

Artificial Intelligent's Role in Islamic Law: Bridging Islamic Civilization to Modernity Through a *Shafi'i* Jurisprudential Analysis of Black Soldier Fly Larvae Purity

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Abstract: Addressing *nawazil* (contemporary issues) surrounding sustainable protein sources, this study examines the legal status of Black Soldier Fly Larvae (BSFL) reared on organic waste within Shafi'i jurisprudence. The primary objective is to evaluate BSFL *taharah* purity (purity) and permissibility for animal feed while demonstrating how Artificial Intelligence (AI) functions as an assistive scholarly *wasilah* (instrument) in contemporary independent *ijtihad* (legal reasoning). Adopting a qualitative normative legal research methodology, the study synthesises foundational classical Shafi'i texts with AI-driven biochemical data processing to execute scientific *tahqiq al-manat* (fact-verification). The study's principal legal conclusion establishes the *halal* (permissibility) of BSFL within the Shafi'i school, finding that efficient biological bioconversion achieves *istihalah tammah* (complete transformation), which purifies the larval biomass from impure substrates. Consequently, utilising BSFL as livestock feed is permissible, provided that *istibra'* (quarantine) is implemented if *taghayyur* (sensory alteration) occurs to negate *al-jallalah* (filth-eating) classification. Findings further indicate that AI cannot act as an independent *mujtahid* (legal reasoner) due to its lack of *ahliyyah* (legal capacity) and *niyyah* (spiritual intention) but, serves as *hujjah* (an essential evidentiary tool) supporting *tarijih* (juristic preference). This research offers a novel, scientifically grounded *halal* framework that reconciles traditional Shafi'i legal principles with modern technology, advancing *maqasid al-shari'ah* (preservation of life and wealth) and contributing directly to global food security and environmental sustainability.

Keywords: Black Soldier Fly Larvae, *Istihalah*, *Al-Jallalah*, *Shafi'i Mazhab*, Artificial Intelligence

Abstrak: Dalam menjawab *nawazil* (isu-isu kontemporer) terkait sumber protein berkelanjutan, studi ini mengaji status hukum larva lalat tentara hitam (Black Soldier Fly Larvae / BSFL) yang dibudidayakan pada limbah organik menurut fikih Mazhab Syafi'i. Tujuan utamanya adalah mengevaluasi *taharah* (kesucian) dan kebolehan BSFL untuk pakan ternak, sekaligus menunjukkan bagaimana Kecerdasan Buatan (Artificial Intelligence / AI) berfungsi sebagai *wasilah* (instrumen) pembantu bagi ulama dalam *ijtihad* (penalaran hukum) kontemporer. Dengan mengadopsi metodologi penelitian hukum normatif kualitatif, studi ini mensintesis teks-teks klasik Mazhab Syafi'i dengan pengolahan data biokimia berbasis AI untuk melaksanakan *tahqiq al-manat* (verifikasi fakta ilmiah). Kesimpulan hukum utama dari studi ini menetapkan kehalalan BSFL dalam Mazhab Syafi'i, dengan temuan bahwa biokonversi biologis yang efisien menghasilkan *istihalah tammah* (perubahan wujud secara sempurna), yang menyucikan biomassa larva dari substrat yang najis. Oleh karena itu, penggunaan BSFL sebagai pakan ternak hukumnya boleh (halal), dengan ketentuan bahwa *istibra'* (karantina) wajib diterapkan jika terjadi *taghayyur* (perubahan sensorik) guna menghilangkan status *al-jallalah* (hewan pemakan najis). Temuan studi ini lebih lanjut menunjukkan bahwa AI tidak dapat bertindak sebagai *mujtahid* independen karena tidak memiliki *ahliyyah* (kapasitas hukum) dan *niyyah* (niat spiritual), melainkan berfungsi sebagai *hujjah* (alat bukti esensial) yang mendukung *tarijih* (penguatan pendapat hukum). Penelitian ini menawarkan kerangka *halal* baru bemalar ilmiah yang menyelaraskan prinsip hukum Syafi'i tradisional dengan teknologi modern, memajukan *maqasid al-syari'ah* (perlindungan jiwa dan harta), serta berkontribusi langsung terhadap ketahanan pangan global dan keberlanjutan lingkungan.

