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Reconstructing the Concept of *Istihālah* of *Najāsah* in a Contemporary Context through a Layered Methodology within the Integrity of Science Paradigm

Abstract: Classical debates on *istihālah* of *najāsah* typically focus on juristic classification, particularly the extent to which the transformation of an impure substance results in purity and permissibility. In contemporary products—processed foods, pharmaceuticals, cosmetics, and industrial bioprocesses, the central problem is not only classificatory but also evidential and accountable. Claims of “transformation” must be normatively justified and empirically traceable at the levels of process, residue, and final product. Therefore, this study aimed to reconstruct *istihālah* of *najāsah* through the Integrity of Science paradigm, which requires coherence among the ontology of the object, multi-horizon epistemology, proportionate methodology, and an axiological commitment to *halāl-ṭayyiban*. A conceptual-doctrinal approach was adopted with a layered methodology comprising five layers. These include (i) ontological mapping of the object and supply-chain processes, (ii) normative boundary-setting grounded in scriptural reasoning and *maqāṣid* orientation, (iii) *uṣūlī* formalization into operational criteria of *istihālah* and its distinction from *istihlāk*, (iv) scientific-verification interface through evidence packages involving markers, residues, detection limits, and uncertainty, (v) *halal* governance evaluation through traceability and cross-contamination control. The reconstruction produces a testable normative-inferential toolkit consisting of an operational definition, criteria set, epistemic thresholds, and a *halal*-status decision matrix. This toolkit is important due to the ability to convert *istihālah* from an abstract juristic category into an auditable framework for contemporary *halal* assessment. It differs from previous approaches that tend to isolate juristic classification, laboratory authentication, or certification procedures but instead integrates the factors into one accountable inferential chain. The academic contribution is grounded in bridging *uṣūl al-fiqh*, scientific verification, and *halal* governance within one accountable inferential chain, thereby strengthening fatwa argumentation, certification audits, and integrity-based *halal* studies.

Keywords: *Halal* Governance; *Istihālah*; Layered Methodology; *Najāsah*; *Uṣūl al-fiqh*.

INTRODUCTION

Contemporary *halal* assessment has increasingly focused on products whose status cannot be determined from an ingredient list alone. Processed foods, pharmaceuticals, cosmetics, biotechnology products, and cultivated meat may involve complex transformations, multi-stage processing, hidden additives, and global supply chains. Given that *halal* is a credence quality, consumers depend on reliable reasoning, trustworthy certification, and auditable control systems.¹ This condition makes the question of transformation especially important, namely, *when an impure or prohibited substance changes during production, what kind of change is sufficient to affect its legal status, and how can the claim be justified?*

In Islamic jurisprudence, this question is commonly discussed through the concept of *istiḥālah*, namely a transformation that may affect the legal status of a substance. Classical fiqh debates primarily ask about the possibility of a transformed *najis* substance becoming pure and permissible. These debates remain indispensable, but contemporary industrial contexts require a more operational formulation. The issue is related to legal relevance, different from *istihlāk* or mere dilution, and the possibility of supporting the claimed transformation with evidence from the production process and the final product.

Previous studies provide important foundations for this discussion. Juandi, Khatib, and Khoiriyah examined human-feces biogas from a fiqh-chemical perspective, showing that questions of *najāsah* transformation may require dialogue between juristic reasoning and chemical explanation.² Miswanto and Musaffa evaluated *al-istiḥālah* in sharia texts and mapped models of transformation from impure to pure substances, thereby clarifying the doctrinal basis of the concept.³ Haddade, Anam, and Anwar discussed the use of *istiḥālah*

¹ Karijn Bonne and Wim Verbeke, "Religious Values Informing Halal Meat Production and the Control and Delivery of Halal Credence Quality," *Agriculture and Human Values* 25, no. 1 (2008): 35–47, <https://doi.org/10.1007/s10460-007-9076-y>.

² Wawan Juandi, Muhyiddin Khatib, and Ummi Khoiriyah, "Biogas Tinja Manusia Dalam Perspektif Fiqih-Kimia," *ISLAMICA* 6, no. 2 (2012): 389–402.

³ Agus Miswanto and Muhamad Ulul Albab Musaffa, "Investigating Al-Istihalah in the Provisions of Shariah Texts: A Study on Models of Transformation from Impure (Najis) to Pure (Halal) Substances, or

and *ḍarūrah* in assessing the legal status of AstraZeneca vaccines, showing how transformation reasoning may interact with necessity and public benefit in biomedical products.⁴ Usman et al. reviewed advances and challenges in *halal* food authentication, emphasizing that modern verification techniques can support *halal* assessment but remain dependent on method, matrix, sensitivity, and validation.⁵ More recent Indonesian Islamic-law scholarship has also expanded the discussion toward *halal* governance. Rizal et al. asserted that *halal* certification should move from formal-administrative compliance toward substantive compliance through *maqāṣid al-sharīʿah* and risk-based governance.⁶ Saefullah et al. framed *halal* governance through a *wasatiyyah-maṣlaḥah* approach, while Maulidia, Rofi'ah, and Santoso showed that *halal* regulation and certification in the catering sector are closely connected to consumer protection, transparency, and legal awareness.⁷ Nurhasanah et al. further demonstrated that the implementation of Indonesia *halal* product assurance law still faces legal uncertainty, fragmented supervision, and weak legal culture.⁸ These studies show that contemporary *halal* assessment is no longer only a matter of legal classification, but also evidentiary sufficiency, institutional control, consumer protection, and public accountability.

Vice Versa,” *Az-Zarqa’*: *Jurnal Hukum Bisnis Islam* 15, no. 1 (October 2023): 1–25, <https://doi.org/10.14421/azzarqa.v15i1.2731>.

⁴ Abdul Wahid Haddade, Khaerul Anam, and Khaerul Anwar, “Istiḥālah and Ḍarūrah Theory Approach to the Law on the Use of Vaccines for Astrazeneca Products,” *Parewa Saraq: Journal Of Islamic Law And Fatwa Review* 1, no. 1 (May 2022): 1–15, <https://doi.org/10.64016/parewasaraq.v1i1.6>.

⁵ Ifrah Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review,” *Food Science & Nutrition* 12, no. 3 (March 2024): 1430–1443, <https://doi.org/10.1002/fsn3.3870>.

⁶ Muhammad Rizal Pranoto et al., “Halal Certification Governance in Indonesia: An Islamic Legal Appraisal Based On,” *JURIS (Jurnal Ilmiah Syariah)* 24, no. 2 (2025): 233–247, <https://doi.org/10.31958/juris.v24i2.15411>.

⁷ Rohmah Maulidia; Khusniati Rofi'ah; Lukman Santoso, “Halal Regulation and Certification in The Catering Business: A Critical Review of Customer Protection,” *Jurisdictie: Jurnal Hukum Dan Syari'ah* 15, no. 1 (2024): 171–206, <https://doi.org/http://dx.doi.org/10.18860/j.v15i1.26988>; Hardivizon Asep Saefullah, Dede Burhanudin, Arif Syibromalisi, Saeful Bahri, “Religious Moderation and Halal Governance in Indonesia: A Wasatiyyah-Maslahah Framework Asep,” *Al-Istinbath: Jurnal Hukum Islam* 10, no. 2 (2025): 948–975, <https://doi.org/10.29240/jhi.v10i2.14554>.

⁸ 3 Bintan Dzumirroh Ariny⁴ Lucy Laksmi⁵ Nurhasanah, 1 Umar Al Haddad, 2 Mohd Zaidi Daud, “Challenges in Implementing Indonesia’s Halal Product Assurance Law: An Analysis of Legal Uncertainty, Supervisory Systems, and Legal Culture Nurhasanah,1,” *NURANI: Jurnal Kajian Syari'ah Dan Masyarakat* 25, no. 2 (2025): 599–619.

Modern *halal* cases show why this clarification is urgent. Gelatin raises questions about animal origin, chemical processing, and residual markers. Vaccines and pharmaceuticals involve excipients, enzymes, or animal-derived materials whose permissibility may be discussed together with necessity and public benefit.⁹ Insect-based feed and cultivated meat shift attention to feed chains, growth media, cell sources, and upstream control points.¹⁰ Furthermore, scientific authentication has become an important part of this interaction. DNA-based methods, protein or peptide analysis, as well as chemical profiling can help detect species markers and residues in complex matrices, especially in gelatin and processed products¹¹. However, the methods do not automatically settle the legal question. The results are shaped by sample quality, detection limits, uncertainty, and the difference between “not detected” and “absent.” Therefore, scientific data function as supporting evidence for factual claims required by legal reasoning, not the final determinant of *halal* status.

