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Maqasid Al-Shari'ah and The Ethics of Food: An Analysis of Genetic Modification Foods (GMFs) Beyond Halal Permissibility

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ABSTRACT

The rise of Genetically Modified Foods (GMFs) has introduced new challenges to *halal* assurance systems, which have traditionally focused on the permissibility of ingredients. While many GMFs products may be considered *halal* in a technical sense, their production, safety, and overall impact on human health and the environment raise questions that go beyond legal compliance. This study examines GMFs through the lens of *Maqasid al-Shariah*, the higher objectives of Islamic law, to explore how biotechnology can align with ethical, safety, and *tayyib* (wholesome) principles in the *halal* food sector. Using a qualitative, library-based approach, the research draws on primary Islamic sources, classical *fiqh*, and contemporary *halal* and bioethical literature. The findings highlight that a *maqasid* perspective allows for a more holistic evaluation of GMFs, emphasizing the protection of religion (*hifz al-din*), life (*hifz al-nafs*), intellect (*hifz al-ʿaql*), lineage (*hifz al-nasl*), and property (*hifz al-mal*). Ultimately, the study demonstrates that integrating *maqasid* principles into *halal* certification not only ensures that GMFs are not only legally permissible but also promotes public welfare, ethical responsibility, and sustainability, making *halal* food both permissible and truly wholesome in the era of modern biotechnology. The contribution of this paper to the international scholarly and policy community lies in its development of an integrative ethical model that bridges Islamic jurisprudence, global food safety concerns, and sustainability discourse. By articulating how maqasid principles can complement existing international standards on biotechnology, food security, and environmental protection, the study offers a normative framework that is relevant not only to Muslim-majority contexts but also to multicultural and multireligious societies engaged in ethical food governance. Ultimately, this research contributes to global debates on responsible biotechnology by demonstrating that halal certification, when informed by *Maqasid al-Shariah*, can function as a universal ethical benchmark—promoting public welfare, consumer trust, environmental stewardship, and sustainable development—thus positioning halal not merely as a religious compliance system but as a globally relevant paradigm for wholesome and ethical food production in the era of modern biotechnology.

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Introduction

The rise of genetically modified foods (GMFs) has revolutionised global food production by offering solutions to hunger, enhancing crop resilience, and improving nutritional value. Yet, the integration of GMFs into the *halal* food industry raises complex ethical and religious concerns. GMFs challenge conventional *halal* assurance systems, which traditionally focus on the permissibility of ingredients rather than a holistic evaluation of food safety and societal impact. Herdiana (2025) notes that "the complexity of GMFs poses challenges for *halal* assurance systems, especially regarding the health risks and religious compliance of genetically modified foods". This emphasises that *halal* certification alone may not fully address consumer concerns regarding the safety, wholesomeness, and ethical nature of food products.

Beyond safety, GMFs provoke broader bioethical questions. For example, the use of genetic material derived from non-*halal* sources, such as pigs or enzymes that are not permissible, can directly conflict with Shariah requirements (Kashim et al., 2018). Furthermore, the environmental consequences of GMFs, including biodiversity loss, ecological imbalance, and patent monopolies in seed markets, underscore the need for a more comprehensive ethical evaluation that extends beyond legal permissibility. Consumers increasingly demand that *halal*-certified products also embody principles of justice, sustainability, and social responsibility.

Given these challenges, evaluating GMFs necessitates an ethical framework that strikes a balance between technological advancement and Shariah values. Chang (2020) argues that "bioethical evaluation of genetically modified crops requires a perspective that extends beyond legal *halal* permissibility to consider social and moral outcomes". In this context, GMFs are not merely a scientific or economic concern but also a test of the integrity and credibility of the *halal* food industry. There is thus an urgent need to apply a principled framework to ensure that biotechnology aligns with Islamic ethical standards.

Maqasid al-Shariah refers to the higher objectives of Islamic law, aiming to preserve human welfare and prevent harm in all aspects of life. These objectives include protection of religion (*hifz al-din*), life (*hifz al-nafs*), intellect (*hifz al-'aql*), lineage (*hifz al-nasl*), and property (*hifz al-mal*) (Kashim et al., 2018). Within the context of biotechnology and GMFs, the *maqasid* framework offers a lens through which halal certification can be evaluated, not only in terms of legality, but also in terms of safety, ethics, and overall societal impact. By focusing on these objectives, Islamic scholars and regulators can ensure that the development and consumption of GMFs remain aligned with moral, environmental, and social responsibilities.