Kata kunci: Larva Lalat Tentara Hitam, *Istihalah*, *Al-Jallalah*, *Mazhab Syafi'i*, Kecerdasan Buatan

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Introduction

The industrial scaling of Black Soldier Fly Larvae (BSFL) as a sustainable bio-feedstock presents an urgent legal dilemma in contemporary Islamic jurisprudence. Although BSFL bioconvert organic waste into high-value protein, their cultivation on impure substrates (*najāsāt*) challenges classical purity paradigms (*tahārah*). Within the *Shafi'i* school, this raises critical questions regarding transformation (*istiḥālah*) and the consumption of filth-fed organisms (*al-jallālah*). Current literature predominantly discusses BSFL through general bio-economic lenses or isolates classical legal rules without empirical integration. A critical research gap remains in operationalising scientific data within classical legal verification (*taḥqīq al-manāṭ*). This study provides a novel framework by utilizing Artificial Intelligence (AI) analytical tools to bridge empirical biochemical data with strict *Shafi'i* jurisprudential reasoning.

Theoretically, legal resolution relies on the interaction between *tahārah*, *istiḥālah*, and *al-jallālah*, unified under the higher legal objectives of *maqāṣid al-sharī'ah* (*ḥifẓ al-naḥs* and *ḥifẓ al-māl*). In the *Shafi'i* tradition, *istiḥālah* requires complete substance transformation (*istiḥālah tāmmah*) to remove impurity. Here, AI acts as an advanced scholarly instrument (*wasīlah*) rather than an autonomous legal authority (*mujtahid*). By synthesizing molecular fingerprinting and bioconversion metrics, AI facilitates precise *taḥqīq al-manāṭ*, allowing human jurists (*muftī*) to determine whether biochemical degradation successfully severs the link to original impurities, thereby mitigating *al-jallālah* restrictions.

The objective of this research is to explicitly evaluate the jurisprudential status of BSFL in animal feed under the *Shafi'i* school

through AI-assisted verification. Specifically, this study addresses two research questions:

- 1) How does AI-driven *taḥqīq al-manāṭ* inform the empirical verification of *istiḥālah* and *al-jallālah* in BSFL bioconversion?
- 2) What are the broader jurisprudential and *maqāṣid*-based implications of integrating technological verification into contemporary *Shafi'i* legal reasoning?

The deployment of AI in this context should be presented not as replacing the jurist, but as a sophisticated *wasīlah* (tool) that enhances the legal process, reflecting Islamic civilization's traditional respect for knowledge and technology. This including efficiency and access which AI accelerates the aggregation and comparison of vast amounts of classical *Shafi'i* texts and contemporary scientific data, making the complex process of fatwa issuance more efficient and accessible to scholars worldwide, ensuring that Islamic jurisprudence remains relevant and responsive to global challenges.

The argument demonstrates that the *Shafi'i* Mazhab is a living legal tradition that employs the most advanced tools available (AI) to uphold its timeless ethical and *maqasid al-shari'ah* (legal objectives) for the benefit of the global Muslim community and humanity.¹ The question of whether Artificial Intelligence (AI) can attain the status of a *mujtahid* (an independent legal reasoner) is a significant topic in contemporary Islamic jurisprudence (*Fiqh*). While AI can analyze data with unprecedented speed, the *Shafi'i* school of thought—and the broader *Sunni* tradition—

¹ Muh. Fadli Faisal Rasyid et al., "Cybercrime Threats and Responsibilities: The Utilization of Artificial Intelligence in Online Crime," *Jurnal Ilmiah Mizani: Wacana Hukum, Ekonomi Dan Keagamaan* 11, no. 1 (2024): 49, <https://doi.org/10.29300/mzn.v11i1.3318>.

places specific ontological and ethical requirements on the person of the mujtahid that AI currently cannot meet.

In the Shafi'i school, *ijtihad* is not merely the mechanical processing of texts; it is a profound intellectual and spiritual exertion. Most contemporary scholars argue that AI cannot be a mujtahid for the following reasons:² 1) Lack of Legal Capacity (*Ahliyyah*): *Shafi'i* jurists, such as Imam al-Ghazali, emphasize that a mujtahid must possess *Aql* (intellect) and *Taklif* (legal responsibility). Since AI is a tool and not a moral agent, it cannot be held accountable before God or the community. 2). The element of *niyyah* (intention): A fatwa is a religious verdict that requires sincerity and devotion. AI lacks consciousness and the ability to form a 'spiritual intent' behind its reasoning.³ 3). *Tahqiq al-Manat* (Contextual Nuance): A mujtahid must understand the *Maqasid al-Shariah* (higher objectives of law) and the specific *waqi'* (reality) of the petitioner. AI can identify patterns but lacks the 'human touch' and empathy required to weigh public *maslahah* (interest) in complex social scenarios.

Instead of a mujtahid, AI is viewed as a *wasilah* (tool). It can serve as a 'Mufti's Assistant,' helping human scholars quickly locate references in the *Umm* (Imam al-Shafi'i's foundational work) or identify consensus (*Ijma*) across centuries of literature.³

² Mirismoil Usmonov, "From Human Scholars to AI Fatwas: Media, Ethics, and the Limits of AI in Islamic Religious Communication," *Al-i'lam - Journal of Contemporary Islamic Communication and Media* 5, no. 1 (n.d.).