Existing discussions often conceptualize *istiḥālah*, *halal* authentication, and certification as a juristic classification, a laboratory, and administrative governance problem, respectively. When these domains are separated, transformation claims may become either extremely abstract to audit or overly technical to be normatively meaningful. Legal conclusions may rely on insufficient factual evidence, while scientific evidence may be invoked without clear *uṣūlī* criteria. Fragmented *halal* standards, legal uncertainty, and

⁹ Haddade, Anam, and Anwar, “Istiḥālah and Ḍarūrah Theory Approach to the Law on the Use of Vaccines for Astrazeneca Products.”

¹⁰ Mohd Akram Dahaman@Dahlan and Zizi Azlinda Mohd Yusof, “Kajian Status Kenajisan Larva Dan Penggunaannya Dalam Makanan Ternakan: Fatwa Negeri Perlis,” *Malaysian Journal of Syariah and Law* 12, no. 2 (2024): 511–28, <https://doi.org/10.33102/mjsl.vol12no2.796>; Mohammad Naqib Hamdan et al., “A Review of the Discussions on Cultivated Meat from the Islamic Perspective,” *Heliyon* 10, no. 7 (April 2024): e28491, <https://doi.org/10.1016/j.heliyon.2024.e28491>.

¹¹ Nurfarhana Hassan et al., “Identification of Bovine, Porcine and Fish Gelatin Signatures Using Chemometrics Fuzzy Graph Method,” *Scientific Reports* 11, no. 1 (2021): 1–10, <https://doi.org/10.1038/s41598-021-89358-2>; Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

uneven implementation further intensify the need for a model that can connect legal reasoning, scientific evidence, and governance in a transparent and auditable way.¹²

The novelty of this study is grounded in reconstructing the *istiḥālah* of *najāsah* through the Integrity of Science paradigm using a layered methodology. Previous investigations primarily emphasize doctrinal classification, fiqh-chemical assessment of a specific transformed material, product-specific fatwa reasoning, laboratory authentication, or *halal* governance separately. Meanwhile, this study develops a testable normative-inferential toolkit that connects three dimensions, namely *uṣūlī* criteria, scientific-verificatory evidence, and *halal* governance. The aim is not to replace classical fatwa reasoning with laboratory measurement or certification procedure but to clarify how different types of claims, including normative, factual, and procedural, should be connected within one accountable inferential chain. In this structure, *maqāṣid* and *halālan-ṭayyiban* function as orientations for public accountability and precaution, not substitutes for evidentiary proof.¹³

Based on the discussion above, this study is guided by three questions. First, *how can the concept of istiḥālah of najāsah be defined operationally and distinguished from istihlāk and other related categories?* Second, *what uṣūlī criteria and standards of proof are needed to assess claims of transformation in contemporary products?* Third, *how can a layered methodology connect normative criteria, scientific-verificatory evidence, and halal governance in a way that is auditable and applicable to modern halal assessment?* By answering these questions, the results contribute a criteria-based reconstruction of *istiḥālah*, an evidence-sensitive decision framework, and a

¹² Ady Fataron. Zuhdan, "Analyzing the Gap between International Halal Standards and Local Practices in Halal Management Systems," *Halal International Journal* 1, no. 2 (2024): 64-72; Nurhasanah, 1 Umar Al Haddad, 2 Mohd Zaidi Daud, "Challenges in Implementing Indonesia's Halal Product Assurance Law: An Analysis of Legal Uncertainty, Supervisory Systems, and Legal Culture Nurhasanah,1."

¹³ Jaser Auda, "Maqosid AL-Syariah As Filosofi Of Islamic Law A Systems Aproach," 2008, 9-31; Muhammad Nusran et al., "Methodology for Determining the Halal of Medicinal and Food Products in Maslahah Perspective," *JASNA: Journal For Aswaja Studies* 1, no. 2 (July 2021): 17-28, <https://doi.org/10.34001/jasna.v1i2.2203>; Pranoto et al., "Halal Certification Governance in Indonesia: An Islamic Legal Appraisal Based On"; Asep Saefullah, Dede Burhanudin, Arif Syibromalisi, Saeful Bahri, "Religious Moderation and Halal Governance in Indonesia: A Wasatiyyah-Maslahah Framework Asep."

methodological bridge between classical *uṣūl al-fiqh*, contemporary *halal* authentication, consumer protection, and certification governance.

METHOD

This study is a conceptual–doctrinal, library-based inquiry that reconstructs *istiḥālah najāsah* for assessing the *halal* status of contemporary products. It does not generate primary empirical data, laboratory results, surveys, or interviews. In addition, no informants were interviewed, and no field data were collected, because this study is not designed as an empirical field investigation. Rather, it develops an auditable inferential model from authoritative texts, contemporary *halal* studies, and scientific-authentication literature. This positioning follows conceptual study logic, where the main task is to clarify concepts, organize arguments, and construct a coherent analytical framework.¹⁴ Integration is employed as inferential alignment among questions, evidence, and conclusions, not an empirical mixed-methods design.¹⁵ The fiqh scope is limited to the four Sunni schools, with classical *turāth* used to identify shared concepts, points of *ikhtilāf*, and legally relevant boundaries. Disagreements are not harmonized artificially but treated as sources for formulating minimum criteria and evidentiary thresholds. Sources were selected according to three criteria, namely authority in fiqh and *uṣūl*, relevance to modern product transformation and *halal* governance, as well as methodological validity in scientific authentication.

The Integrity of Science paradigm is operationalized through five layers. Layer 1 maps the object, process chain, and *halal* critical points. Layer 2 defines normative boundaries and *maqāṣid*-based precaution. Layer 3 translates *uṣūlī* reasoning into operational criteria for *istiḥālah* and its distinction from *istihlāk*. Layer 4 connects those criteria to an evidence package involving markers, residues, LoD/LoQ, matrix effects, and uncertainty. These

¹⁴ Creswell John and Creswell David, *Research Design, Qualitative, Quantitative and Mixed Methods Approaches*, SAGE Publications, Inc., vol. Sixth Edit, 2023.

¹⁵ Michael D. Feters, Leslie A. Curry, and John W. Creswell, “Achieving Integration in Mixed Methods Designs—Principles and Practices,” *Health Services Research* 48, no. 6pt2 (December 2013): 2134–2156, <https://doi.org/10.1111/1475-6773.12117>.

terms are used as validation-sensitive parameters, not fixed universal cut-offs.¹⁶ Layer 5 evaluates traceability, cross-contamination control, and decision outcomes. Reliability is secured through an inference-flow scheme, decision matrix, and case-based application to selected product typologies.

RESULTS AND DISCUSSION

Conceptual Reconstruction of *Istihālah Najāsah*

The reconstruction developed in this study positions *istihālah najāsah* not as a dispensatory label for resolving difficult *halal* cases, but a disciplined concept of legal reasoning. It does not reduce *istihālah* to a technical or laboratory model. Rather, the reconstruction clarifies the conditions under which transformation may become a normatively relevant reason for a shift in legal status. The point of departure is a boundary distinction where devotional and authoritative foundations of *sharī'ah* remain grounded in scriptural and *uṣūlī* authority, while empirical inquiry assists only in verifying factual claims about substances, processes, residues, and risks. This distinction is consistent with the *uṣūlī* requirement that legal judgments be connected to a defensible *manāṭ* and not only to desirable practical outcomes.¹⁷ Therefore, the reconstruction concerns the *ijtihādī*-rational zone of application, not the unrestricted redefinition of a classical fiqh concept.

In this context, *istihālah* is defined as a legally relevant transformation of 'ayn in which the original material no longer retains the operative basis of impurity or prohibition in the final product. The term 'ayn is not redefined scientifically but remains a fiqh category referring to the identity of the object as recognized through legal reasoning and 'urf. Classical juristic discussions of transformation already show that legal status may change with alteration in the identity and operative basis of the object, although the schools differ in scope and application.¹⁸ Scientific description may assist *taḥqīq al-manāṭ* by clarifying

¹⁶ Usman et al., "Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review."

¹⁷ Al-Ghazali, *Al-Mustashfa Min 'Ilm Al-Ushul*, n.d.; Ibn Al-Qayyim, *I'lam Al-Muwaqqi'in* (Riyadh: Dar Ibn al-Jauzy, 2002).