A *maqasid*-based approach is particularly relevant when considering the broader implications of GMFs on public health, environmental sustainability, and ethical trade. Adenan et al. (2023) explain that "the assessment of genetically modified foods from a *maqasid* perspective allows for a comprehensive evaluation of potential benefits and harms, ensuring that food consumption supports both human welfare and divine guidance". In other words, the Shariah's goals extend beyond merely prohibiting impermissible substances to encompass proactive measures that promote safety, justice, and moral responsibility in technological innovation.

Moreover, adopting the *maqasid* perspective bridges the gap between scientific advancement and religious ethics. While *halal* certification ensures technical compliance, it may overlook unintended consequences such as health risks, environmental damage, or social inequities. By applying *maqasid* principles, stakeholders, including scientists, regulators, and consumers, can evaluate

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genetically modified foods in a holistic manner, ensuring that biotechnology contributes positively to both human welfare and the ethical standards mandated by Shariah.

Despite the proliferation of GMFs in the global food market, current *halal* certification systems often focus narrowly on ingredient compliance, failing to address broader ethical and societal implications. Ahmad (2024) argues that "*halal* certification alone is insufficient to capture the complexity of genetically modified foods, as it does not fully address issues related to safety, environmental impact, and social equity". This narrow, legalistic focus may lead to products being certified halal, while potentially causing harm or ethical concerns that conflict with the *maqasid* objectives.

In addition, global supply chains and advancements in biotechnology complicate the verification of *halal* compliance. The origin, handling, and labelling of genetically modified ingredients are often opaque, creating confusion and distrust among consumers. Bouzenita (2010) highlights that "the lack of a structured Shariah-based ethical evaluation for GMFs has resulted in inconsistent rulings and consumer confusion". This problem underscores the need for a standardised framework that considers both *halal* permissibility and ethical responsibility in GMFs production and distribution.

Furthermore, the limited integration of *maqasid* in *halal* regulatory frameworks leaves significant gaps in protecting human welfare, environmental integrity, and social justice. Products that are *halal* in composition may still undermine public health, distort natural ecosystems, or perpetuate economic inequities. The complexity of these challenges underscores the need to evaluate GMFs through a holistic Shariah lens, ensuring that technological innovation and Islamic ethical guidance progress in tandem.

This study aims to address the gaps in current *halal* assessment systems by evaluating genetically modified foods through the lens of *maqasid al-Shariah*. The first objective is to analyse GMFs production and consumption in relation to the five maqasid, which are religion, life, intellect, lineage, and property, to ensure that biotechnology serves human welfare without violating Shariah principles. This analysis will assess whether GMFs are truly *halal* in both legal and ethical senses (Idris et al., 2020; Adenan et al., 2023).

The second objective is to examine the safety, ethical, and *tayyib* dimensions of GMFs. While *halal* certification focuses on the permissibility of ingredients, it does not fully guarantee the wholesomeness, safety, and fairness of the product's supply chain. This study will critically evaluate GMFs to ensure alignment with the Shariah objectives of protection, justice, and ethical consumption (Herdiana, 2025; Kamal, 2024).

Finally, the third objective is to propose a *maqasid*-based framework that can guide regulators, *halal* certification bodies, and consumers. Such a framework would extend the scope of *halal* evaluation beyond mere permissibility, ensuring that genetically modified foods uphold the broader purposes of Shariah, including public welfare, environmental stewardship, and moral accountability (Kashim et al., 2018). By achieving these objectives, this research contributes to a more nuanced understanding of halal science, emphasising that true halal compliance must incorporate both legal and ethical dimensions.

Literature Review

Global Development and Controversies of GMFs

Genetically modified foods (GMFs) have fundamentally transformed the global food industry by enabling precise modifications of plant and animal genes to enhance crop yield, nutritional

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quality, and resistance to pests and environmental stressors (Amanullah et al., 2024; Klümper, 2014). Since their commercialisation in the 1990s, GMFs have been widely adopted in countries such as the United States, Brazil, and India, contributing to food security and agricultural productivity. Despite these benefits, GMFs remain highly contested due to potential health risks, ecological disruption, and socio-economic implications, including seed market monopolisation and marginalisation of smallholder farmers (Idris et. al, 2020; Brahim, 2022).