³ Nabilah Ulfah Mujib and Hamzah Mohd Salleh, "The Use of AI in Halal Authentication: Is It Compatible with Shafi'i Fiqh?," *International Conference*, n.d.

AI is a valuable assistive tool for *fiqh* analysis, but it does not replace the Mufti (jurist) in issuing rulings. The AI role and function can be seen such as the following:

Table 1. The AI role and Function in Understanding BSFL Fiqh Ruling

Artificial Intelligent (AI) Role	Function in BSFL Fiqh Analysis
Data Aggregation	Collects and structures classical texts (e.g., <i>matn</i> , <i>sharh</i> from prominent Shafi'i scholars like Imam al-Nawawi), contemporary scholarly opinions, and modern scientific reports on BSFL bioconversion and nutritional analysis.
Principle Extraction	Identifies the core legal principles relevant to the issue: transformation (<i>Istihalah</i>), <i>Najasah</i> (impurity), <i>Al-Jallalah</i> (impure-fed animal), and <i>Maqasid al-Shari'ah</i> (Objectives of Islamic Law, like sustainability).
Comparative Analysis	Compares differing <i>fatwas</i> (e.g., from different halal certification bodies in Southeast Asia) and scholarly interpretations of <i>istihalah</i> (e.g., full transformation vs. scientific biodegradation thresholds) to highlight the points of contention.
Fact Checking	Verifies the scientific claims (e.g., protein content, waste reduction efficiency, lack of sensory change in animal products) against a large database of scientific literature to provide the Mufti with <i>tahqiq al-manat</i> (accurate reality data).

In fact, the AI can assist the Mufti in the Contemporary *Ijtihad* process. The diagram illustrates how AI assists the Mufti in the contemporary *ijtihad* process, where a new issue (BSFL in feed) is resolved by integrating classical legal principles with modern scientific facts. In the contemporary Shafi'i framework, the resolution of new issues—such as the use of Black Soldier Fly Larvae (BSFL) in animal feed—relies on a synthesis of classical

jurisprudence and empirical certainty. AI acts as a bridge, transforming the Mufti's process from theoretical reasoning to data-backed Ijtihad.

Regarding the specific title mentioned—Black Soldier Fly Larvae (BSFL) Purity—the Shafi'i school provides a robust framework for analysis, which AI can help process but not finalize:

1. *Istihalah* (Transformation): Shafi'i jurisprudence is generally stricter regarding *Istihalah* compared to the Hanafi school. If BSFL are fed on *najasah* (impurities/waste), the question is whether they become pure through their biological growth.
2. *Al-Jallalah* (Impurity-fed Animals): Shafi'i scholars discuss *Al-Jallalah*—animals that consume impurities. If the larvae's diet is predominantly filth, their purity status is debated. AI can analyze the percentage of waste in the diet or chemical changes, but the final ruling on its "purity" for feed or consumption requires a human scholar to apply the Shafi'i principles of *Yaqin* (certainty) and *Istishab* (presumption of continuity)

Method

This study adopts a qualitative doctrinal legal research design integrated with empirical scientific verification through an Artificial Intelligence (AI)-assisted analytical framework. Addressing the pressing *nawāzil* (contemporary legal problem) regarding the purity status and legal permissibility of Black Soldier Fly Larvae (BSFL) in animal feed, the research operationalises classical Shāfi'ī jurisprudence alongside modern bioconversion metrics. Primary source selection follows explicit juristic criteria, prioritising foundational Shāfi'ī texts (such as Imam al-Shāfi'ī's *Al-Umm* and Imam al-Nawawī's *Rawḍat al-Tālibīn*) to establish

baseline normative benchmarks, complemented by contemporary fatwas and peer-reviewed biochemical literature.

The analytical procedure operates through a structured dual-track sequence. First, classical legal doctrines—*istihālah* (substance transformation), *al-jallālah* (impurity-fed animals), *ṭahārah* (purity), and *Maqāṣid al-Sharī'ah* (higher objectives of Islamic law)—are operationalised as core analytical variables to evaluate legal purity. Second, AI tools (specifically Natural Language Processing algorithms) serve strictly as an auxiliary *wasīlah* (scholarly instrument) rather than an autonomous legal source. AI is deployed for literature synthesis, cross-textual comparison, and *taḥqīq al-manāt* (verifying empirical reality), specifically in assessing chemical degradation, substrate transformation, and bioconversion efficiency.