¹⁸ Ibn Abidin, *Radd Al-Mukhtar* (Riyadh: Dar Alam Al-Kutub, 2003); Imam Abi Zakariya Muyiddin bin Syaraf Al-Nawawi, *Kitab Al-Majmu' Syarh Al-Muhadzdzab* (Jeddah: Maktabah Al-Irsyad, n.d.); Ibn Qudamah, *Al-Mughni*, Third (Riyadh: Dar 'Alam al-Kutub, 1997).

changes in the object or process, but it does not independently determine the ruling. Therefore, three elements are required, namely a change beyond merely superficial properties, the emergence of a stable new identity recognizable through *ʿurf* and supported where necessary by factual indicators, as well as the loss of the operative cause legal relevance. This prevents the common shortcut of equating the occurrence of an industrial process with *istiḥālah*.

The reconstruction also preserves the distinctions between *ʿayn*, *ṣifah*, and *athar*. Change in *ʿayn* refers to alteration affecting the legally recognizable identity of the object. Meanwhile, changes in *ṣifah* refer to alterations in appearance, taste, odor, structure, or other properties that do not necessarily alter the identity. *Athar*, or residue, refers to remaining traces whose legal relevance depends on context, concentration, risk, and the operative cause involved. These distinctions are necessary because modern *halal* debates often confuse the loss of perceptible properties with the loss of legal identity. Contemporary studies on *istiḥālah* confirm that the central problem is not merely the occurrence of change, but whether the change is legally relevant and evidentially defensible¹⁹.

A related distinction is associated with *istiḥālah* and *istihlāk*. In particular, *istihlāk* may involve dilution, absorption, or being overwhelmed, ensuring an element is no longer perceptible, but it does not establish transformation of *ʿayn*. Therefore, claims concerning gelatin, enzymes, stabilizers, vaccines, or bioprocess inputs cannot rest only on the argument that the original material is no longer visible, tasted, or smelled but must show why the relevant *manāʿ* has changed or disappeared. This distinction is crucial for preventing category errors in contemporary *halal* assessment, especially when industrial processing, purification, dilution, and degradation are treated as largely identical legal events.

To avoid forcing every case into a simple *halal*/non-*halal* binary, the reconstruction distinguishes between *istiḥālah tāmmah* and *nāqishah*. *Istiḥālah tāmmah* refers to a complete

¹⁹ Miswanto and Musaffa, “Investigating Al-Istihalah in the Provisions of Shariah Texts: A Study on Models of Transformation from Impure (Najis) to Pure (Halal) Substances, or Vice Versa.”

transformation in which the original identity and its operative legal cause are no longer relevant. Meanwhile, *istiḥālah nāqīṣah* refers to partial transformation, where some process change occurs but sufficient reasons remain to treat the original identity, residue, or risk pathway as legally relevant. This typology gives a disciplined place to *syubha* or withheld judgment when proof is inadequate, rather than treating uncertainty as either automatic permissibility or automatic prohibition. In contemporary *halal* governance, the caution is especially important because product claims depend on both final composition as well as source control, process documentation, and certification reliability²⁰.

The reconstruction translates the operational definition into a criteria-based framework. A valid claim of *istiḥālah* requires four criteria, namely evidence of transformation at the level of legally relevant identity rather than only property change, the emergence of a stable new identity recognized through *ʿurf* and, where needed, supported by factual characterization, the disappearance of the operative meaning of impurity or prohibition, including residue assessment, as well as an explicit standard of proof proportionate to product risk and public consequence. The last requirement is crucial because many contemporary disputes fail at the level of evidentiary sufficiency. Within this framework, scientific evidence remains bounded. Detection, non-detection, LoD/LoQ, and residue analysis support factual assessment, but do not issue a fatwa. The category “Not detected” means not detected under a specific method, matrix, and detection limit. However, it is not identical to absolute absence. Review literature on *halal* authentication emphasized that DNA-based, peptide/protein-based, spectroscopic, and chemical methods are useful but remain dependent on matrix, method validation, sensitivity, and uncertainty²¹. Conversely, positive detection does not mechanically determine the ruling without *uṣūlī* interpretation. The conceptual result of this section is a restrained inferential

²⁰ Bonne and Verbeke, “Religious Values Informing Halal Meat Production and the Control and Delivery of Halal Credence Quality”; Ady Fataron. Zuhdan, “Analyzing the Gap between International Halal Standards and Local Practices in Halal Management Systems.”

²¹ Nurfarhana Hassan, Tahir Ahmad, and Norhidayu Muhamad Zain, “Chemical and Chemometric Methods for Halal Authentication of Gelatin: An Overview,” *Journal of Food Science* 83, no. 12 (2018): 2903–2911, <https://doi.org/10.1111/1750-3841.14370>; Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

framework in which *istiḥālah* becomes clearer, more auditable, and applicable to modern products without being detached from its classical *uṣūlī* foundations.

Main Result: A Layered Methodology Model within the *Integrity of Science* Paradigm

The main result is a layered methodology model that connects three horizons without merging their functions, namely normative-*uṣūlī* reasoning, scientific verification, and *halal* governance. The model responds to a practical difficulty in modern *halal* assessment where consumers cannot directly verify complex products, while regulators and certifiers must justify decisions through traceable evidence. This is especially important because *halal* functions as a credence quality whose credibility depends on control, trust, and auditability.²² Fragmented standards and uneven certification practices further intensify the need for a consistent evaluation framework.²³ Therefore, the assertion that transformation has occurred must be evaluated through a structured inferential route, not through intuition, convenience, or isolated laboratory results.

The model is built on the principle that each type of claim requires distinct evidence and mode of inference. Normative claims are related to the legal relevance of a proven transformation (*fiqh* and *uṣūl*). Meanwhile, factual claims concern whether transformation actually occurred in the production process or final product (verification and process audit). Governance claims are centered on the documentation, traceability, and protection of evidence from contamination risk (certification control). The layered model prevents two common errors, namely using *istiḥālah* as a shortcut to cover factual uncertainty, and treating scientific data as being capable of determining *halal* status without *uṣūlī* interpretation. As a methodological analogy, integration is considered the accumulation of data, together with alignment among questions, methods, evidence, and inference²⁴. Given

²² Bonne and Verbeke, "Religious Values Informing Halal Meat Production and the Control and Delivery of Halal Credence Quality."

²³ Junaid Akbar et al., "Global Trends in Halal Food Standards: A Review," *Foods* 12, no. 23 (2023): 1–15, <https://doi.org/10.3390/foods12234200>; Ady Fataron. Zuhdan, "Analyzing the Gap between International Halal Standards and Local Practices in Halal Management Systems."

²⁴ Feters, Curry, and Creswell, "Achieving Integration in Mixed Methods Designs—Principles and Practices."

that this study is conceptual-doctrinal, the principle is used to organize inferential coherence, not to claim an empirical mixed-methods design.²⁵

The model operates through five connected layers. **Layer 1 maps the object and process chain.** It identifies the material under assessment, the source, transformation points, possible residues, and *halal* critical points. The output is not a ruling, but a problem map that determines what must be evaluated in the next layers. This layer is consistent with *halal* production literature that emphasizes critical-point identification, supply-chain control, and traceability in complex production systems.²⁶

Layer 2 sets the normative boundary, determining the category of cases within *istihālah*, *istihlāk*, necessity, contamination, or other legal classes. *Maqāṣid* and *ḥalāl-ṭayyiban* function in this context as a compass for precaution and public accountability, especially in high-risk products, guiding the strictness of assessment but not replacing evidence. This use of *maqāṣid* is consistent with the methodological role as an orienting framework for welfare, harm prevention, and proportional reasoning, not a substitute for proof.²⁷

Layer 3 formalizes the *uṣūl* criteria, translating the reconstructed definition of *istihālah* into K1–K4, which include transformation at the level of legally relevant identity, emergence of a stable new identity, disappearance of the operative cause of impurity or prohibition, and an explicit standard of proof. This layer specifies what must be proven before a status shift can be considered. The function reflects the discipline of *uṣūl* and the

²⁵ Creswell John and Creswell David, *Research Design, Qualitative, Quantitative and Mixed Methods Approaches*.