From an Islamic ethical perspective, these concerns extend beyond conventional notions of safety and legality. Even if a GMF product is technically *halal* in terms of ingredients, ethical issues regarding the source of genetic material, manipulation processes, and socio-environmental consequences require careful assessment. For instance, GMFs that involve prohibited DNA or practices that harm ecosystems may not align with the higher objectives of Islamic law (*maqasid al-shariah*) (Bouzenita, 2010; Hashim, 2019). While Ramlan et al. (2025) approached these concerns primarily from a regulatory and policy-oriented perspective, emphasising Malaysia's biosafety and *halal* certification frameworks, Idris et al. (2020) adopted a global bioethical lens, focusing on universal moral accountability and the spiritual dimensions of scientific innovation. Both studies, however, converge in recognising that the evaluation of GMFs cannot be limited to legality alone but must integrate broader ethical and *maqasid*-based reasoning. This comparative insight underscores a significant research gap: the need for an integrative framework that combines scientific, regulatory, and ethical perspectives in assessing GMFs within Muslim societies.

Halal and Tayyib Principles in Biotechnology

Traditional *halal* certification primarily focuses on the permissibility of ingredients and compliance with Islamic dietary laws. However, the emergence of biotechnology challenges this binary framework, as a product may be *halal* yet not fully tayyib, meaning wholesome, safe, and beneficial (Idris et al., 2020; Ramlan et al., 2025). The concept of *halalan tayyiban* emphasises that *halal* foods should also meet ethical, health, and environmental standards, ensuring that production processes do not cause harm to consumers or the ecosystem (Kashim, 2017; Nordin et al., 2025).

Examples include the use of prohibited genetic material such as swine DNA, unethical laboratory practices, or production processes that degrade the environment, all of which may render a product inconsistent with the *tayyib* criterion even if it is technically *halal* (Al-Attar, 2017; Amin, 2015). In Malaysia, regulatory frameworks, such as the Biosafety Act 2007 and labelling requirements, provide mechanisms to ensure safety, transparency, and consumer choice, reflecting *maqasid* objectives, including the preservation of life (*ḥifẓ al-nafs*) and intellect (*ḥifẓ al-ʿaql*) (Ramlan et al., 2025).

Critically, while Ramlan et al. (2025) emphasise the institutional integration of *halal* and tayyib principles within national regulations, Idris et al. (2020) interpret *tayyib* through a philosophical and moral dimension, arguing that it reflects a divine balance between human innovation and environmental harmony. These differing emphases suggest that while both studies uphold the inseparability of *halal* and *tayyib*, Kamal and Ramlan view it through a compliance-oriented lens, whereas Idris et al. situate it within a broader ethical cosmology of human responsibility as *khalifah* (stewardship). This comparative understanding enriches the discourse by bridging regulatory pragmatism with spiritual ethics in the governance of biotechnology.

Ethical Governance and Maqasid al-Shariah

Applying *maqasid al-shariah* as an evaluative framework enables a holistic ethical assessment of GMFs that extends beyond mere *halal/haram* classification. The classical objectives preservation of

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religion (*ḥifẓ al-din*), life (*ḥifẓ al-nafs*), intellect (*ḥifẓ al-ʿaql*), lineage (*ḥifẓ al-nasl*), and property (*ḥifẓ al-mal*) provide multidimensional criteria for analysing bioethical issues (Kamal, 2020; Idris et al., 2020). Preservation of life emphasises rigorous safety testing to prevent harm to human health. Preservation of property focuses on socio-economic justice, equitable access to biotechnology, and the protection of farmers' rights. Preservation of intellect entails transparency, informed consent, and accurate labelling to facilitate ethical consumer choices. Preservation of lineage and the environment underscores the ethical imperative of biodiversity conservation and sustainable practices for future generations. Preservation of religion ensures that genetic manipulation does not involve prohibited materials or practices that violate Islamic law (Idris et al., 2020; Kamali, 2008; Brahim, 2022).

While both Ramlan et al. (2025) and Idris et al. (2020) employ the *maqasid* framework, their analytical orientations differ. Kamal and Ahmad operationalise *maqasid* as a policy tool for integrating Islamic ethics into Malaysia's biosafety and *halal* governance systems, whereas Idris et al. reinterpret *maqasid* as a moral philosophy that underpins universal bioethical accountability in scientific innovation. Despite these differences, both studies converge in affirming that *maqasid al-shariah* provides a unifying ethical compass capable of balancing the benefits (maṣlaḥah) and harms (mafsadah).

This convergence supports the argument that an integrated *maqasid*-based model combining Kamal and Ramlan's policy-driven pragmatism with Idris et al.'s philosophical universalism can establish a comprehensive governance framework for GMFs. Such an approach not only ensures legal permissibility but also strengthens public welfare, ethical integrity, and sustainable consumption, aligning biotechnology with the higher purposes of Islamic law (Bouzenita, 2010; Kamali, 2019).