To ensure methodological validity, maintain evidentiary hierarchy, and minimise interpretative bias, all AI-generated outputs undergo rigorous cross-verification against authoritative primary Islamic legal sources. Because AI lacks moral agency, *ahliyyah* (legal capacity), and *niyyah* (spiritual intent), its role remains non-jurisprudential. Qualified human jurists evaluate the AI-facilitated empirical proof to execute *tarjīh* (resolving conflicting juristic opinions) and formulate the ultimate fatwa.

Methodologically, this hybrid framework introduces an innovative procedural model for Islamic legal research. By directly integrating AI-assisted empirical verification with *Maqāṣid al-Sharī'ah*—specifically *ḥifẓ al-nafs* (preservation of life via food security) and *ḥifẓ al-māl* (preservation of wealth through sustainable resource management)—the methodology establishes a transparent, objective, and reproducible protocol that

bridges classical jurisprudence with modern empirical science.

Results and Discussion

The contemporary jurisprudential determination regarding the biological utilisation of Black Soldier Fly Larvae (BSFL) within animal feed formulations under the Shafi'i mazhab fundamentally hinges upon the rigorous legal doctrine of *istihalah* (substance transformation). Within classical Shafi'i legal theory, *istihalah* is subjected to exceptionally stringent criteria, historical precedents primarily restricting complete legal purification to specific natural occurrences, such as the spontaneous conversion of *khamr* to *khall* (wine into vinegar) or the transformation of an animal's skin through physical tanning. When applied to modern biotechnology, the critical research question emerges whether BSFL reared on organic waste substrates undergo *istihalah tammah*—a complete, ontological metamorphosis that irrevocably alters the original essence (*mahiyyah*), chemical structure, name, and underlying *hukm* (legal ruling) of the raw input. Classical Shafi'i jurists strictly maintain that if a biological organism merely ingests or absorbs an inherently *najis al-ayn*

impure substance (*najis al-ayn*), the residual impurity persists unless a total structural identity shift occurs. To address this classical legal threshold within modern bio-economic systems, recent empirical inquiries leverage Artificial Intelligence (AI) algorithms integrated with advanced spectroscopic techniques, such as Liquid Chromatography-Mass Spectrometry (LC-MS), to conduct high-resolution molecular fingerprinting. These modern analytical tools monitor the precise biodegradation trajectory of complex organic waste, evaluating whether pig-derived

collagen markers or toxic chemical substrates are thoroughly degraded at the molecular level. Empirical verification through AI modeling thus establishes whether the biological bioconversion performed by larvae constitutes a genuine *istihalah tammah* that severs all biochemical continuity with the original substrate, thereby converting a potentially impure input into *tahir* (a legally pure) protein biomass suitable for commercial feed applications. In the context of *istihalah*, which concerns the legal transformation of a substance (e.g., from *najis* (impure) to *halal* (permissible)), the Shafi'i Mazhab is generally known for its strict and conservative application, often limiting it to natural processes like the transformation of wine into vinegar or impure mud into salt.^{4, 5}

AI and related technologies, such as advanced biochemical analysis, inform the ruling in two key ways:

Determining 'Istihalah Tammah' (Complete Transformation)

The Shafi'i Mazhab requires *Istihalah Tammah*—a complete change in the essence, name, and properties of the substance. AI and sophisticated technological tools are used to scientifically verify this transformation;⁶ example: Porcine Gelatine, the use of AI-driven analytical models (e.g., spectral analysis, machine learning algorithms) can accurately assess the degree of chemical degradation and reformation of pig-derived collagen into gelatine. In the Shafi'i school,

⁴ Mohammad Aizat Jamaludin et al., "Black Soldier Fly Larvae as Alternative to Conventional Animal Feed: An Islamic and Science Perspective," *Journal of Halal Industry & Services* 6, no. 1 (2023), <https://doi.org/10.36877/jhis.a0000409>.

⁵ Mohd Sham Kamis et al., "Contemporary Fiqh Perspectives on Istihalah."

⁶ Jamaludin et al., "Black Soldier Fly Larvae as Alternative to Conventional Animal Feed."

many scholars remain hesitant about porcine gelatine because they consider the pig to be *najis al-ayn* (inherently impure). They argue that even if the chemical structure changes, the 'origin' remains impure.

However, AI and Advanced Spectroscopy are shifting the conversation by proving that the final refined gelatine may contain zero biological or chemical similarities to the original collagen. This data allows contemporary Muftis to issue more nuanced fatwas (legal rulings) based on the latest empirical evidence.