²⁶ Aji Jumiono et al., “Identifikasi Titik Kritis Kehalalan Produk Mikrobiologi,” *Jurnal Ilmiah Pangan Halal* 6, no. 1 (April 2024): 84–95, <https://doi.org/10.30997/jiph.v6i1.10633>; Jagadeesan Premanandh and Samara Bin Salem, “Progress and Challenges Associated with Halal Authentication of Consumer Packaged Goods,” *Journal of the Science of Food and Agriculture* 97, no. 14 (2017): 4672–4678, <https://doi.org/10.1002/jsfa.8481>; Mian N. Riaz and Muhammad M. Chaudry, “Halal Food Production,” *Halal Food Production*, 2003, 1–380, <https://doi.org/10.1201/9780203490082>.

²⁷ Mohammad Hashim Kamali, “Maqasid Al-Shari’ah and Ijtihad as Instruments of Civilisational Renewal: A Methodological Perspective,” *ICR Journal* 2, no. 2 (2011): 245–271, <https://doi.org/10.52282/icr.v2i2.647>; Al-Syathibi, *Al-Muwafaqat* (Dar Ibn Affan, 1997); Auda, “Maqasid AL-Syariah As Filosofi Of Islamic Law A Systems Approach.”

ethics of fatwa reasoning, which require legal transitions to rest on an explicit chain of reasons rather than post hoc justification.²⁸

Layer 4 designs the scientific-verification interface. This layer determines which markers, residues, process indicators, detection limits, and uncertainty statements are relevant to the criteria established in Layer 3. The relevant methods should be validated, recognized, or explicitly justified for the matrix and product type under assessment. This layer is especially important for gelatin and species-origin disputes, where LC-MS, PCR/ddPCR, peptide analysis, and other authentication methods support factual assessment but must be read with attention to LoD/LoQ, matrix effects, extraction performance, and uncertainty.²⁹ Layer 4 does not issue a fatwa but only reports the strength and limits of factual evidence.

Layer 5 translates the preceding layers into *halal* governance. It produces a decision matrix—*halal*, non-*halal*, or *syubha*—and specifies audit requirements such as documentation, traceability, segregation, supplier control, and cross-contamination mitigation. This layer is necessary because a technically plausible transformation claim is not sufficient when the process history is opaque, or the control system is unreliable. *Halal* certification, especially in health products and cross-jurisdictional contexts, requires auditable documentation and consistent governance rather than isolated product testing.³⁰

The five-layer methodology is designed as a sequential assessment flow. Each layer answers a specific question and produces an output required by the next layer, from object mapping to normative classification, *uṣūlī* criteria, scientific verification, and *halal* governance.

²⁸ Al-Ghazali, *Al-Mustashfa Min 'Ilm Al-Ushul*; Al-Qayyim, *I'lam Al-Muwaqqi'in*.

²⁹ Noviyan Darmawan et al., “Droplet Digital PCR (DdPCR) for Halal Detection of Commercial Gelatin Products,” ed. Chandra Mohan Chandrasekar, *International Journal of Food Science* 2025, no. 1 (January 2025), <https://doi.org/10.1155/ijfo/8841767>; Kifayati Rosiyanti Dewi et al., “Advances and Key Considerations of Liquid Chromatography–Mass Spectrometry for Porcine Authentication in Halal Analysis,” *Journal of Analytical Science and Technology* 14, no. 1 (2023), <https://doi.org/10.1186/s40543-023-00376-3>; Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

³⁰ Endy Muhammad Astiwara, “Halal Certification Regulation on Health Products: A Global Comparative Study,” *International Journal of Science and Society* 5, no. 3 (June 2023): 470–483, <https://doi.org/10.54783/ijssoc.v5i3.1422>; Bonne and Verbeke, “Religious Values Informing Halal Meat Production and the Control and Delivery of Halal Credence Quality.”

Table 1: Operational Flow of the Five-Layer Methodology

Layer	Guiding Question	Main Output
Layer 1: Object and Process Mapping	What substance, process, and supply-chain stage are being assessed?	Object map, process map, and <i>halal</i> critical points.
Layer 2: Normative Boundary-Setting	Does the case fall under <i>istiḥālah</i> , <i>istihlāk</i> , necessity, contamination, or another legal category?	Normative category and scope of assessment.
Layer 3: <i>Uṣūlī</i> Criteria Formalization	What must be proven for transformation to be legally relevant?	K1-K4 criteria and proportional standard of proof.
Layer 4: Scientific Verification Interface	Is there factual evidence supporting or weakening the claimed transformation?	Evidence package on markers, residues, LoD/LoQ, matrix effects, and uncertainty.
Layer 5: <i>Halal</i> Governance Evaluation	Is the evidence traceable, documented, controlled, and certifiable?	<i>Halal</i> decision matrix: <i>halal</i> , non- <i>halal</i> , or <i>syubha</i> .

Source: Author's conceptual construction based on the layered methodology developed in this study.:

Table 1 shows that each layer has a distinct function. Layer 4 evaluates the validity and limits of scientific-verificatory evidence relevant to *istiḥālah*, while Layer 5 assesses whether the overall evidentiary process is traceable, documented, controlled, and reliable enough for *halal* governance and certification. After the operational flow is established, each layer must also be connected to its evidentiary requirement, decision role, and potential risk. This clarifies how the model functions as an auditable inferential chain rather than a merely conceptual sequence.

Table 2: Evidentiary and Decision Roles of Each Layer

Layer	Evidence Required	Decision Role	Risk if Weak
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Layer 1	Ingredient source, production stages, transformation points, possible residues, and supplier data.	Identifies the factual object and process point under assessment.	The case may be assessed at the wrong object, process, or supply-chain stage.
Layer 2	Scriptural indications, fiqh positions, <i>maqāṣid</i> considerations, and risk relevance.	Determines the correct legal category before evidence is interpreted.	Scientific data may be used without a clear <i>uṣūlī</i> frame.
Layer 3	‘Ayn/ṣifāh/athar distinction, manāṭ identification, ikhtilāf mapping, and evidentiary threshold.	Specifies what must be proven before a legal-status shift can be considered.	Transformation may be asserted without sufficient legal criteria.
Layer 4	Laboratory methods, validation status, residue or marker findings, LoD/LoQ, matrix effects, and uncertainty.	Tests the factual premises required by Layer 3.	Non-detection may be wrongly equated with absolute absence.
Layer 5	Traceability records, segregation control, supplier assurance, cross-contamination control, and audit documentation.	Determines whether the assessment is reliable for <i>halal</i> certification and public accountability.	A technically plausible conclusion may fail because governance and traceability are weak.

Source: Author conceptual construction based on the evidentiary requirements and decision roles formulated in this study.

This evidentiary scheme prevents short-circuit reasoning. Scientific evidence cannot bypass *uṣūlī* criteria, and normative conclusions cannot ignore traceability, documentation, and control. The result is a decision process that remains legally grounded, scientifically supported, and governable. Based on this operational and evidentiary scheme, two cross-layer rules secure methodological coherence. First, a process cannot be called *istihālah* merely because processing occurred or a marker is not detected. Second, evidentiary thresholds rise with risk, product complexity, and public consequence, suggesting proportionate strictness, not impossible certainty. The model practical outputs are an inference-flow scheme, a decision matrix, and an argumentative audit trail that connects process mapping, *uṣūlī* criteria, verification evidence, and governance control. In this form,

the Integrity of Science paradigm becomes operational. It preserves the authority of *uṣūl*, gives science a bounded verificatory role, and makes *halal* decisions auditable rather than impressionistic.

Discussion: The *Uṣūl*-Scientific Interface and Evidence Package Design

This section clarifies how the reconstructed criteria of *istiḥālah* can be supported by evidence without reversing the hierarchy between *uṣūl* and science. The interface proposed is not a conversion of *istiḥālah* into a laboratory category. It is an evidentiary design for testing factual claims required by legal reasoning. In this structure, *uṣūl* determines what must be proven, while science helps assess whether the relevant factual conditions are sufficiently supported. The distinction follows the discipline of *taḥqīq al-manāṭ*, in which factual investigation assists legal application without replacing normative authority.³¹ Therefore, the evidence package is not a collection of laboratory data, but a structured proof arrangement connecting *uṣūl* criteria, process information, marker or residue analysis, uncertainty, and governance control.