Methodology

This study uses a qualitative library research method. This method is suitable because the research focuses on understanding concepts and ideas related to the integration of *Naqli* (revealed) and *Aqli* (rational) knowledge in guiding the ethical use of modern technology. A qualitative approach enables the researcher to explore the meanings and values found in texts, rather than collecting numerical data (Merriam, 2016). The data for this study come from primary and secondary sources. The primary sources include the Qur'an, Hadith, and classical writings of Muslim scholars that provide the foundation for Naqli knowledge. The secondary sources consist of academic journals, books, reports, and fatwa documents that discuss technology, ethics, and Islamic values (Ramlan et al., 2025). All collected materials were analysed using content and thematic analysis. The researcher identified and grouped related ideas based on the principles of *Maqasid al-Shariah* (the objectives of Islamic law). These include the protection of faith (hifz al-din), life (hifz al-nafs), intellect (*hifz al-'aql*), progeny (*hifz al-nasl*), and property (*hifz al-mal*). According to Bowen (2009), this type of document analysis helps identify key themes and understand the deeper meaning behind written texts. By employing this approach, the study bridges the gap between classical Islamic knowledge and rational and modern perspectives. It aims to demonstrate how Islamic principles can guide individuals in using technology responsibly and ethically in today's world.

Discussion

Protection of Religion (Hifz al-Din)

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In the context of *Maqasid al-Shariah*, the preservation of religion (*Hifz al-Din*) emphasises the need to ensure that every innovation, including in the field of biotechnology and the production of genetically modified foods (GMFs), complies with the *halal* and *haram* laws stipulated by Shariah. Ibn Ashur (1998) defines *hifz al-Din* as the preservation of a Muslim's faith by protecting individuals from engaging in actions that may weaken, confuse, or distort their understanding and practice of religion. With the increasing use and commercialisation of GMFs, concerns and debates have emerged regarding their impact on individuals, particularly in relation to the right to food (Awe, 2025). Therefore, compliance with this law extends beyond the final ingredients of a product to include its entire production process. For example, the use of genes from pigs or animals that are considered impure in Islam is strictly prohibited because it affects the *halal* status of the product (Anas et al., 2016).

To ensure compliance, collaboration between scholars, scientists, and halal institutions, such as JAKIM in Malaysia and the Indonesian Ulema Council (MUI), as well as international bodies like the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI), is essential. The views and fatwas from these institutions play a key role in determining Shariah guidelines on the use of GMF technology. For instance, The Department of Islamic Development Malaysia (Jabatan Kemajuan Islam Malaysia – JAKIM), during the 95th Muzakarah Fatwa Committee of the National Council for Islamic Religious Affairs Malaysia held from 16 to 18 June 2011, resolved that genetically modified food (GMF) products derived from aquatic sources, such as fish and similar species, are considered *halal*, provided that they do not cause harm to humans (JAKIM, 2011). Through the principles of *Maqasid al-Shariah*, biotechnology needs to be regulated so that it does not undermine the purity of religion and the principles of *halal*, but instead becomes a tool for innovation that aligns with Islamic values. This approach ensures that scientific and technological advances do not conflict with religious demands, but rather contribute to the development of safer, cleaner, and more ethical food in accordance with Shariah.

Protection of Life (Hifz al-Nafs)

Within the framework of *Maqasid al-Shariah*, the principle of *Hifz al-Nafs* or preservation of life emphasises the importance of protecting human safety and well-being from any form of harm (Rosidi et al., 2025). In the context of genetically modified foods (*Genetically Modified Organisms* – Fs), this principle is particularly relevant because it assesses the extent to which the product affects consumer health. The primary focus is to ensure that consumers are not exposed to risks such as allergies, toxicity, or long-term health effects due to the consumption of GMF products (Amin et al., 2011). A study was conducted to investigate the effects of transgenic pesticides on rats, revealing that exposure led to intestinal deterioration (Juan Antonio). Although many scientific studies state that most GMFs are safe, several other studies indicate potential risks that require further assessment to ensure that there is no threat to human health (Domingo, 2016). Therefore, a thorough risk analysis must be conducted before any approval is granted to ensure that consumer safety is always prioritised.

From a Shariah perspective, the principle of *darar* (harm) is the main guide in determining the necessity of something. The fiqh method states that "*la darar wa la dirar*", there is no harm and cannot harm others (Rosidi, 2024). This means that if it is proven that the use of GMFs can cause harm to human health, their use should be restricted or prohibited to uphold the primary objective of Shariah, which is to protect life (*Hifz al-Nafs*) (al-Ghazali, 1997). However, if scientific studies prove that GMFs do not cause harm and can bring benefits, such as improving food quality or helping to address global food shortages, then their use can be accepted under the principle of

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maslahah mursalah (public interest) (Dusuki, 2007). Therefore, the Islamic approach to GMFs requires a balance between scientific innovation and Shariah ethical principles, ensuring that technological progress does not compromise human safety and the values that form the foundation of Islamic teachings.