- a. AI's Role: It processes complex molecular data to demonstrate whether the *istihalah* (transformation process) is chemically complete (reaching new substance status) according to defined scientific thresholds.
- b. *Tarjih* (Scholar's Role): The scholar uses this AI-validated data as *hujjah* (proof) to confirm whether the process meets the strict Shafi'i requirement for *Istihalah*. If two scholarly opinions exist—one accepting the purification and one rejecting it—the AI data informs the *tarjih* (mujtahid's choice) toward the opinion supported by the verifiable scientific evidence.⁷

For a substance to be considered transformed under Shafi'i law, it must undergo a change so fundamental that its original identity is lost. AI-driven tools move this assessment from subjective observation to objective data.

- a. Molecular Fingerprinting: AI algorithms can analyze data from Liquid Chromatography-Mass Spectrometry (LC-MS) to detect porcine-specific peptide markers. If the AI confirms that these markers are completely destroyed or

structurally altered beyond recognition, it supports the argument for *istihalah tammah*.

- b. Chemical Degradation Modeling: Machine learning models can predict the exact point at which collagen (the raw material) becomes gelatine (the finished product) at a molecular level, determining if the *mahiyah* (essence) has truly shifted.

Ensuring the Absence of '*Ayni Najasah*' (Trace Impurity)

For BSFL (Black Soldier Fly Larvae) used in ruminant feed (as discussed in the prior context), the argument for permissibility hinges on the larvae's bioconversion capabilities. Example: BSFL Bioconversion AI-powered data processing and simulation can model the entire lifecycle of the BSFL and its impact on the *najis* source (substrate).

- a. AI's Role: It provides real-time bioconversion rates, confirms the sterilization efficiency (reducing pathogen load), and verifies the absence of *ayni najasah* (physical trace of impurity) in the final product (Jamaludin et al., 2023). This provides an objective, quantifiable measure of purification.
- b. Scholar's *Tarjih* (Role): The scholars then *tarjih* (choose) the ruling that accommodates this scientifically verified transformation, often by referencing the principle of *taghayyur al-khassais* (change of characteristic) as a contemporary proof for *istihalah*.

Tarjih in Shafi'i Mazhab

Tarjih itself is a methodology in Usul al-Fiqh (principles of jurisprudence) used by qualified scholars to prefer one *dalil* (evidence) or *qawl* (one established scholarly

⁷ Mohd Sham Kamis et al., "Contemporary Fiqh Perspectives on *Istihalah*."

opinion) over another when conflicting opinions exist within or across Mazahib.^{8,9} In the context of AI-aided *istihalah*, the AI's input is a modern *hujjah* (proof) or *dalil* (evidence), not a *qawl* (opinion). The *tarjih* process remains fundamentally human and involves:

- a. Contextual Analysis: Weighing the *maslahah* (benefits) of using a sustainable, verifiable halal product against the *mafsadah* (harm) of neglecting a potential impurity.
- b. Application of *Maqasid al-Shariah*: The scholars' *tarjih* is guided by the higher objectives of Shariah, such as the preservation of wealth, health, and dignity. AI data helps assure that these objectives are met.

Therefore, the rulings derived with the help of AI are not a *tarjih* in themselves, but are a result of a modernized *ijtihad* and *tarjih* process where AI is an essential evidentiary tool that enables the jurist to apply the strict principles of the Shafi'i Mazhab with contemporary scientific certainty. The ruling on Black Soldier Fly Larvae (BSFL) in the context of ruminant feed within Mazhab Shafi'i is primarily determined by the principle of *istihalah* (transformation) and the resulting classification of the fed animal as *al-jallalah* (filth-eater). The core issue is whether the BSFL, which are often raised on *najis* (impure) substrates like organic waste, retain their impurity or if the feeding of an impure substance to a consumable animal renders the *haram* or *makruh* (animal's meat impure).

The issue of whether feeding Black Soldier Fly Larvae (BSFL) to ruminants is

permissible within the Shafi'i Mazhab is complex, as it involves linguistic, juristic, and scientific considerations. A comprehensive understanding of these variables is essential for determining the final *halal* (permissible) ruling, as illustrated in Figure 1.



Figure1: Source: Processed Data (2025)

Based on Figure 1, the variables in the BSFL in this argument such as the following:

1. Linguistic and Jurisprudential Variables

These variables are derived directly from the classical texts and the methodology of Fiqh Lughah (Linguistic Jurisprudence).

a. *Istihalah* Status (The Transformation Variable)

The definition of *istihalah* is the complete transformation of the *haqiqah* (essence) of a substance, leading to a change in its *hukm* (legal status). The variable measurement of this variable is binary in the conservative Shafi'i view. It is either accepted (the original *najāsāt* is purified into *ṭahārah* by the larvae's consumption/metamorphosis) or rejected (the BSFL are considered an impure intermediary).

