa/penggunaan-stem-cell-sel-punca-untuk-tujuan-pengobatan>
- Martin, C., & Butelli, E. (2025). The Purple Tomato Story; From Laboratory Bench to the Consumer. *ACS Food Science & Technology*, 5(1), 19–28. <https://doi.org/10.1021/acfoodscitech.4c00692>

- Muhyin, N. F., & Nasir, M. R. (2023). Metode Penafsiran Ibnu Katsir dalam Tafsir Al-Qur'an Al-Adzim. *AlTadabbur: Jurnal Ilmu Al-Qur'an Dan Tafsir*, 8(1), 145–162. <https://alashriyyah.stainuruliman.ac.id/index.php/alashriyyah/article/download/199/141/>
- Musyarif. (2019). Buya Hamka: Suatu Analisis Sosial Terhadap Kitab Tafsir Al-Azhar. *Al Ma'arief: Jurnal Pendidikan Sosial Dan Budaya*, 1(1), 36–57. <https://doi.org/10.35905/almaarief.v1i1.781>
- Naegeli, H., Birch, A. N., Casacuberta, J., De Schrijver, A., Gralak, M. A., Guerche, P., Jones, H., Manachini, B., Messéan, A., Nielsen, E. E., Nogué, F., Robaglia, C., Rostoks, N., Sweet, J., Tebbe, C., Visioli, F., Wal, J.-M., Ardizzone, M., & Paraskevopoulos, K. (2018). Assessment of genetically modified cotton GHB614 × T304-40 × GHB119 for food and feed uses, import and processing under Regulation (EC) No 1829/2003 (application EFSA-GMO-NL-2014-122). *EFSA Journal*, 16(7), e05349. <https://doi.org/10.2903/j.efsa.2018.5349>
- Ormandy, E. H., Dale, J., & Griffin, G. (2011). Genetic engineering of animals: ethical issues, including welfare concerns. *The Canadian Veterinary Journal* = *La Revue Veterinaire Canadienne*, 52(5), 544–550. <http://www.ncbi.nlm.nih.gov/pubmed/22043080>
- Pfutz, A. (2014). *Saving heirloom corn from GMO contamination*. The Organic & Non-GMO Report. <https://www.non-gmoreport.com/articles/february2014/saving-heirloom-corn-from-GMO-contamination.php>
- Pons, E., Alquézar, B., Rodríguez, A., Martorell, P., Genovés, S., Ramón, D., Rodrigo, M. J., Zacarías, L., & Peña, L. (2014). Metabolic engineering of β -carotene in orange fruit increases its in vivo antioxidant properties. *Plant Biotechnology Journal*, 12(1), 17–27. <https://doi.org/10.1111/pbi.12112>
- Pradhan, E. (2021). Genetic Engineering: An Overview. *Journal of Biomedical Engineering and Medical Devices*, 6(5), 163. <https://www.longdom.org/open-access/genetic-engineering-an-overview-78448.html>
- Remington, B., Broekman, H. C. H., Blom, W. M., Capt, A., Crevel, R. W. R., Dimitrov, I., Faeste, C. K., Fernandez-Canton, R., Giavi, S., Houben, G. F., Glenn, K. C., Madsen, C. B., Kruizinga, A. K., & Constable, A. (2018). Approaches to assess IgE mediated allergy risks (sensitization and cross-reactivity) from new or modified dietary proteins. *Food and Chemical Toxicology*, 112, 97–107. <https://doi.org/10.1016/j.fct.2017.12.025>
- Ruskin, G. (2015). *What Big Food is hiding with its slick PR campaign on GMOs*. U.S. Right to Know.
- Rusli. (2021). *Inkonsistensi Ibnu Katsir Dalam Menafsirkan Ayat-Ayat Tentang*

