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Gelatine source labelling in gelatine-containing products: A product analysis

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Abstract

Gelatine is a widely used ingredient in food and health supplement products, valued for its functional properties but controversial due to its animal source. For Muslim consumers, the halal status of gelatine depends on the source animal and slaughtering process, while for others, allergenicity and dietary restrictions (e.g., vegetarianism) require clear source disclosure. In Malaysia, the Food Regulations 1985 [Part VIII: Standards and particular labelling requirements for food 153(4)] mandate transparency in gelatine labelling, including the requirement to state the source animal. This study evaluated the extent of disclosure of gelatine sources among gelatine-containing products marketed in Malaysia. A total of 120 products across confectionery, health supplements, and bakery ingredient categories were assessed using a structured checklist. Findings showed that 78% of products declared the source of gelatine, whereas 22% listed only the generic term "gelatine" without specifying the source. Halal logos were displayed on 73% of the products, with variation observed across product categories. The presence of products without clear gelatine source information indicates gaps between regulatory expectations and marketplace practice, which may affect religious assurance, allergen risk awareness, and consumer confidence. Strengthening consistency in source declaration, supported by responsible industry practice and accessible verification mechanisms, may enhance transparency and support informed decision-making among consumers in Malaysia.

1. Introduction

Gelatine is one of the most versatile ingredients in the global food and pharmaceutical industries, widely used for its gelling, stabilising, emulsifying, and film-forming properties. It is commonly found in confectionery, dairy products, bakery items, desserts, beverages, and pharmaceutical capsules (Ahmad *et al.*, 2024; Rather *et al.*, 2022). Despite its functional importance, gelatine is also a sensitive ingredient due to its animal origin. Produced from the partial hydrolysis of collagen derived from animal skin, bones, and connective tissues, its use raises dietary, ethical, and religious concerns. For Muslim consumers, the permissibility of gelatine depends on the source animal and whether it was slaughtered in accordance with Islamic law (Uddin *et al.*, 2021). Similarly, vegetarians, vegans, and individuals with dietary restrictions or allergenic sensitivities also rely on clear disclosure of the source to make informed consumption decisions (Shokri *et al.*, 2025; Soedarini & Octavia, 2024). Beyond religious and dietary considerations, transparent labelling is central to building consumer trust in the food system. Wu *et al.* (2021) emphasise that consumers rely heavily on product assurances such as ingredient labels, certifications, and traceability information to evaluate food quality and integrity, particularly for credence attributes that cannot be visually verified.

In Malaysia, the regulation of gelatine in foods is governed by the Food Regulations 1985, which define, set quality requirements, and impose labelling obligations for edible gelatine. Regulation 153 defines edible gelatine as a clean and wholesome product obtained from collagenous animal materials, subject to limits on moisture and ash content, and permitted to contain specific preservatives. Crucially, the regulation also emphasises transparency in labelling. Subclause (3) mandates that no product may claim to contain edible gelatine unless the common name of the source animal is stated. At the same time, Subclause (4) requires that any food containing gelatine must display the declaration "contains edible gelatine from [state animal source]" in no less than 10-point lettering. These provisions underscore the importance of consumer rights, ensuring that individuals have accurate information about the source of gelatine used in foods (Food Regulation, 1985).

Nevertheless, concerns remain about the extent to which these requirements are followed in practice. In many cases, however, product labels list gelatine generically without clarifying its animal source, creating uncertainty as to whether it is derived from bovine, porcine, or other sources. This lack of specificity has raised concerns not only about halal assurance but also about consumer health. Studies have emphasised the importance of verifying the source of gelatine due to religious, cultural, and safety considerations (Hassan *et al.*, 2024).

Furthermore, gelatine has been reported to cause allergic reactions in sensitive individuals, with bovine, porcine, and fish gelatine implicated in hypersensitivity responses (Guyot *et al.*, 2025; Shokri *et al.*, 2025). These issues underscore the need for transparent labelling to safeguard both consumer trust and well-being.