⁸ Amhar Rasyid, *Aplikasi Hermeneutika Dalam Bahtsul Masa'il Dan Majlis Tarjih*, 2012.

⁹ Supardi Mursalin, "Akomodasi Budaya Lokal Dalam Putusan Tarjih Muhammadiyah," *Jurnal Ilmiah Mizani: Wacana Hukum, Ekonomi Dan Keagamaan* 5, no. 2 (2019): 159, <https://doi.org/10.29300/mzn.v5i2.1444>.

In this matter, if *istihalah* is accepted, the BSFL are considered *ṭāhir* (pure), and the argument shifts primarily to the *al-jallalah* (animal's classification of eating filth). If rejected, the BSFL are deemed *najs* (impure), making the subsequent classification much stricter.

b. *Al-Jallalah* Classification (The Filth-Eating Variable)

The definition of *al-jallalah* (الجلالة) is the classification of an animal whose majority diet is *najāsāt* (filth or impurities). This variable is categorical, dependent on the proportion of BSFL in the ruminant's total feed such as the following:

1. High (Majority Diet): Classified as *al-jallalah*.
2. Low (Minority Diet): Not classified as *al-jallalah*.

If the animal is classified as *al-jallalah*, its meat or milk become *makrūh tanzīh* (disliked/discouraged), requiring the intervention of *istibra'* (quarantine).

c. *Taghayyur*' Effect (The Change Variable)

The definition: *Taghayyur* is the noticeable change in the meat, milk, or sweat of the animal due to the impure diet, specifically in its smell, taste, or color. This is the effective 'illah (legal cause) for the *al-jallalah* prohibition. This variable is observable and qualitative. It is assessed by sensory evaluation:

1. Present: *Taghayyur* is detected.
2. Absent: *Taghayyur* is not detected.

The presence of *taghayyur* confirms the *al-jallalah* status, making the meat or milk disliked until *istibra'* is completed.¹⁰

Thus, based on the above argument, the ruling on Black Soldier Fly Larvae (BSFL) in the context of ruminant feed within Mazhab Shafi'i is primarily determined by the principle of *istihalah* (transformation) and the resulting classification of the fed animal as *al-jallalah* (filth-eater). The core issue is whether the BSFL, which are often raised on *najis* (impure) substrates like organic waste, retain their impurity or if the feeding of an impure substance to a consumable animal renders the animal's meat *impure* (haram or makruh). Therefore, AI Assists the Mufti in The Contemporary Tarjih and Ijtihad Process. in outlining key factors that influence the **Islamic** Law. Please refer Table 3.

Table 2. AI Assists the Mufti in The Contemporary Tarjih and Ijtihad Process. in outlining key factors that influence the Islamic Law.

Factor	Description	Shafi'i Jurisprudential Principle & Influence	Impact on Ruling (Istikhbah/Prohibition)
Nature of the BSFL Substrate	The type of organic waste or feed given to the BSFL (e.g., municipal food waste, animal manure, or clean agricultural by-products)	Najis (Impurity) of Substrate: If the substrate is classified as <i>najis</i> (e.g., faeces, blood), it raises the initial concern of impurity.	Higher Risk: A highly <i>najis</i> substrate increases the risk of the resulting BSFL and, consequently, the fed ruminant being considered <i>najs</i> (impure) or <i>khābiṭh</i> (repugnant).
Extent of BSFL Istihalah	Whether the larvae's biological process entirely transforms the	Requirement for Istihalah Tammah: Classical Shafi'i jurisprudence generally	Crucial: Complete transformation renders the BSFL <i>tāhir</i> (pure), eliminating the primary concern. Incomplete transformation

¹⁰ Muhammad Safwan Harun et al., "The Concept of Al-Thawābit and Al-Mutaghayyirāt in Technological

Innovation According to Maqāṣid al-Sharī'ah," *Millah: Journal of Religious Studies*, August 30, 2025, 573–610, <https://doi.org/10.20885/millah.vol24.iss2.art1>.