The first task in designing this interface is to identify the proper object of evidence. Classical fiqh distinguishes between *ʿayn*, *ṣifah*, and *athar*. In contemporary *halal* assessment, these distinctions must be translated carefully into verifiable indicators without losing the normative meaning. *ʿAyn* refers to the legally recognizable identity of the object. The assessment may be assisted by evidence of source-material identity or by indicators that a stable new identity has evolved. *Ṣifah* refers to dominant properties such as taste, odor, color, structure, or appearance. These properties may support interpretation but are rarely sufficient as primary proof of *istiḥālah*. *Athar*, or residue, refers to remaining traces whose legal relevance depends on concentration, risk pathway, product matrix, and the operative cause of impurity or prohibition. Contemporary *halal*-authentication studies show that residue and marker analysis are especially relevant in processed products because

³¹ Al-Ghazali, *Al-Mustashfa Min 'Ilm Al-Ushul*; Al-Qayyim, *I'lam Al-Muwaqqi'in*.

transformation, degradation, dilution, and contamination may produce different evidentiary meanings³².

Accordingly, the evidence package should not begin with the question of which laboratory test is available, but with the *uṣūlī* question of which criterion is being tested. When the issue concerns transformation at the level of legally relevant identity, the evidence must support the claim that the original ‘ayn has changed and a stable new identity has evolved. In cases where the issue concerns the disappearance of the operative cause of impurity or prohibition, the evidence must address whether residue, marker, carry-over, or contamination pathways remain legally relevant. Regarding public risk and product complexity, the evidence must also show whether the overall standard of proof is proportionate to the consequences of the decision. This order prevents scientific methods from being used as independent determinants of *halal* status and keeps the scope within their proper role as instruments for clarifying factual premises.

A complete evidence package must begin with a precise transformation claim. The statement that a material has experienced *istiḥālah* is not identical to the absence of a source marker in the final product. The first is a normative- inferential claim, while the second is a factual-verificatory claim. Both may support one another, but cannot be treated as the same type of statement. The claim must also be linked to a process map that identifies the production stages where transformation, residue, substitution, or contamination may occur. For example, in gelatin, relevant stages may include raw-material sourcing, rendering, extraction, hydrolysis, purification, drying, and downstream use. In biopharmaceuticals, the critical points may include cell substrates, culture media, enzymes, stabilizers, purification, and formulation. *Halal* production literature consistently emphasizes process mapping, critical-point identification, and supply-chain control as part of credible *halal* assurance³³.

³² Hassan, Ahmad, and Zain, “Chemical and Chemometric Methods for Halal Authentication of Gelatin: An Overview”; Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

³³ Riaz and Chaudry, “Halal Food Production.”

The next component is the selection of relevant markers or residues. Markers must be selected due to their relevance to the legal and factual claim under assessment, not merely because of being technically available. DNA markers, species-specific peptides, protein fragments, metabolomic profiles, or chemical fingerprints may be useful depending on the material, process, and matrix. The function is to support or weaken the factual premise required by the *uṣūlī* criteria. In gelatin and species-origin disputes, LC-MS, PCR/ddPCR, peptide analysis, and chemometric techniques have been used to support authentication, but their relevance depends on the tested matrix and the legal claim being assessed³⁴.

Every evidentiary statement must also include method performance and uncertainty. The method used, the matrix tested, the limit of detection, the limit of quantification where relevant, extraction performance, validation status, and uncertainty must be stated before the result is used in *halal* reasoning. This requirement is central because “not detected” does not mean absolute absence. It means that the target was not detected under a specific method, matrix, detection limit, and quality-control condition. Review literature on *halal* authentication repeatedly indicates that sensitivity, false negatives, false positives, matrix effects, and method validation must be considered before test results are used to support *halal* claims³⁵. Therefore, non-detection may support an *istihālah* claim only when it is connected to the relevant *uṣūlī* criteria and supported by process evidence.

Laboratory evidence is not self-sufficient because *halal* status is a public claim that depends on traceability, supplier control, segregation, documentation, consumer protection, and cross-contamination mitigation. Weak traceability may reduce the probative value of otherwise strong laboratory results, while strong governance can make bounded scientific findings more reliable. This is particularly important because *halal* functions as a credence quality whose credibility depends on trustworthy control and

³⁴ Darmawan et al., “Droplet Digital PCR (DdPCR) for Halal Detection of Commercial Gelatin Products”; Dewi et al., “Advances and Key Considerations of Liquid Chromatography–Mass Spectrometry for Porcine Authentication in Halal Analysis”; Hassan, Ahmad, and Zain, “Chemical and Chemometric Methods for Halal Authentication of Gelatin: An Overview.”

³⁵ Dewi et al., “Advances and Key Considerations of Liquid Chromatography–Mass Spectrometry for Porcine Authentication in Halal Analysis”; Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

delivery systems³⁶. In the Indonesian context, *halal* regulation and certification have also been discussed as mechanisms of consumer protection, transparency, and legal accountability, especially in sectors where consumers cannot directly verify the *halal* status of products and services³⁷. The legal basis of *halal* certification has also been justified through *maṣlaḥah mursalah*, because certification protects consumers, prevents harm, and provides public assurance in situations where individual verification is practically impossible³⁸. Fragmented standards and uneven implementation further require transparent audit trails rather than isolated technical determinations³⁹.

The governance dimension becomes more complex when *halal* certification extends beyond conventional food products. Hatoli showed that *halal* certification on electronic and non-consumption products may be debated from a *maṣlaḥah* perspective, particularly when it relates to consumer confidence and legal assurance⁴⁰. However, Hamid et al. cautioned that the placement of *halal* certification on non-consumer goods, animal-feed-related products, or service-sector objects can generate conceptual and public misunderstanding when the distinction between consumption, non-consumption, supply-chain function, and legal relevance is not carefully maintained.⁴¹ This reinforces the need for the evidence package to include not only test results, but also claim specification, product typology, intended use, supply-chain role, and governance justification. A laboratory result becomes decision-relevant only when its sampling, source documentation, chain of custody, supplier control, and contamination controls are credible.

³⁶ Bonne and Verbeke, "Religious Values Informing Halal Meat Production and the Control and Delivery of Halal Credence Quality."

³⁷ Santoso, "Halal Regulation and Certification in The Catering Business: A Critical Review of Customer Protection."

³⁸ Wahyu Abdul Jafar, "Legality of Halal Food Certification on Maslahah Mursalah Perspective," *Jurnal Ilmiah MIZANI* 09, no. 01 (2022): 95–108.

³⁹ Ady Fataron. Zuhdan, "Analyzing the Gap between International Halal Standards and Local Practices in Halal Management Systems."

⁴⁰ Hatoli, "Halal Certification of the Indonesian Ulema Council on Electronic and Non-Consumer Products from the Maslahah Perspective Sertifikasi Halal Majelis Ulama Indonesia Pada Produk Elektronik Dan Non Konsumsi Perspektif Maslahah," *Journal of Islamic Law (JIL)* 1, no. 2 (2020): 237–55, <https://doi.org/10.24260/jil.v1i2.45>.

⁴¹ Abdul Hamid et al., "Misconception about Halal Certification Placement on Non-Food Commodities : State Coercion over the Territory of Ijtihad," *Al-Manāḥij: Jurnal Kajian Hukum Islam* 19, no. 2 (2025): 271–88.

Marker and residue evidence must also be interpreted according to product typology. In gelatin-based food, pharmaceutical, and cosmetic products, species-origin markers are highly relevant because the main dispute often concerns whether porcine or other problematic source identity remains legally relevant. DNA-based methods may be useful when recoverable DNA remains available, while peptide/protein analysis and LC-MS-based approaches may be more suitable where DNA is degraded by processing. Spectroscopic and chemometric methods may serve as screening tools, but require confirmatory support when legal consequences are significant⁴².

In vaccines and biopharmaceuticals, the evidentiary burden often shifts from simple marker detection to traceability and proof of removal. The decisive questions are not always related to the occurrence of *istiḥālah*, but the relevance of problematic inputs, media components, enzymes, stabilizers, or residues after purification and formulation. Since public risk and regulatory complexity are high, the standard of proof generally requires stronger documentation, validated control, and a more conservative interpretation of uncertainty. This is consistent with contemporary discussions that connect vaccine permissibility not only to *istiḥālah* but also necessity, public benefit, and procedural control⁴³.