Despite the regulatory framework in place, there remains a paucity of empirical research examining the actual state of gelatine labelling practices in Malaysia. Most existing studies have focused on the technical aspects of gelatine detection (e.g., DNA or protein-based authentication methods) or general halal certification frameworks, without systematically assessing market compliance with labelling regulations from a consumer-facing perspective (Razak *et al.*, 2025; Fathima *et al.*, 2024; Ng *et al.*, 2022; Zain & Zakaria, 2022). Furthermore, prior research has often centred on halal issues in broader food sectors or in pharmaceutical products, leaving a gap in understanding how gelatine-source disclosure specifically affects consumer trust, regulatory compliance, and public health risks. Recent works have called for more robust, market-wide investigations into labelling practices. For instance, Basuki *et al.* (2025) emphasised the importance of transparent gelatine labelling for halal authentication using molecular tools such as PCR and ELISA, while Tieu *et al.* (2024) highlighted the broader consequences of unclear ingredient labelling on religious and ethical consumption choices within public health systems. Accordingly, this study focuses on consumer-facing transparency of gelatine source labelling, rather than formal regulatory enforcement or compliance auditing. These findings underscore the need for systematic, regulation-aligned audits of gelatine-containing products in Malaysia's market.

Given these regulatory and consumer concerns, this study aims to evaluate the extent of labelling of gelatine sources in gelatine-containing products marketed in Malaysia. By systematically analysing the ingredient labels of gelatine-containing products across selected categories, this research provides evidence of compliance with existing regulations and highlights potential gaps in current labelling practices.

2. Materials and methods

2.1 Study design

This study employed a descriptive, cross-sectional product analysis to evaluate the transparency of gelatine source labelling in food products available in Malaysia. The analysis was guided primarily by the Food Regulations 1985, particularly Regulation 153, which requires that the animal source of edible gelatine be declared on product labels. To situate the findings within halal governance, the Manual Procedure for Malaysia Halal Certification (MPPHM) 2020 was also used as a regulatory reference. These frameworks collectively emphasise that the extent of labelling is central to both consumer protection and halal assurance.

2.2 Sampling of products

A total of 120 gelatine-containing products were purposively selected to capture variation across three major categories in which gelatine is widely utilised: confectionery, health supplements, and bakery ingredients. The sample size was determined to ensure adequate coverage across product categories and retail channels, while remaining feasible for detailed ingredient-level analysis. Similar sample sizes have been used in previous product-based and labelling studies to

assess trends in ingredient disclosure and compliance (Olatunde *et al.*, 2024; Maganja *et al.*, 2023).

The sampling frame was designed to reflect products commonly available to Malaysian consumers, encompassing both everyday consumption and specialised dietary use. Products were sourced through a combination of physical retail outlets, including supermarkets, pharmacies, and specialty stores in Kuala Lumpur, Selangor, and Kedah, as well as online marketplaces. This dual-channel sampling approach, conducted between March and May 2025, was adopted to reflect the increasing role of e-commerce alongside physical retail environments in shaping consumer access to food and supplement products (Moorthy *et al.*, 2025; KPMG, 2024). Kedah was included to enhance regional diversity beyond the Klang Valley and to capture product availability in a predominantly Muslim northern state.

Products were sampled using a purposive strategy based on predefined inclusion and exclusion criteria. Physical retail sampling was conducted across multiple outlet types, with products collected from several outlets representing different retail formats in each state. Sampling was not based on a predetermined number of outlets per state but was guided by product availability within each retail setting. Products were sampled across categories based on availability at each outlet, rather than equally across categories.

Inclusion criteria required that products (i) explicitly list "gelatine" in their ingredient declaration, (ii) be packaged consumer products intended for sale in the Malaysian market, and (iii) display legible labelling information. Products were excluded if they (i) did not clearly specify gelatine in the ingredient list (e.g., ambiguous terms such as "gelling agent" without clarification), (ii) were unpackaged or sold in bulk without full ingredient disclosure, or (iii) were non-consumer or industrial-use products. These criteria ensured that the sampled products were appropriate for evaluating ingredient disclosure and labelling practices from both consumer and regulatory perspectives.

