

## Indonesian Halal Pharmaceutical: Challenges and Market Opportunities

Yedi Herdiana\*<sup>1</sup>, Taofik Rusdiana<sup>2</sup>

<sup>1</sup>Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmacy,  
Universitas Padjadjaran, Sumedang 45363, Indonesia  
email: y.herdiana@unpad.ac.id

Submitted :05/01/2022, Revised :25/01/2022, Accepted :25/01/2022, Published :07/02/2022

### Abstract

The halal food market has grown worldwide, including the shift from food to other products, including halal pharmaceuticals (HPC). The growth followed by the abundance of literature has been on halal, especially pharmaceuticals. Muslim consumers need halal certification (HCT) on medicines to ensure that they do not consume or use products or services that are not halal. The government must guarantee to Muslim consumers that consumer goods or services circulating in the community are truly halal. The halal label itself will increase consumer confidence, expand the reach of the global halal food market, and increase the marketability of products in the market. Indonesia, which is predominantly Muslim, is considered a long extension in implementing HP until 2034. Different attitudes are shown by several countries with large non-Muslim majority populations but are very concerned about the implementation of HPC. The accelerated growth of knowledge of halalness, impact social media, will push the industry to implement HPC. In this review, we will discuss critical players in implementing HPC, including the ingredients that have been widely used but still doubt their halalness and what they are used for in the pharmaceutical industry. This knowledge is essential for industry and researchers to build safer alternative materials.

**Keywords:** Halal, Indonesia, Muslim, Halal Pharmaceutical, Halal Certification.

### 1. Introduction

There are around 1.8 billion Muslims globally (1); Indonesia is the country with the largest Muslim population in the world (2). The accelerated growth of Muslim awareness in the world will accelerate the recognition of halal products as a new benchmark for safety and quality assurance (3–5). Although at the beginning of the development of the halal industry, most of the attention was paid to halal food, it has penetrated other sectors, including pharmaceutical drugs and medical devices (Majdina 2021). Halal drugs contain halal ingredients and are produced according to

Islamic law (6–10). Therefore, medicines are increasingly a health need. This condition will encourage the obligation of HCT for the pharmaceutical industry (6,11–13). Many of the obstacles faced can be seen from the low number of halal-certified products, which is 0.5% of the total halal-certified products. The situation can be ironic; simultaneously, countries with small non-Muslim populations are trying to build a halal industry, such as Japan (14–16), South Korea (17,18), Australia (16,19), and others. They have released several drugs with HCT. However, foreign companies wishing to market their products in

\*Corresponding author,  
e-mail : [y.herdiana@unpad.ac.id](mailto:y.herdiana@unpad.ac.id) (Y. Herdiana)

Indonesia must first apply for a halal certificate unless they have a halal certificate as long as the Halal Certificate issued by a foreign halal institution has collaborated on recognition (20). The potential and opportunities of the global halal industry in the future are enormous and promising (21).

There is no conflict between the principles of halal and technological developments. The application of halal standards in the meat industry has improved the quality of the modern meat industry (22). It turns out that halal standards take science and animal welfare into account (23). Implementation of HTC increasing revenue and performance of business plant (24,25).

A medicine comprises an active component and an excipient (6). The components come from several origins - animal, plant, or synthetic. Haram / forbidden Muslims, as indicated in the Qur'an, are several sources (pigs, dead animals, or blood) (26). Therefore, implementing the halal-tayyib standard is a right, and an obligation for Muslims, which will ensure that the medicinal products consumed are guaranteed in terms of Sharia and quality in health care (8). Furthermore, Muslim consumers are entitled to make informed treatment choices (3).

There are essential players in implementing halal standards, namely: the government, the pharmaceutical industry, health workers, and consumers. Every country has an organization that examines relevant problems and regulates HTC and the "Guidelines for Halal Certification." (6,13). Products or certified Halal demands that the supply chain or business processes align with Islamic law and values (27,28). The problem arises because of intense pressure from Muslim consumers and the perception of the negative sentiment behind the business in the current certification (29).

There will be competition for halal information between official and non-government sources in the form of many studies in the digital world. If these conditions are not controlled, it will

confuse information in the community (20). Halal certificate application scheme will provide various advantages. Indonesia decided to suspend the mandatory HTC for drugs. Therefore, the Convention and Pharmaceutical Inspection Co-operation Scheme (PIC/S) becomes more basic before certified halal (29).

In this review, we will discuss critical players in implementing HPC, including the ingredients that have been widely used but still doubt their halalness and what they are used for in the pharmaceutical industry. This knowledge is essential for industry and researchers to build safer alternative materials.

## **2. Methods**

The data were collected from primary and secondary sources, namely, the regulation and standard from the authority's bodies in Indonesia, academic journals, and reference books related to Islamic studies. The documents, related themes, and classification were identified in assisting the determination of halal status for the ingredients' evaluation process. The research shows that Indonesia's Halal Law has a significant intermestic factor by showing interrelationship influence between domestic and international dynamics. Furthermore, it is indicated that the lack of clarity of Indonesia's HTC process (e.g., in the absence of tariff regulation or lack of dissemination) immensely affects international trade and businesses in many countries.

## **3. Halal-tayyib Principle**

### **3.1 Definition of Halal-Tayyib**

Islam is not only a religion but also a way of life. Allah Subhanahu Wa Ta'ala commands to consume the good and Halal (Qur'anul Karim, 16:114; 23:51). His prophet, Muhammad Shollallohu Alayhi Wa Sallam, explained to avoid consuming ambiguous things, whether halal or haram (Imam Nawawi, Bukhari, and Muslim hadith). The word halal is mentioned in the

Qur'an to describe an action, object, or behavior in which an individual has the freedom to choose, and the practice does not bring any reward or punishment. Compliance with commands differs between individuals depending on religiosity (30).