Protection of the Intellect (Hifz al-Aql)

Hifz al-'Aql (Preservation of Intellect) is one of the five main *maqasid* in Islam, emphasising the importance of maintaining and preserving human intellectual capacity so that it can think rationally and make decisions in line with Shariah principles (Muhamad Hanizad et al., 2025; Rosidi et al., 2022; Ismail et al., 2024). In the context of genetic modification foods (GMFs), preservation of intellect requires that Muslims be given deep education and awareness about the science and Islamic ethics related to this food technology. Muslim consumers need to understand the issues arising from GMFs, not only in terms of the halal status of a product, but also in terms of ethics, safety, and long-term health effects and societal implications (Barasa et al., 2025). Without a clear understanding, there is a risk of information manipulation by the food industry, which can cause confusion among consumers and thus weaken the principles of trust and social responsibility in the *halal* system. Consumer intentions serve as one of the strongest predictors of actual purchasing behaviour toward genetically modified foods. This reflects consumers' level of confidence and trust in emerging technologies such as genetic modification, indicating their recognition and acceptance of these innovations (Tallapragada et al., 2020).

From the perspective of scientific awareness and consumer ethics regarding halal GMFs, educational institutions and authorities, such as JAKIM and halal certification agencies, play a crucial role in educating the public about the true concept of *halal* in the context of modern biotechnology. This knowledge is not just technical, but also requires an understanding of maqasid al-shariah, ensuring that every decision made is based on comprehensive Islamic principles. In Islam, seeking knowledge is an obligation (*fard 'ayn*) for every individual to ensure that their actions and choices do not conflict with syarak (Al-Ghazali, n.d). Anas ibn Malik reported: The Messenger of Allah, peace and blessings be upon him, said, "Seeking knowledge is an obligation upon every Muslim." Therefore, education based on ethical values and *maqasid* is a crucial foundation in enabling the Muslim community to make informed choices regarding GMF-based foods, incorporating rational, moral, and Shariah considerations.

Protection of Progeny (Hifz al-Nasl)

Within the framework of *Maqasid al-Shariah*, the principle of *Hifz al-Nasl*, or the preservation of lineage, plays a crucial role in ensuring the well-being and survival of humans in a healthy and balanced manner (Megat Danuwa et al., 2025; Maruan et al., 2025; Asmawi et al., 2025). This principle requires that all forms of scientific innovation, including biotechnology and genetically modified foods (GMFs), do not compromise the stability of human genetics or disrupt the balance of the food chain. From an Islamic ethical perspective, any form of genetic modification of plants or animals must be evaluated not only in terms of the apparent *halal* nature of the material, but also in terms of its long-term implications for health, genetic safety, and environmental sustainability (Ibn Ashur, 1998).

GMFs that involve genetic manipulation have the potential to create a risk of inheriting toxic or allergic genes that can affect the health of future generations (Awe, 2025). For example, genes modified to increase resistance to pesticides or accelerate plant growth can trigger unexpected effects in humans who consume them, either through allergic reactions or certain

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physiological changes. This raises ethical questions from the perspective of *Hifz al-Nasl*, because Islam insists that any effort that can damage the purity of Allah's creation and change the nature of creatures without urgent need is prohibited (Al-Qaradawi, 2001).
Shariah principles insist that humans are allowed to utilise knowledge and technology as long as it brings benefits and does not exceed limits (*la darar wa la dirar* - not harming oneself or others). Therefore, in the context of GMFs, scientific intervention must be accompanied by moral responsibility and awareness of the *maqasid* to maintain the continuity of healthy food sources and ensure that human descendants are free from harmful genetic effects.

Protection of Property (Hifz al-Mal)

From the perspective of *Maqasid al-Shariah*, the principle of *Hifz al-Mal* (preservation of property) emphasises the importance of maintaining economic balance, protecting property rights, and ensuring fairness in muamalat affairs (Mohd Azam et al., 2025;). In the context of modern food technologies such as Genetically Modified Organisms (GMOs), this principle becomes increasingly relevant when the biotechnology industry is dominated by large companies that monopolise agricultural seeds and technology. This monopoly not only affects the competitiveness of small farmers but also creates economic imbalances in the global food supply chain (Amin, 2021). This situation can lead to exploitation, as farmers are forced to repurchase genetically modified seeds each season at a high cost, without the freedom to replant their own seeds.