- Hukum* [Universitas Islam Negeri Ar-Raniry]. https://repository.ar-raniry.ac.id/id/eprint/23363/1/Rusli_29173592_PS_IAT_082317673301.pdf
- Salgotra, R. K., & Chauhan, B. S. (2023). Genetic Diversity, Conservation, and Utilization of Plant Genetic Resources. *Genes*, *14*(1), 174. <https://doi.org/10.3390/genes14010174>
- Saputri, R. E. (2023). Fazlur Rahman's hermeneutic analysis of Hamka's Tafsir al-Azhar. *Islamic Thought Review*, *1*(1), 22–32. <https://doi.org/10.30983/itr.v1i1.6491>
- Sayara, T., Basheer-Salimia, R., Hawamde, F., & Sánchez, A. (2020). Recycling of Organic Wastes through Composting: Process Performance and Compost Application in Agriculture. *Agronomy*, *10*(11), 1838. <https://doi.org/10.3390/agronomy10111838>
- Shihab, M. Q. (2002a). *Tafsir Al-Misbah: Pesan, Kesan, dan Keserasian Al-Qur'an, Jilid 02 (Sūrah An-Nisā (4): 119)*. Lentera Hati. [https://archive.org/details/tafsir-al-mishbah-prof-dr.-m.-quraish-shihab-/Tafsir Al-Mishbah Jilid 02 -Dr. M. Quraish Shihab-pages-deleted/page/n603/mode/2up?view=theater](https://archive.org/details/tafsir-al-mishbah-prof-dr.-m.-quraish-shihab-/Tafsir%20Al-Mishbah%20Jilid%2002%20-Dr.%20M.%20Quraish%20Shihab-pages-deleted/page/n603/mode/2up?view=theater)
- Shihab, M. Q. (2002b). *Tafsir Al-Misbah: Pesan, Kesan dan Keserasian Al-Qur'an, Jilid 01 (Sūrah al-Baqarah (2): 168)*. Lentera Hati. <https://archive.org/details/tafsir-al-mishbah-prof-dr.-m.-quraish-shihab->
- Simms, E. L. (2013). Plant–Animal Interactions. In *Encyclopedia of Biodiversity* (pp. 39–55). Elsevier. <https://doi.org/10.1016/B978-0-12-384719-5.00109-X>
- Subagja, R., & Khoiruddin, H. (2023). Telaah Metodologi Penafsiran Al-Qur'an Oleh Quraish Shihab Melalui Prisma Tafsir Al-Misbah: Analisis Terhadap Ayat 63 Surah Al-Furqan. *Tahdzib Al-Akhlaq: Jurnal Pendidikan Islam*, *6*(2), 165–176. <https://doi.org/10.34005/tahdzib.v6i2.3226>
- U.S. Department of Agriculture, E. R. S. (2025). *Adoption of genetically engineered crops in the United States (Data product)*. <https://www.ers.usda.gov/data-products/adoption-of-genetically-engineered-crops-in-the-united-states>
- Vercesi, M. L., Krogh, P. H., & Holmstrup, M. (2006). Can *Bacillus thuringiensis* (Bt) corn residues and Bt-corn plants affect life-history traits in the earthworm *Aporrectodea caliginosa*? *Applied Soil Ecology*, *32*(2), 180–187. <https://doi.org/10.1016/j.apsoil.2005.07.002>
- Verma, C. (2011). A Review on Impacts of Genetically Modified Food on Human Health. *The Open Nutraceuticals Journal*, *4*(1), 3–11. <https://doi.org/10.2174/1876396001104010003>
- Waddell, M. (2024). *The GMO High-Risk List: Potatoes*. The Non-GMO

- Project. <https://www.nongmoproject.org/blog/the-gmo-high-risk-list-potatoes/>
- Wai, A. H., Naing, A. H., Lee, D.-J., Kim, C. K., & Chung, M.-Y. (2020). Molecular genetic approaches for enhancing stress tolerance and fruit quality of tomato. *Plant Biotechnology Reports*, 14(5), 515–537. <https://doi.org/10.1007/s11816-020-00638-1>
- Waraich, R. S., Fayaz, M., & Khan, G. G. (2021). Women Empowerment through Quran: An Alternative Narrative to the Western Liberal Feminism. *Al-Qamar*, 4(4), 23–44. <https://alqamarjournal.com/index.php/alqamar/article/view/675/377>
- Willows, M. (2024). *What are heirloom seeds & why are they more sustainable?* *Sustainable Jungle*. <https://www.sustainablejungle.com/what-are-heirloom-seeds/>
- Yan, Z., Yang, S., Lin, C., Yan, J., Liu, M., Tang, S., Jia, W., Liu, J., & Liu, H. (2024). Advances in plant oxygen sensing: endogenous and exogenous mechanisms. *Journal of Genetics and Genomics*. <https://doi.org/10.1016/j.jgg.2024.11.014>
- Zaman, T. ul, Qureshi, S. A., & Ilahee, A. (2023). Methodology and approach of Imam Ibn Kathīr in narrating Isrā'iliyyāt: A specialised study of Tafsīr al-Qur'ān al-'Azīm. *Al-Mahdi Research Journal (MRJ)*, 5(2), 718–724. <https://ojs.mrj.com.pk/index.php/MRJ/article/view/414/492>
- Zimmerman, S. (2024). *Agtech seedlings: Pairwise develops 'world's first' seedless blackberry*. EchTarget, Inc. <https://www.agriculturediver.com/news/agtech-seedlings-pairwise-seedless-blackberry-bezos-plant-based-meat-center/718347/>