Health supplements were restricted to capsule- and gummy-based vitamins, as these represent the most common forms in the Malaysian market and typically use gelatine as capsule shells or gelling agents. This categorisation was consistent with the MPPHM 2020, which specifies that health supplements generally fall under the Food and Beverages Scheme rather than the pharmaceutical scheme. This classification is significant, as it subjects such products to food-based halal certification requirements, including compliance with labelling laws and transparency of animal-derived ingredients. Thus, purposive sampling ensured that the selected products were not only relevant to consumer behaviour but also aligned with the regulatory framework governing halal certification.

2.3 Data collection

Data were collected using a structured checklist developed to capture key aspects of gelatine-related labelling and halal claims. Each product was examined for the disclosure of gelatine-related information, including the stated source of gelatine (e.g., bovine, porcine, fish, or unspecified) and the presence of halal logos or claims on the product label. Observations were recorded descriptively based on the information presented on product packaging and used as the basis for subsequent analysis of labelling practices among the sampled products.

2.4 Data analysis

Data obtained from the checklist were compiled and analysed descriptively using Microsoft Excel. Results were presented as frequencies and percentages to indicate patterns of gelatine source disclosure and halal-related labelling practices among the sampled products. Data collection and analysis were conducted by a single researcher using a predefined structured checklist; therefore, inter-rater reliability analysis was not applicable. This descriptive approach facilitated the identification of variations and areas of limited information disclosure in product labelling across the market.

3. Results and discussion

3.1 Disclosure of gelatine source

Of the 120 gelatine-containing products analysed, 78% (n = 93) clearly stated the source of gelatine on their labels, identifying it as bovine, porcine, fish, or other sources. Conversely, 22% (n = 27) did not disclose the animal source, merely listing "gelatine" as an ingredient. This lack of specificity creates ambiguity and challenges for consumers who depend on labelling transparency to make informed purchasing decisions. The distribution of gelatine source declaration and halal logo presence across product categories and formats is presented in Table 1.

For Muslim consumers, who require halal-assured products, undisclosed sources pose a direct risk of consuming impermissible ingredients. Although many consumers rely on the halal logo as a primary indicator of product permissibility, the lack of source disclosure remains a concern, particularly regarding allergenicity. Moreover, from a public health perspective, source ambiguity may endanger individuals with allergies or hypersensitivities to specific animal proteins. For example, individuals allergic to bovine or porcine gelatine require precise identification of the animal source to prevent adverse reactions (Schmidle *et al.*, 2021). Thus, the finding that over one-fifth of products do not declare the source of gelatine illustrates a gap in protecting both religious and health-based consumer needs.

The problem of an undeclared gelatine source identified in this study is consistent with broader patterns of food fraud in animal-derived products. Hassoun *et al.* (2020) highlight that mislabelling and species substitution remain among the most common authenticity issues across meat, milk, fish, and honey, reflecting both economic motivations and weak enforcement mechanisms. Recent empirical studies further illustrate this challenge in Kosovo. Mehmetkaj *et al.* (2025) reported that more than half of beef sausages contained undeclared animal species, predominantly poultry, even though they were marketed as beef products. Similarly, in South Africa, Tantuan and Viljoen (2021) found undeclared animal species in 27% of ready-to-eat meat products, including pork in products marketed as "no pork". Together, these findings demonstrate that non-disclosure of animal origin is not confined to gelatine but represents a global issue that undermines consumer trust, compromises religious and health-based dietary needs, and underscores the urgent need for more vigorous enforcement and more transparent labelling practices. Comparable challenges have been noted internationally regarding gelatine-related labelling expectations. Chang *et al.* (2023) show that although most countries follow Codex Alimentarius, the obligation to declare animal-derived ingredients varies significantly across countries. In some jurisdictions, derivatives such as fish gelatine are exempted from mandatory

disclosure, creating blind spots for consumers who may avoid specific animal sources for religious, ethical, or health reasons.

In Malaysia, the Food Regulations 1985 govern ingredient labelling, including requirements related to the declaration of gelatine sources. However, the presence of products with undeclared gelatine sources observed in this study suggests that regulatory provisions alone may not ensure consistent labelling practices in the marketplace. This highlights the importance of effective implementation and oversight to support consumer trust in food labelling information.

These findings also resonate with broader trust issues identified in global food systems. Wu *et al.* (2021) argue that consumer trust is not only related to the visible safety of products but also to the assurances conveyed through labelling, certification, and traceability mechanisms. In the absence of such assurances, consumers may perceive reduced credibility in both the product and the regulatory framework that governs it.