From the perspective of Islamic ethics, the management of property and natural resources must be based on justice (*'adl*), transparency (*amanah*), and social responsibility. Islam rejects any form of economic exploitation that benefits only certain groups and oppresses the weak. The word of Allah SWT in Surah al-Hasyr (59:7) reminds us that wealth "does not circulate only among the rich among you." This principle shows that any economic system that restricts access to sources of livelihood, such as a GMO seed monopoly, contradicts the spirit of *Hifz al-Mal*. Therefore, in the development and distribution of *halal* GMFs products, there must be policies that ensure market fairness, equal opportunities for small farmers, and sustainable resource management. This includes the implementation of corporate social responsibility (CSR) by biotechnology companies to help the agricultural community, educate consumers, and ensure that profits are distributed fairly (Abdul Rahman, 2020).

Overall, *Hifz al-Mal* in the context of food ethics and GMFs demands that the production and marketing of biotechnology products not only meet the technical aspects of *halal* but also preserve the economic well-being of the people and social justice. A balance must be maintained between scientific innovation and the principles of Islamic justice, ensuring that the development of biotechnology does not become a tool of exploitation, but a vehicle for shared prosperity.

Shariah Analysis

Principle of Istihalah and Istihlak

The jurisprudential concept of *istihalah*, which is the complete transformation of a substance from one state to another, is often invoked in assessing genetically modified foods (GMFs). Kashim et al. (2018) state that "*Istihalah* is allowed in Islam only if it is *istihalah sahihah* (complete transformation). However, it is not easy to determine the *halal* or *haram* status of food produced using biotechnological processes. Similarly, Kashim, Mokhtar, Hasim, and Hatta (2024) in their study on GMF rulings assert that "if it comes from an animal that is *halal* to consume, then the ruling of the GMF product is *halal* to eat". Thus, *istihalah* serves as an essential mechanism by which

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scholars attempt to reconcile *halal* dietary law with modern biotechnology by examining whether an originally non-halal source has undergone such a transformation that it becomes permissible. However, the application of *istihalah* in the context of GMFs is controversial when genetic material derives from inherently impure sources such as pigs. Imron & *Muallifah* (2025) emphasise that "the impurity of pig-based genetic material remains controversial due to the Qur'anic emphasis on its inherent *najasah* (impurity)". They argue that although the material may undergo transformation, unless the original impure attributes are irreversibly altered, the scholar may not accept it as *halal*. Kashim et al. (2024) also note that large-scale GMFs food systems introduce elements where "laboratory verification is needed to confirm transformation, because traditional metrics of transformation (taste, smell, colour) may not suffice". The tension here lies between advancements in biotechnology and the criteria of classical *fiqh*: transformation must not only be physical but also legal and spiritual in essence.

Parallel to *istihalah* is the concept of *istihlak*, which allows a negligible amount of impure substance to be absorbed into a larger pure medium and thereby be considered negligible. Kashim et al. (2024) propose that "if the presence of impure genetic material is scientifically proven to be negligible and has no effect on the final composition, *istihlak* may render it permissible" (p. 92). Elbashir (2023) adds that "Islamic consumer protection demands clarity, safety and moral responsibility in evaluating GM foods, ensuring that permissibility does not endanger public trust or wellbeing". When *istihalah* and *istihlak* are evaluated through the lens of *maqaṣid al-shariah,* which prioritises protection of life (*ḥifẓ al-nafs*) and property (*ḥifẓ al-mal*), *halal* governance can better integrate ethical, scientific and religious scrutiny into GMFs certification.

Principle of Maslahah Mursalah

The principle of *maslahah mursalah*, which encompasses the public interest unrestricted by specific textual evidence, plays a vital role in determining the permissibility of genetically modified foods (GMFs) and related food technologies. This principle prioritises benefits (*maṣaliḥ*) and prevents harm (*mafsadah*) in cases where no explicit Qur'anic or Sunnah ruling exists. Mas'ud, Fahmi, and Saputra (2025) explain that *maslahah mursalah* reflects the dynamism of Islamic legal theory (*usul al-fiqh*) in addressing emerging issues such as biotechnology, artificial additives, and modern *halal* food production. Similarly, Shariah Attitude Towards Genetically Modified Foods (2019) highlights that the principle encourages ijtihad grounded in both *ʿaqli* (rational) and *naqli* (textual) reasoning when evaluating potential benefits, such as food security and medical innovation. In this sense, *maslahah mursalah* ensures that Shariah remains responsive to technological advancement while upholding moral and legal integrity.