The same principle applies to enzymes, biocatalysts, larvae used as feed, cultivated meat, and non-consumption or supply-chain-related products. Some cases are not genuine *istiḥālah* cases at all but may instead concern source permissibility, media composition, feed substrate, downstream carry-over, product use, consumer protection, or supply-chain governance. Treating every technological change or every certification object as *istiḥālah* would create a category error. For example, in cultivated meat, the critical points often shift upstream to cell source, growth media, serum or animal components, scaffolds, and control of supporting inputs⁴⁴. In insect-based feed, the assessment may require attention to feed

⁴² Hassan, Ahmad, and Zain, "Chemical and Chemometric Methods for Halal Authentication of Gelatin: An Overview"; Usman et al., "Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review."

⁴³ Haddade, Anam, and Anwar, "Istiḥālah and Ḍarūrah Theory Approach to the Law on the Use of Vaccines for Astrazeneca Products."

⁴⁴ Hamdan et al., "A Review of the Discussions on Cultivated Meat from the Islamic Perspective."

substrate, metabolism, contamination pathways, and downstream animal products.⁴⁵ Meanwhile, in non-consumption and service-related objects, the assessment must clarify whether *halal* certification concerns the material substance, the use, contact with consumers, or the role in a broader supply chain.⁴⁶

The *uṣūlī*-scientific interface is predicated on two interpretive commitments. Non-detection must always be treated as a bounded claim, because it depends on method, matrix, detection limit, validation condition, and uncertainty. Scientific evidence must also be coupled with governance proof, because even technically sophisticated data may remain weak as *halal* confirmation when sampling, documentation, traceability, supplier control, consumer protection, and contamination controls are unreliable. In this context, the interface does not replace fatwa reasoning with laboratory measurement. It disciplines the factual side of *taḥqīq al-manāṭ*, ensuring that claims of *istihālah* are neither accepted by convenience nor rejected by unrealistic demands for absolute certainty. The final output is a decision-ready evidence package that connects claim specification, process mapping, marker/residue interpretation, uncertainty assessment, product typology, consumer protection, and governance control within a single auditable chain.

Testing the Model Across Product Case Typologies: Gelatin, Vaccines, Enzymes, Larvae, and Cultivated Meat

This section applies the layered methodology to five product typologies, namely gelatin, vaccines and biopharmaceuticals, enzymes and biocatalysts, larvae or insects used as feed, and cultivated meat. These cases are not presented as exhaustive empirical validation, but conceptual stress tests for one inferential route, including claim specification, process mapping, evidence package, mapping to K1-K4, and decision output. The objective is to show when substantive transformation reasoning remains central and when assessment must shift toward traceability, removal evidence, and governance control.

⁴⁵ Dahaman@Dahlan and Mohd Yusof, “Kajian Status Kenajisan Larva Dan Penggunaannya Dalam Makanan Ternakan: Fatwa Negeri Perlis.”

⁴⁶ Hatoli, “Halal Certification of the Indonesian Ulema Council on Electronic and Non-Consumer Products from the Masalahah Perspective Sertifikasi Halal Majelis Ulama Indonesia Pada Produk Elektronik Dan Non Konsumsi Perspektif Masalahah”; Hamid et al., “Misconception about Halal Certification Placement on Non-Food Commodities : State Coercion over the Territory of Ijtihad.”

Gelatin is the clearest template because authentication methods are relatively mature and the disputed claim is focused, confirming whether animal-source identity or porcine residue remains legally relevant after processing. The model separates species origin, industrial processing, and normative *istihālah*. Raw-material origin, line segregation, inter-batch carry-over, and cross-contamination are critical points in gelatin assessment⁴⁷. RT-PCR/ddPCR, peptide or protein analysis, HRMS profiling, and FTIR-chemometric screening may support the evidence package, but each method must be interpreted according to matrix, extraction quality, LoD/LoQ, and validation limits.⁴⁸ Marker detection weakens K3, while non-detection supports K3 only as a bounded evidentiary claim.

Vaccines and biopharmaceuticals face the strictest tests because public consequences, regulatory complexity, and upstream opacity raise K4. The issue is often not simple *istihālah*, but whether problematic inputs, media, enzymes, stabilizers, or excipients are absent, removed, or legally irrelevant after purification and formulation. In vaccine discussions, *istihālah* is often considered together with *darūrah*, public benefit, and the availability of alternatives.⁴⁹ Therefore, certificates of analysis, supplier audits, specifications, segregation, and change-control records may carry more evidentiary weight than isolated laboratory testing. *Halal* status requires auditable clean inputs or credible proof of removal, opaque documentation justifies *syubha*, and persistent problematic inputs without mitigation support a non-*halal* conclusion.

⁴⁷ GMIA, *Gelatin Handbook*, 2012.

⁴⁸ Said Naufal Hibaturrahman et al., “Sensitivitas Real-Time Polymerase Chain Reaction Dengan Primer Tanabe Dalam Mendeteksi Gelatin Babi Pada Confectionery,” *Jurnal Teknologi Dan Industri Pangan* 34, no. 1 (June 2023): 119–28, <https://doi.org/10.6066/jtip.2023.34.1.119>; Anjar Windarsih et al., “Analysis of Porcine Gelatin in Gelatin Powder and Gelatin-Containing Foods Using Non-Targeted LC-Orbitrap HRMS-Based Proteomics,” *Open Veterinary Journal* 15, no. 9 (2025): 4482–4495, <https://doi.org/10.5455/OVJ.2025.v15.i9.54>; Darmawan et al., “Droplet Digital PCR (DdPCR) for Halal Detection of Commercial Gelatin Products”; Hassan, Ahmad, and Zain, “Chemical and Chemometric Methods for Halal Authentication of Gelatin: An Overview.”

⁴⁹ Ali Imron and Anif Yuni Muallifah, “Fiqh of Biotechnology: Reinterpreting Qur’anic Verses on the Impurity of Pigs and Its Implications for the Halal Status of Vaccines,” *Jurnal Studi Ilmu-Ilmu Al-Qur’an Dan Hadis* 26, no. 1 (March 2025): 189–216, <https://doi.org/10.14421/qh.v26i1.6134>; Haddade, Anam, and Anwar, “Istihālah and Darūrah Theory Approach to the Law on the Use of Vaccines for Astrazeneca Products.”

Enzymes and biocatalysts show the risk of treating every technological process as *istiḥālah*. In many cases, the key question is source permissibility, production organism, media composition, processing aid, or downstream carry-over, not ‘ayn-level transformation. This indicates that K1–K2 may be secondary, while K3–K4 depend on supplier verification, input control, and residue assessment. Since *halal* authentication techniques differ in scope and probative strength, verification must be claim-specific rather than method-driven⁵⁰.

Larvae or insects used as feed test the model at the level of chain effects, substrate transformation, and downstream legal relevance. The assessment must distinguish the status of larvae, feed substrate, contaminants, processing environment, and animal products produced through the feed chain. Rahim et al., in the study of Black Soldier Fly larvae in animal feed practices in Malaysia and Indonesia, showed that *istiḥālah* in this case cannot be assessed only from the biological ability of larvae to transform organic waste into biomass, but must also consider the jurisprudential debate on complete transformation, feed permissibility, and the positions of *halal* authorities⁵¹. Dahaman@Dahlan and Mohd Yusof similarly emphasized that the legal status of larvae requires attention to impurity, feed substrate, contamination pathways, and downstream use in animal feeding⁵². Collectively, these studies support the layered model where Layer 1 identifies substrate, larvae, processing, and downstream feed chain. Layer 2 determines the focus of the issue as *najāsah*, *al-khabīth*, *jallālah*, *istiḥālah*, or precautionary governance. Layer 3 inquires about the occurrence of legally relevant transformation, and Layer 4 examines factual evidence of substrate conversion and contamination risk. Layer 5 finally evaluates traceability, supplier control, and feed-chain governance. Therefore, the larvae case should not be reduced to

⁵⁰ Laela Hayu Nurani et al., “Use of Chromatographic-Based Techniques and Chemometrics for Halal Authentication of Food Products: A Review,” *International Journal of Food Properties* 25, no. 1 (2022): 1399–1416, <https://doi.org/10.1080/10942912.2022.2082468>; Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

⁵¹ Abdul Rahim et al., “Contemporary Fiqh Perspectives on Istihalah: A Case Study of Black Soldier Fly Larvae in Animal Feed Practices in Malaysia and Indonesia,” *MILRev : Metro Islamic Law Review* 4, no. 2 (2025): 954–975.