3.2 Halal certification status

Halal logos were displayed on 73% (n = 88) of the products assessed across confectionery, dietary supplements, and bakery ingredient categories (Table 1). For many Muslim consumers, the halal logo serves as a crucial indicator of product permissibility. However, in several instances, the halal logo appeared to function as the primary assurance marker despite limited disclosure of gelatine source on the ingredient list. Within the Malaysian halal certification context, this is noteworthy because products certified under the national system are governed by the MPPHM 2020, which expects certified products under the Food and Beverages Scheme to comply not only with halal assurance requirements but also with relevant national labelling regulations. In this study, at least one product carrying the JAKIM halal logo did not clearly disclose the animal source of gelatine, indicating that, in isolated instances, consumer-facing information may be limited even in certified products.

In addition to locally familiar halal logos, some products displayed halal certification marks issued by foreign certification bodies, reflecting the increasingly international nature of the food and supplement supply chain. In Malaysia, the presentation of halal-related descriptions and markings on product labels is guided by the Trade Descriptions (Certification and Marking of Halal) Order 2011, which identifies the competent authorities for halal certification and outlines expectations regarding the representation of halal status, including the use of recognised foreign certification. This study did not verify the legal status or recognition of individual foreign halal marks; observations were limited to what was presented on product packaging. Notably, in at least one instance, a product used the wording "halal/Muslim product" on its label without clear evidence of formal certification or identification of a certifying body. This situation is relevant to the Trade Descriptions (Definition of Halal) Order 2011, which treats halal and related expressions as legally meaningful descriptions that should not mislead or confuse Muslim consumers. While this study does not evaluate enforcement or legal compliance, the use of halal-related terminology without traceable certification may introduce uncertainty for consumers, particularly given the already limited ingredient-level transparency.

Table 1: Gelatine source declaration and halal logo presence across product categories

Items	Categories					Frequency (%) (N=120)
	Confectionery Gummy (N=40)	Marshmallow (N=30)	Health Supplement Gummy (N=11)	Capsule (N=19)	Bakery Gelatine Powder (N=20)	
a) Gelatine Source Declaration						
Declared	27	23	9	18	16	93 (78%)
Not declared	13	7	2	1	4	27 (22%)
b) Halal Logo Presence						
Present	36	27	6	10	9	88* (73%)
Absence	4	3	5	9	11	32 (27%)

*Note: Of the 88 products displaying a halal logo, 35 (40%) carried a JAKIM-issued halal logo.

Meanwhile, 27% (n = 32) of products did not display any halal logo. This pattern was more evident among certain health supplement products and gelatine powder items, indicating that some product categories are more likely to obtain halal certification than others. Although halal certification in Malaysia is generally voluntary unless a halal claim is made, the absence of a halal logo provides less assurance to Muslim consumers than that offered by formally certified products.

Overall, the findings indicate that while halal certification is widely adopted among gelatine-containing products in the Malaysian market, variability remains in how halal-related information is presented. Strengthening alignment between halal claims, regulatory expectations, and the transparent declaration of gelatine source may better support informed, confident consumer decision-making.

3.3 Implications for consumer trust and public health

The study underscores the intersection of food safety, religious compliance, and consumer rights. For Muslim consumers, undisclosed gelatine sources not only present a religious concern but also expose them to potential allergenicity risks. Evidence indicates that gelatine can act as a clinically significant allergen, with fish-derived gelatine and bovine/porcine gelatine reported to cause hypersensitivity reactions and, in some cases, anaphylaxis, particularly among sensitised individuals (Shokri *et al.*, 2025; Soedarini *et al.*, 2024; Ueno *et al.*, 2020). Therefore, incomplete labelling not only erodes consumer trust but also carries tangible risks for public health.

However, labelling effectiveness also depends on consumer awareness and comprehension. Mehanna *et al.* (2024) found that while most consumers in Egypt expressed favourable attitudes toward food labelling, more than half demonstrated low awareness of label content, with many failing to read ingredient lists due to barriers such as small font size, lack of time, or mistrust of information. These findings highlight that, even when labelling is present, its public health benefits are limited if consumers cannot easily access or trust the information provided.