However, the invocation of *maslahah mursalah* in biotechnology must be cautious and evidence-based. Kashim et al. (2024) emphasise that benefits, such as increased food production or disease resistance, must not override clear prohibitions or cause harm to human health, the environment, or religious beliefs. Elbashir (2023) also asserts that Islamic consumer protection frameworks require *maslahah* to be balanced with ethical responsibility and transparency, especially when dealing with uncertainty in GM food safety. The Journal of Fatwa Management and Research (2019) supports this by stating that decisions involving genetic modification must weigh *daruriyyat* (essential needs) and *ḥajiyyat* (complementary needs) to ensure no conflict with the higher objectives of Shariah (*maqaṣid al-shariah*). Therefore, while *maslahah mursalah* offers flexibility, it cannot justify innovation that contradicts established prohibitions or exposes consumers to harm.

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Moreover, the integration of *maslahah mursalah* with other jurisprudential maxims, such as istihalah and istihlak, strengthens *halal* governance in biotechnology. Kashim et al. (2018) observe that combining *maslahah* with transformation principles allows jurists to assess not only the origin of materials but also their societal impact. Imron and Muallifah (2025) expand this discussion by arguing that biotechnology can serve legitimate *maslahah* if it aims to preserve life (*ḥifẓ al-nafs*) and health without breaching purity (*ṭaharah*) or faith (*ʿaqidah*) (p. 202). Mas'ud et al. (2025) conclude that a sustainable halal policy must strike a balance between scientific innovation and moral prudence, ensuring that the use of biotechnology contributes to human welfare rather than merely economic gain. Hence, *maslahah mursalah* provides a principled yet adaptable framework that harmonises Shariah objectives with modern scientific realities.

Principle of Amanah & Khilafah

The principles of *amanah* (trust) and *khilafah* (stewardship) are among the foundational ethical concepts in Islam that define humanity's relationship with creation (Rosidi et al, 2021). In the context of biotechnology and genetically modified foods (GMFs), these principles serve as a moral compass, ensuring that scientific advancement aligns with divine trust and responsibility. Sujak et al. (2011) emphasised that the Islamic code of ethics in biotechnology requires that humans act as trustees (*khulafaʾ*) who uphold integrity and justice in manipulating biological life, ensuring that such innovations do not violate the sanctity of Allah's creation. Similarly, Kashim et al. (2024) argue that decisions on genetic modification must be grounded in the *maqasid al-shariah*, ensuring protection of life (*hifz al-nafs*) and sustenance (*hifz al-nafs wa al-biʾah*) without causing ecological disruption. The Qur'an (6:165) describes humankind as inheritors of the earth, implying that they are accountable for maintaining balance (*mizan*). Therefore, *amanah* and *khilafah* together frame biotechnology as both a divine privilege and a moral responsibility.

Applying these principles to modern biotechnology, Muslim scholars emphasise the need to strike a balance between innovation and environmental and ethical safeguards. Ansari (2012) emphasises that sustainable development in Islam encompasses khilafah and mas'uliyyah (accountability), requiring that technological pursuits prioritise the protection of biodiversity and preservation of natural resources. Zawawi (2014) further add that the Islamic approach to biodiversity conservation stems from the notion that all living beings are communities like humans, as stated in Qur'an 6:38, thus deserving respect and protection. Within this ethical frame, genetic modification should be pursued not solely for economic or scientific gain, but to uphold *maslahah ʿammah* (public benefit) and prevent *mafsadah* (harm). Elbashir (2023) supports this view, stating that consumer protection in Islamic jurisprudence extends beyond safety regulations to encompass the moral obligations of producers and policymakers to safeguard both human and environmental welfare. These perspectives affirm that Islamic ethics demand a comprehensive stewardship model—where scientific innovation, ecological care, and social justice converge.

In a deeper sense, *amanah* also calls for transparency and moral accountability among scientists, policymakers, and *halal* authorities who govern the regulation of GMFs. Kashim et al. (2018) explain that ensuring *halal* transformation (*istihalah*) requires rigorous scientific verification and ethical responsibility to preserve public trust. Imron and Muallifah (2025) argue that biotechnology must be approached through honest reinterpretation of Qur'anic guidance, particularly regarding impurity and genetic modification, to maintain both *halal* integrity and spiritual conscience. Sujak et al. (2011) also highlight that biotechnological ethics in Islam encompass sincerity, truthfulness, and responsibility, qualities derived from the principle of *amanah*. By upholding *khilafah*, the Muslim scientific community acts as a moral guardian of life,

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ensuring that human interventions in nature are guided by compassion and wisdom rather than exploitation. As Mas'ud, Fahmi, and Saputra (2025) conclude, such stewardship reflects the higher objective of Shariah, which aims to achieve harmony between human advancement, divine trust, and environmental sustainability.