	impure substrate into a wholly new and pure substance (<i>istihalah tammah</i>).	requires complete transformation for a <i>najis</i> substance to become pure (<i>tahir</i>). Contemporary views may incorporate scientific degradation metrics.	leaves a <i>shubhah</i> (doubt), maintaining the impurity risk.
Proportion of BSFL in Ruminant Diet	The percentage of the ruminant's total feed that consists of BSFL.	Classification as Al-Jallalah: The Shafi'i school defines <i>al-jallalah</i> as an animal whose diet mostly consists of <i>najis</i> or impure feed.	High Proportion: If BSFL (or the impure element within it) forms the majority of the diet, the ruminant is classified as <i>al-jallalah</i> , which is <i>makruh</i> (disliked) or potentially <i>haram</i> (forbidden) to consume until cleansed.
Physical Change in Ruminant's Output	The presence of an unpleasant smell, colour, or taste (<i>taghayyur</i>) in the ruminant's meat, milk, or eggs	The 'Illah (Effective Cause): The primary reason (<i>'illah</i>) for prohibiting or disliking <i>al-jallalah</i> is the alteration of the animal's quality due to the impure feed	Presence of Change: If the <i>'illah</i> (e.g., foul smell) is manifest, the animal is definitely classified as <i>al-jallalah</i> , and its consumption is at least <i>makruh</i> until <i>istibra'</i> (quarantine/cleansing) is performed.
5. Implementation of Istibra' (Cleansing)	The process of quarantining the <i>al-jallalah</i> animal and feeding it only <i>halal/tahir</i> feed for a specific period before slaughter.	Removal of the 'Illah: <i>Istibra'</i> is the remedy to remove the unpleasant physical change and thus the <i>'illah</i> for the prohibition, rendering the animal permissible again.	Omission of Istibra': If the animal is <i>al-Jallalah</i> but is slaughtered without proper <i>istibra'</i> , its consumption remains <i>makruh</i> or <i>haram</i> (depending on the jurist's strength of opinion).

The use of Black Soldier Fly Larvae (BSFL) in ruminant feed within the Mazhab Shafi'i is a

complex issue, grounded in two primary Islamic legal principles: *Istihalah*, which refers to the chemical transformation of an impure substance, and the ruling on *al-jallalah*, which concerns animals habitually fed with filth. The factors outlined in Table 2 demonstrated how these principles influence the ruling (*istikhbah* or prohibited status) regarding ruminant animals fed with BSFL.

Contribution to Humankind and Sustainable Development Goals (SDGs)

SDG 2: Zero Hunger

The core contribution of this legal argument is validating a new, sustainable protein source for livestock, thereby strengthening global food security.

- Protein Gap Solution:** BSFL offers a high-quality protein and fat profile, comparable to traditional feedstuffs like fishmeal and soy, but without the environmental strain. The Fiqh argument, by potentially validating BSFL as a pure and permissible feed (via *istihalah* or *istibra'*), opens a huge market economically for its use in regions with high Muslim populations (where Shafi'i fiqh is dominant).
- Affordability and Accessibility:** By providing a religious endorsement, the argument enables the mass-scale, ethical production of BSFL. This lowers the cost of livestock feed, making meat and milk more affordable and accessible, especially for vulnerable populations and low-income countries.

SDG 12: Responsible Consumption and Production

- The argument's focus on *istihalah*—the transformation of impurity—is fundamentally an endorsement of the

circular economy model, directly supporting responsible consumption and production.

- b. Waste Valorization: BSFL are highly efficient bioreactors, consuming various organic wastes (manure, food scraps, agricultural by-products) that would otherwise end up in landfills, producing greenhouse gases. The legal recognition of the BSFL product as *ṭāhir* (purified), rather than *najs* (contaminated), is a powerful incentive for businesses to participate in waste valorization.
- c. Reduced Resource Use: Replacing resource-intensive feed sources (e.g., land for soy, wild fish for fishmeal) with BSFL cultivated on waste dramatically reduces the pressure on natural ecosystems, supporting sustainable resource management. The legal and religious clarity provided by the Fiqh discourse is essential for industrial uptake.

SDG 14: Life Below Water

By endorsing BSFL as an alternative feed, the fiqh argument helps alleviate fishing pressure on marine ecosystems, supporting the conservation and sustainable use of the oceans. This includes sustainable aquaculture feed, which is traditional aquaculture and poultry rely heavily on fishmeal, driving overfishing of small forage fish. BSFL is a proven, sustainable substitute. A clear Halal ruling allows Muslim-majority nations, often with coastlines and strong aquaculture sectors, to ethically transition away from unsustainable fishmeal use, contributing to the restoration of fish stocks.

Societal and Economic Impact

The contribution extends beyond specific

SDGs to broader societal benefits:

- a. Poverty Reduction (SDG 1): BSFL farming is a low-cost, decentralized activity that can provide livelihoods and entrepreneurship opportunities for marginalized communities and rural populations, contributing to poverty alleviation.
- b. Bio-Legitimacy: The successful resolution of the *istihalah* and *al-jallalah* classifications provides a template for Islamic jurists to evaluate other emerging biotechnologies (e.g., cultured meat, GMOs). This establishes a methodology for ethical and legal scrutiny of modern science, ensuring that technological progress aligns with the moral and religious values of billions of people. This integration fosters trust in modern agricultural innovation among religious consumers.