Furthermore, consumers with dietary restrictions, such as vegetarians and vegans, are also disadvantaged by incomplete labelling. The lack of source information prevents these groups from making ethically consistent food choices. Recent evidence also shows that precautionary allergen labelling (PAL), widely

used to indicate possible cross-contamination, is applied inconsistently across countries and often confuses rather than reassures consumers (Turner *et al.*, 2024). This demonstrates that the issue extends beyond halal considerations into broader questions of consumer rights, risk communication, and market accountability.

3.4 Policy and industry considerations

The findings of this study indicate that, while labelling practices in Malaysia generally demonstrate high transparency, inconsistencies persist in the disclosure of gelatine sources. Products that do not clearly specify their gelatine source create uncertainty for consumers who rely on this information for religious, ethical, or health-related decision-making.

Strengthening accountability mechanisms may offer a constructive pathway forward. Rather than focusing solely on punitive enforcement, enhancing transparency and verifiable information systems could empower consumers and encourage responsible industry practice. In line with global developments, digital solutions such as QR-coded product information or blockchain-enabled traceability platforms can complement existing labelling by allowing consumers to access authenticated data beyond what is printed on packaging. Evidence shows that such systems can enhance supply chain integrity, support verification of halal-sensitive processes, and improve consumer confidence by ensuring that information is traceable, immutable, and easily accessible (Ahamed *et al.*, 2024; Susanty *et al.*, 2024). This approach aligns with broader findings demonstrating that validated traceability mechanisms and credible certification information significantly strengthen consumer trust in complex food supply chains (Wu *et al.*, 2021).

For these systems to be meaningful, QR or blockchain access may provide: (i) declared gelatine source or animal origin; (ii) country of manufacture or processing; (iii) certification or verification status, where applicable; and (iv) relevant audit or verification history. Providing structured and verifiable information helps address information asymmetry and supports more informed purchasing decisions. Industry stakeholders play a central role in achieving progress in this area. Manufacturers, importers, and retailers share a responsibility to ensure that labelling is transparent, accurate, and meaningful. An explicit declaration of the gelatine source, responsible use of claims, and a willingness to adopt more transparent information systems would contribute substantially to consumer trust and market integrity.

Complementary consumer education initiatives may also encourage the public to engage more actively with labelling and available verification tools.

In addition to improving labelling clarity, several contextual factors may also affect the overall effectiveness of information governance in gelatine-related product labelling. These include potential resource limitations that may constrain routine oversight activities, the limited scope of systematic post-market monitoring to ensure ongoing label accuracy, and the possible misuse or ambiguous use of assurance-related wording or symbols without clear verification or traceability. While this study does not evaluate enforcement mechanisms, acknowledging these realities highlights the importance of regulatory capacity, continuous marketplace surveillance, and the safeguarding of credible product information to sustain consumer confidence and informed decision-making.

In summary, while the overall picture of gelatine labelling in Malaysia is generally positive, there are still important areas for improvement. Moving forward, coordinated efforts among policymakers, industry players, and consumers will be essential to clarify information, strengthen trust, and safeguard consumer rights and public health.

4. Conclusion

This study shows that while gelatine labelling in Malaysia generally demonstrates high transparency, inconsistencies in declaring the gelatine source may create uncertainty for consumers with religious, ethical, or health-related concerns. Enhancing industry accountability, improving clarity of ingredient disclosure, and supporting access to verifiable product information could help strengthen consumer confidence and public health protection. From a practical perspective, this suggests that regulators may consider strengthening post-market monitoring and progressively supporting digital verification mechanisms (such as QR codes for access to information); manufacturers and importers should ensure more explicit, more consistent declarations of gelatine source; and consumers may benefit from greater awareness and engagement with ingredient and verification information. This study is limited by its focus on selected categories and regions and by its reliance on the accuracy of information declared on product labels. Future research should include broader nationwide sampling, independent verification of label claims through regulatory records or certification databases, and exploration of consumers' understanding of labelling and digital verification tools to inform policy and industry practice better.

5. Conflict of interest

The authors declare no competing interests.

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