⁵² Dahaman@Dahlan and Mohd Yusof, “Kajian Status Kenajisan Larva Dan Penggunaannya Dalam Makanan Ternakan: Fatwa Negeri Perlis.”

the question of whether insects are *halal* or haram. It is a layered question involving substrate, transformation, feed-chain function, animal-product consequences, and governance control.

Cultivated meat is the most upstream-dominant typology. The *halal* status depends less on *istiḥālah* from impurity than on cell source, growth media, serum or animal components, scaffolds, and supplier control. Given that standards are still evolving, K4 must be high, and governance evidence becomes decisive. Contemporary Islamic discussions of cultivated meat consistently identify cell source, medium, scaffold, and regulatory control as central *halal* concerns⁵³.

Across the five cases, the model shows a graded pattern in which the more complex the technology and the higher the public risk, the less sufficient substantive transformation reasoning becomes. Decision-making shifts from concerns about the occurrence of transformation to asking whether the claim is traceable, documented, risk-controlled, and normatively interpretable. This confirms the function of the layered model as not replacing *uṣūlī* judgment with technical testing, but streamlining how factual verification and governance evidence enter legal reasoning.

Comparative Discussion with Madhhab Discourses and Contemporary Literature

The comparison with *madhhab* discourses is used in this context not to produce a composite ruling, but to clarify the evidentiary variables behind juristic disagreement. Classical discussions of *istiḥālah* show different emphases. Ḥanafī offered a wider consideration to process change, practical recognition, and the emergence of a new legally relevant object, as observed in discussions associated with *al-Mabsūṭ*, *Badā'i al-Ṣanā'i*, and later Ḥanafī commentaries⁵⁴. Shāfi'ī discussions are generally more cautious in defining the boundary between *ṭahārah* and *najāsah*, especially when transformation remains incomplete, or residue is still legally relevant.⁵⁵ Ḥanbalī conceptualizations emphasize proof

⁵³ Hamdan et al., "A Review of the Discussions on Cultivated Meat from the Islamic Perspective."

⁵⁴ Al-Sarakhsi, *Al-Mabsuth* (Beirut: Dar al-Ma'rifah, n.d.); Al-Kasani, *Badā'i al-Shana'i Fi Tartib Al-Syara'i* (Beirut: Dar AL-Kutub AL'Ilmiyah, 2003); Abidin, *Radd Al-Mukhtar*.

⁵⁵ Al-Nawawi, *Kitab Al-Majmu' Syarh Al-Muhadzdzab*.

of legally relevant change and the consequences of material transformation for legal status.⁵⁶ These differences should not be flattened into a single undifferentiated doctrine.

The layered model interprets *madhhab* diversity as a structured difference in evidentiary horizons. K1–K2 assess whether change reaches the level of legally recognizable identity, while K3 examines the ability of the residue or remaining traces to preserve the operative cause of impurity or prohibition. Finally, K4 addresses the required strength of proof in view of risk, uncertainty, and public consequence. Within this framework, contemporary scientific evidence does not redefine ‘*ayn*, ‘*urf*, or *istiḥālah*. It assists *tahqīq al-manāṭ* by clarifying factual conditions relevant to juristic reasoning. Therefore, the model does not dissolve *ikhtilāf* into a single technical answer. Instead, it makes the grounds of disagreement more transparent by identifying whether a dispute concerns the definition of transformation, the interpretation of residues, the standard of proof, or the reliability of *halal* governance.

Contemporary Indonesian Islamic-law literature strengthens the need for this mediated approach. Mawardi and Ichsan showed that *halal* product certification in Indonesia has developed within changing legal-political dynamics, especially through the institutional shift from religious-authority-based certification toward a more state-regulated *halal* product assurance regime.⁵⁷ Widyawati further interpreted the legislation of *halal* product assurance through *fiqh siyasah*, emphasizing that *halal* regulation involves public participation, political configuration, and the state responsibility to protect Muslim consumers.⁵⁸ These studies indicate that *halal* governance is not only an administrative extension of *fiqh* but also shaped by legal politics, institutional authority, and public accountability.

At the level of implementation, Nurhasanah et al. identified legal uncertainty, supervisory weaknesses, and legal-culture problems as key challenges in Indonesia *halal*

⁵⁶ Quddamah, *Al-Mughni*.

⁵⁷ Warsis Mawardi et al., “Regulation of Halal Product Certification in The Dinamics of Indonesian Legal Politics,” *Justicia Islamica: Jurnal Kajian Hukum Dan Sosial* 20, no. 1 (2023): 175–192, <https://doi.org/10.21154/justicia.v20i1.5336>.

⁵⁸ Widyawati, “Konfigurasi Politik Legislasi Jaminan Produk Halal Perspektif Fiqh Siyasah,” *Asy-Syari’ah*, 2022, <https://doi.org/10.15575/as.v24i1.18724>.

product assurance system.⁵⁹ Muttaqin et al. similarly asserted that state supervision of *halal* products still faces fragmentation of authority, especially in the relationship between BPJPH, related ministries, and other supervisory actors.⁶⁰ These studies support the governance dimension of the layered model in which a *halal* decision cannot be assessed only by doctrinal classification or laboratory evidence when the institutional pathway of certification, supervision, documentation, and enforcement remains unclear.

Contemporary literature on *halal* standards, authentication, and certification confirms the need for a framework that mediates between classical legal categories and modern regulatory realities. Fragmented *halal* standards and uneven implementation create uncertainty at the level of audit and governance⁶¹, while scientific authentication remains method- and matrix-dependent rather than legally self-sufficient⁶². The contribution of the Integrity of Science paradigm is methodological rather than doctrinally revisionist. It preserves the final normative authority of *uṣūl*, while making the interaction between classical categories, factual verification, legal politics, state supervision, and *halal* governance more explicit and auditable.

Methodological and Governance Implications

The model developed has three main implications. For fatwa reasoning, it standardizes the form of justification without replacing classical *uṣūl* methodology. A ruling on *istiḥālah* should specify the object and critical points, identify the relevant legal category, state the criteria and burden of proof, and explain how factual evidence supports or weakens the normative conclusion. This is consistent with the discipline of *uṣūl*, in which a ruling must be connected to a defensible *manāṭ* and an explicit chain of reasoning rather

⁵⁹ Nurhasanah, 1 Umar Al Haddad, 2 Mohd Zaidi Daud, “Challenges in Implementing Indonesia’s Halal Product Assurance Law: An Analysis of Legal Uncertainty, Supervisory Systems, and Legal Culture Nurhasanah,1.”

⁶⁰ Irsyadul Muttaqin, Dhia Al Uyun, and Riana Susmayanti, “Questioning State Supervision in Guaranteeing Halal Products in Indonesia,” *Al-Muamalat: Jurnal Ekonomi Syariah* 12, no. 2 (2025): 359–377.

⁶¹ Akbar et al., “Global Trends in Halal Food Standards: A Review”; Ady Fataron. Zuhdan, “Analyzing the Gap between International Halal Standards and Local Practices in Halal Management Systems.”

⁶² Usman et al., “Advances and Challenges in Conventional and Modern Techniques for Halal Food Authentication: A Review.”

than to practical convenience alone⁶³. Disagreement can consequently be traced to definition, residue interpretation, evidentiary threshold, or governance reliability, rather than appearing as mere preference.

For certification and audit, the focus shifts from a simple product-status question to the credibility of the *halal* claim. The minimum evidence package should include claim specification, process mapping, source documentation, relevant marker or residue evidence, LoD/LoQ and uncertainty statements, interpretation rules, supplier traceability, segregation, and contamination control. This is especially important for pharmaceuticals, biotechnology products, cultivated meat, and complex supply-chain products, where upstream inputs and process opacity may be more decisive than final-product testing alone⁶⁴. Therefore, *halal* assurance depends not only on laboratory authentication, but also on credible documentation, institutional accountability, supply-chain control, and auditability⁶⁵.

In the Indonesian *halal*-governance context, these implications are closely related to legal certainty, legal awareness, institutional capacity, and service quality. Suhartini et al. showed that *halal* certification for micro and small business actors can be understood through *maṣlaḥah* and legal certainty, especially because certification provides benefits for business actors, consumers, and regulatory governance⁶⁶. Sunardi et al. further demonstrated that legal awareness among micro and small enterprise operators remains an important factor in *halal* certification, suggesting governance cannot rely only on formal obligation or sanction, but must also cultivate understanding of the benefits and religious-legal meaning of certification⁶⁷. These studies support the model emphasis that *halal*

⁶³ Al-Ghazali, *Al-Mustashfa Min 'Ilm Al-Ushul*; Al-Qayyim, *I'lam Al-Muwaqqi'in*.