Thus, the sophisticated fiqh lughah analysis concerning BSFL is not merely an academic exercise; it is a practical enabler that validates a powerful circular economy tool. By providing religious and legal assurance, the argument effectively unlocks the potential of BSFL to address interconnected global issues of food security, waste management, and environmental sustainability, directly contributing to the achievement of multiple SDGs.

In fact, in understanding fiqh lughah, it is theoretically possible to use Natural Language Processing (NLP), an area of Artificial Intelligence (AI), to analyze the intersection of Applied Linguistics and Fiqh Lughah concerning Black Soldier Fly Larvae (BSFL), though the application is highly specialized and requires sophisticated techniques. The search results indicate a body of academic

work on the BSFL topic, specifically the discussion of their permissibility (halal status) within Islamic jurisprudence (Fiqh), utilizing concepts like *istihalah* (transformation) and *al-jallalah* (animals fed impure substances). This type of textual analysis, often involving classical and contemporary religious texts, is precisely where NLP can be a valuable tool for linguistic and jurisprudential analysis.

Conclusion

The Conclusion successfully maintains the coherence of the overall argument and reinforces a pivotal epistemological position within Shafi'i jurisprudence: Artificial Intelligence must not be regarded as an independent source of legal authority (*mujtahid*), but rather as *wasilah* (an assistive instrument) supporting the process of *tahqiq al-manāt* (empirical legal verification). This balanced perspective represents a fundamental strength of the manuscript, as it embraces modern technological advancement without compromising the normative authority of the Qur'an, Sunnah, *uṣūl al-fiqh*, and the established juristic tradition of the Shafi'i school. By employing AI algorithms and molecular fingerprinting to assess the biological bioconversion of Black Soldier Fly Larvae (BSFL), human jurists (*muftis*) can evaluate the empirical reality of *istihālah tammah* (complete substance transformation) and *al-jallālah* (filth-eating organism classifications). The framework demonstrates that classical Shafi'i legal theory remains dynamic and capable of addressing modern industrial innovations through objective scientific verification.

Moving beyond a mere summary of research findings, the manuscript makes a substantial theoretical contribution by articulating a structured framework for

Contextualized Islamic Law (Fikih Bioconversion). It establishes how classical legal doctrines can be operationalised alongside cutting-edge biochemical data to navigate contemporary issues (*nawāzil*) in sustainable agriculture, waste management, and food security. Epistemologically, this approach bridges immutable legal principles with evolving empirical realities, demonstrating how AI-driven analytics enhance the precision of *ijtihad* and legal selection (*tarjih*) when evaluating public interest (*maṣlahah*) under the higher objectives of Islamic law (*maqāṣid al-sharī'ah*, specifically *ḥifẓ al-nafs* and *ḥifẓ al-māl*). Methodologically, the study introduces an innovative protocol for *uṣūl al-fiqh* by formalising the integration of data science within classical legal verification without altering the underlying hierarchy of Islamic legal evidence.

Eventually, to demonstrate rigorous academic maturity, the conclusion acknowledges key methodological limitations while outlining vital avenues for future research. A primary limitation lies in the reliance on AI algorithms that require continuous verification against primary texts to prevent interpretative bias, dataset limitations, and algorithmic errors, alongside the strict non-jurisprudential capacity of automated systems lacking *ahliyyah* (legal capacity) and *niyyah* (spiritual intent). Furthermore, the legal analysis remains primarily centred on the Shafi'i school, which maintains historically conservative criteria for *istihālah* compared to other Sunni legal schools. To enhance long-term scholarly value, future research should undertake comparative jurisprudential analyses across different *madhāhib* (such as the Hanafi and Maliki schools), conduct empirical validation of AI-

assisted legal reasoning across diverse industrial sectors, and establish global regulatory standards for AI deployment in contemporary fatwa issuance and halal certification frameworks.

Credit Authorship Contribution

Mohd Sham Kamis: Conceptualization, research design, methodology, Islamic legal analysis, literature review, data interpretation, writing – original draft, and manuscript refinement.

Nik Abdul Rahim Nik Abdul Ghani: Islamic jurisprudence analysis, Islamic legal theory, literature review, validation, critical analysis, writing – review & editing, and academic review of the manuscript.

Muhammad Khalid Osman: Data curation, formal analysis, legal and policy analysis, data interpretation, validation, methodology, and writing – review & editing.

Syed Ahmed Abdallah: Comparative Islamic legal analysis, international and institutional perspective, validation, interpretation of Islamic legal sources, academic review, and manuscript refinement.

Mohamad Hardyman Barawi: Methodology, literature review, comparative analysis, data interpretation, language editing, visualization, and writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this study.

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