Recommendation

Based on the discussion and findings of this study, several recommendations can be made to strengthen the ethical use of technology in line with Islamic principles. These suggestions aim to connect Islamic values with the realities of modern science and technology, especially in the fields of biotechnology and genetically modified foods (GMFs).

One important step is to align Islamic halal-tayyib principles with modern bioethical standards. In Islam, *halal* does not only mean what is legally permissible, but also what is *tayyib*, which is clean, safe, and beneficial. This principle can guide scientists and policymakers to ensure that technological innovations, including food and genetic technologies, are both lawful and wholesome for human use.

Institutions such as IKIM and JAKIM have emphasised that *halal* products should also meet health, safety, and ethical standards (IKIM, 2023). By working together, religious scholars, scientists, and policymakers can design a shared framework that respects both Islamic values and scientific evidence. This cooperation will help ensure that technology continues to serve human wellbeing without neglecting moral and spiritual responsibilities (Ramlan et al., 2025).

Transparency and traceability are also crucial for maintaining public trust and ensuring ethical accountability. In Islam, values such as *amanah* (trustworthiness) and *sidq* (truthfulness) are strongly encouraged. These principles can be applied in technology management by ensuring that information about product sources, processes, and safety is transparent and easily verifiable.

Modern tools, such as blockchain or digital tracking systems, can support this goal by making production and distribution more transparent (Dialogue UM, 2022). This not only helps protect consumers from fraud or misuse but also fulfils Shariah objectives such as protecting property (*hifz al-mal*) and intellect (*hifz al-'aql*) (Bowen, 2009). When data are open and traceable, both ethical integrity and consumer confidence can grow together.

As technology advances, new ethical questions arise, particularly in biotechnology. There is an urgent need for clear fatwa guidelines and *halal* certification systems for GMFs. The Malaysian National Fatwa Council (1999) has already ruled that using genetic material from non-*halal* sources, such as pigs, is prohibited. However, more detailed frameworks are needed to address other types of genetic modification that involve plants or microorganisms.

Developing these frameworks requires cooperation between scientists, jurists, and ethicists to evaluate both the scientific facts and the moral implications. When fatwa decisions are informed by accurate data and guided by *Maqasid al-Shariah*, which are the protection of life, intellect, and health, they become more practical and relevant to modern realities (ICR Journal, 2021; IKIM, 2023). This approach will enable the Muslim community to confidently adopt new technologies while remaining true to Islamic ethics.

In short, these recommendations call for a balance between faith and progress. By harmonising *halal-tayyib* and bioethical standards, ensuring transparency and traceability, and developing informed fatwa frameworks, Muslim societies can guide technology towards what is beneficial, safe, and morally sound. This balance reflects the true spirit of Islamic knowledge, where *Naqli* and *Aqli* reasoning work together to serve humanity.

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Conclusion

This article set out to examine genetically modified foods (GMFs) through a broader Islamic ethical lens, moving beyond the narrow question of *halal* permissibility. The findings show that while determining the lawful source of genetic material remains a necessary foundation, it does not fully capture the wider moral and social implications of GMFs technologies in today's food systems. By applying the framework of *Maqasid al-Shariah*, the study demonstrates that an Islamic assessment must consider not only the rulings on ingredients but also the potential impact on human health, environmental stability, consumer rights, and economic fairness. When viewed through the objectives of safeguarding religion, life, intellect, lineage, and property, it becomes clear that the ethical responsibilities surrounding GMFs extend far beyond laboratory processes or regulatory labels. The analysis also highlights the value of integrating *maqasid* principles into existing *halal* governance frameworks. A *maqasid*-driven approach encourages regulators, scholars, and industry players to consider transparency, harm prevention, sustainability, and community well-being as essential components of *halal* assurance. As GMFs continue to shape global agriculture and food supply chains, Muslim consumers need guidance that reflects both scientific developments and the spirit of Shariah. This study, therefore, suggests that the future of halal food regulation lies in a more holistic model, one that balances innovation with moral accountability, ensuring that biotechnological progress remains aligned with the Islamic values of justice, compassion, and public welfare. Through this integration, the *halal* industry will be better equipped to uphold both the *halal* and the *tayyib* dimensions that are central to consumer trust and ethical food production.

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