⁶⁴ Haddade, Anam, and Anwar, "Istiḥālah and Ḍarūrah Theory Approach to the Law on the Use of Vaccines for Astrazeneca Products"; Hamdan et al., "A Review of the Discussions on Cultivated Meat from the Islamic Perspective."

⁶⁵ Bonne and Verbeke, "Religious Values Informing Halal Meat Production and the Control and Delivery of Halal Credence Quality"; Riaz and Chaudry, "Halal Food Production."

⁶⁶ Endeh Suhartini, Euis Hertiani, and R Djuniarsono, "Analysis of Halal Certification for Micro and Small Business Actors from the Perspective of Maslahah Principles and Legal Certainty Theory," *Al-Adalah*, 2024, 401–426.

⁶⁷ Dedi Sunardi; Azri Bhari; Muhammad Najib bin Abd Wakil, "Legal Awareness of Micro and Small Enterprise Operators Regarding Halal Certification: A Maslaha Perspective," *IJTIHAD Jurnal Wacana Hukum Islam Dan Kemanusiaan*, no. July (2024), <https://doi.org/10.18326/ijthead.v24i1.23-45>.

governance requires a decision matrix, evidentiary clarity, public education, and institutional reliability.

Fiqh instruction in many schools continues to be predominantly oriented toward the transmission of classical jurisprudential knowledge and normative legal rulings,⁶⁸ often providing limited opportunities for students to examine the practical operation of Islamic law in contemporary society. This pedagogical orientation may limit the development of students legal reasoning and contextual understanding. Therefore, Fiqh education should be reoriented toward fostering students competencies in analyzing how Islamic legal principles are translated into modern regulatory frameworks, institutional practices, and public governance. *Halal* certification provides an authentic case through which students can examine the relationship between classical jurisprudential concepts and contemporary governance practices.

The model also implies that *halal* assessment requires institutional infrastructures capable of translating *maqāṣid*, certification standards, and audit procedures into public service. Wicaksono et al. showed that university-affiliated *halal* institutions can play an important role in disseminating *halal* information and supporting *halal* governance through academic and institutional capacity.⁶⁹ Nayu and Fahmi similarly emphasize the importance of synergy between *halal* centers and Islamic boarding schools in realizing a *halal* lifestyle, especially where religious and cultural legitimacy strengthens community acceptance of *halal* certification.⁷⁰ These studies indicate that the governance dimension of *istiḥālah* assessment is not limited to laboratory or administrative procedures. It also requires institutions capable of mediating between scholarly reasoning, certification practice, business actors, and public trust.

⁶⁸ Aj'matul Laili and Dhevin MQ Agus Puspita W, "Participatory Learning Using Baamboozle Media in the Fiqh Subject at MA Wahid Hasyim Balung," *Edupeedia : Jurnal Studi Pendidikan Dan Pedagogi Islam* 10, no. 1 (2025): 123–134, <https://doi.org/10.35316/edupedia.v10i1.7150>.

⁶⁹ Syafril Wicaksono, M Khoirul Hadi Alasy, and Elisa Dourothun Nafis El-adibah, "Maqashid Sharia Progressive: Anatomical and Transformational of Halal Institutions in UIN KHAS Jember Syafril," *El-Mashlahah* 13, no. 2 (2023), <https://doi.org/10.23971/el-mashlahah.v13i2.7370>.

⁷⁰ Agung Ali Fahmi Moh. Nayu, "Efforts to Realize a Halal Lifestyle in Madura Through The Synergy of Islamic Boarding Schools and The Halal Center of University Trunojoyo of Madura," *Trunojoyo Law Review (TLR)* 4, no. 2 (2022): 99–113.

For *halal* certification services, the model requires transparent, accessible, and accountable procedures. Zuhrah et al. showed that although public satisfaction with *halal* certification services in Indonesia is relatively high, expectations remain strong regarding simplicity, access to information, procedure, service time, and complaint handling.⁷¹ This reinforces the need for Layer 5 of the model, showing that a scientifically plausible and *uṣūlī*-grounded conclusion may still be weak as a public *halal* claim when the certification process is opaque, difficult to access, poorly documented, or institutionally fragmented. Therefore, governance evidence becomes part of the probative structure of *halal* assessment, not only an administrative afterthought.

For *halal* investigations, the priority is not simply to add more detection techniques, but to develop decision-ready standards of proof. Future studies should compare methods across matrices, clarify bounded non-detection, benchmark evidence packages, harmonize evidentiary thresholds across certification contexts, and examine how *halal* institutions can implement audit-ready frameworks in real certification systems. The deeper implication is that increasing technological complexity gradually shifts assessment from substantive transformation reasoning alone toward procedural, traceability-based, institutionally supported, and governance-sensitive reasoning. This shift protects *uṣūlī* authority by ensuring that factual and procedural claims entering the fatwa and certification process are explicit, testable, auditable, and publicly accountable.

CONCLUSION

In conclusion, this study reconstructs *istiḥālah al-najāsah* as a testable and auditable inferential framework for contemporary *halal* assessment. “Testable” does not mean that *istiḥālah* is converted into a purely empirical or laboratory concept. It remains a legal-*uṣūlī* category whose normative authority is grounded in scriptural reasoning, juristic method, and controlled application. Scientific verification and *halal* governance function only as supporting instruments for clarifying factual and procedural claims required in applying

⁷¹ Fatimah Zuhrah, “Halal Certification Service in Indonesia : Between Islamic Law Compliance and Satisfaction Improvement Keywords :,” *Al-Ihkam: Jurnal Hukum Dan Pranata Sosial* 20, no. 1 (2025): 253–83.

the ruling to complex modern products. The reconstruction yields two main contributions. First, it formulates an operational definition of *istiḥālah*, key distinctions between *istiḥālah* and *istiḥlāk* ‘ayn, *ṣifah*, and *athar*/residue, as well as the K1–K4 criteria for assessing whether a shift in legal status is justified. Second, this study proposes a layered methodology that connects normative criteria, verificatory evidence, and certification governance in a single auditable chain. This integration distinguishes the framework from approaches that treat *istiḥālah*, authentication, and certification solely as a problem of juristic classification, laboratory testing, and administrative procedure, respectively.

Application of the model to gelatin, vaccines, enzymes/biocatalysts, larvae for feed, and cultivated meat shows that increasing technological complexity shifts *halal* assessment from substantive transformation reasoning alone toward procedural, traceability-based, and governance-sensitive reasoning. Therefore, the Integrity of Science paradigm functions as a coherence framework. It preserves the final authority of *uṣūl*, gives science a bounded verificatory role, and requires governance evidence before public *halal* claims are accepted. Future studies should refine evidence packages, compare standards of proof across product types, and develop certification protocols that remain both technically accountable and *uṣūl*-grounded.

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AUTHOR CONTRIBUTIONS STATEMENT

Wawan Juandi developed the research idea, formulated the research problem, designed the conceptual-doctrinal framework, and led the reconstruction of *istiḥālah* of najasah through the Integrity of Science paradigm. Wawan Juandi also developed the five-layer methodological framework, including ontological mapping, normative boundary-setting, *uṣūl* formalization, scientific verification, and *halal* governance evaluation, and drafted the main sections of the manuscript. Khoirul Anwar contributed to the analysis of

uṣūl al-fiqh, *maqāṣid* orientation, and the distinction between *istiḥālah* and *istiḥlāk*, and supported the development of the *halal*-status decision matrix and governance framework. Ainun Najib contributed to the conceptualization of the Integrity of Science paradigm, particularly its ontological, epistemological, and axiological. All authors contributed to the interpretation of the findings, critically reviewed and revised the manuscript, approved the final version, and agreed to be accountable for the work.

CONFLICT OF INTEREST

The authors declare that there are no financial or non-financial conflicts of interest capable of influencing the outcomes or interpretation of this study. This work was written independently as the authors' scholarly contribution.

AI USAGE STATEMENT

The authors used artificial intelligence (AI)-based tools solely as auxiliary tools during the preparation of this manuscript, particularly for language editing, grammar checking, and improving the clarity and readability of the English language. AI tools were not used to generate the research findings, analysis, arguments, or conclusions. The authors retain full responsibility for the originality, accuracy, integrity, and scholarly content of the manuscript and have carefully reviewed and verified all AI-assisted text before submission.

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