In Indonesia, product, or service certification criteria: (1). Declared halal following Islamic law (Law No. 33 of 2014, Guarantee of Halal Products), (2) Meets the quality requirements, is safe and efficacious (UU No 36 of 2009, Health), and is registered (has a distribution permit number) at the POM RI Agency. (3) To comply with the Fatwa of the Indonesian Ulema Council Number 30 of 2013 concerning Drugs and Treatment. (4) Not made from mixing with unclean or unclean goods (haram and/or najis free materials). (5) At the time of production, storage, transportation, and distribution are not contaminated by haram or unclean materials (haram or najis free facility and process) (31).

The HTC covers all processes from the supply chain or processes to administration (32). In addition, halal status is also determined by knowledge of Tayyib (pure) and Khabith (impure) and their effects on food safety (8).

The concept of Tayyib relates to the process that food goes through to ensure two goals: maximum cleanliness and minimum contamination without potential toxins, najis materials (najis rituals), and Khabith (unclean) (8).

The findings of this study explain four critical points of difference, namely:

- a. Material classification is based on the origin of the material, and safety aspects can help determine halal status.

Halal is explained as halal goods such as food that Muslims must choose except in an emergency, and halal food must be in good and healthy condition. In the current context, tayyib can be interpreted as good quality, reliable, hygienic, safe, healthy, and useful (33).

- b. Processing and safety aspects are included in the manufacturing protocol that determines the halal status. However, suppose a product is contaminated with prohibited materials such as dirt (najs) or not halal additives. In that case, It might then be classified as syubhah or critical products which require additional assessment (33).
- c. Ethical and responsible officers need to examine and evaluate all sources of origin and procedures. Although ethics and responsibility are not emphasized, they are also part of the process towards clean and pure halal products in creating a sense of comfort to fulfill the main goal of halal-tayyib (33).

There is no problem if the material used is safe and its effectiveness is proven. Still, the concern is on the use of restricted or prohibited materials such as heavy metals. In addition, there were frequent reports on product violations related to the prohibited ingredients found in the pharmaceutical that impacted safety; thus, there is the need to obtain information from the regulation and manufacturers' compliance perspectives (33). The data were collected from primary and secondary sources, namely, the regulation and standard from the authority's bodies in Indonesia, academic journals, and reference books related to Islamic studies. The documents, related themes, and classification were identified in assisting the determination of halal status for the ingredients' evaluation process. The research shows that Indonesia's Halal Law has a significant intermestic factor by showing interrelationship influence between domestic and international dynamics. Furthermore, it is indicated that the lack of clarity of Indonesia's HTC process (e.g., in the absence of tariff regulation or lack of dissemination) immensely affects international trade and businesses in many countries.

### **3.2 The Benefits Halal-Tayyib Result**

Research on halal has not been matched by the availability of literature on halal production. The aspects studied are upstream of the halal product chain, halal production, and community readiness and perception. McDonald's and Nestle have extensively introduced HTC into their operations and production. This is due to constant consumer pressures and severe food sector competitiveness. (25,34).

Many studies show HTC with improved internal and external business performance,

such as in New Zealand and Spain (25). The benefit of halal to business performance: (a) Market share expansion (35–37) (b) Increase number of customers (35,36). (c) Increase revenue (35,36,38). (d) Logistics performance (35) (e) Better management (37) (f) Enhanced consumer confidence (37) (g) Impact consumer decision (37,39). (h) Consumer retention (40).

Food and medicine are needed to live and grow (8). There is an impression that there is no rational link to the health benefits of halal food, as non-Muslims who eat non-Halal foods appear to be healthier and live longer. Halal product is for Muslims a meaningful connection with the Creator and a sense of pleasure and achievement. Alignment of action with Spirituality leads to peace of mind. Consumption that is not halal will cause anxiety that will impact the body, such as a negative impact on metabolism and immune system deficiency will develop in disease. Lifestyle and psychological stress have a significant impact on illness development. The concept of tayyib will have a positive impact on animal welfare. Halal foods and drinks are highly significant in boosting tourism for Muslim tourism locations (41). Due to safety and cleanliness concerns, halal products may attract non-Muslim customers (42).

### **4. Halalness Problem in Pharmaceutical**

Indonesia also has a large and free halal market, the rules are clear, but the implementation can be said to be weak (41). Most of the range of halal products in the Indonesian market is still produced, and non-Muslim entrepreneurs dominate marketing. In addition, raw materials are still controlled by countries, which do not necessarily ratify HTC. Here are the things

that are a problem in the implementation of halal.

#### 4.1 Vaccines

Vaccines contain active components or antigens (immunogens), which are given to stimulate the immune system to produce prevention, improvement, or therapy of disease or infection. Vaccines for registered human use with a) Microorganisms inactivated by chemical/physical means retaining appropriate immunogenic properties; b) Live microorganisms that have been selected for their attenuation while retaining their immunogenic properties; c) Antigens extracted from microorganisms, secreted by them or produced by recombinant DNA technology; or d) Antigen produced by

chemical synthesis in vitro. Antigens may be administered in their original state, truncated, or modified, after introduction or mutation, detoxified by chemical or physical means, and/or aggregated, polymerized, or conjugated to a carrier to enhance immunogenicity. The implementation of HTC for vaccines is strictly limited by Sharia law and fatwas (43). Vaccines are part of pharmaceutical products, which are developed using halal ingredients, which can replace the use of non-halal ingredients or animal products and their derivatives. As in Malaysia, conservative Muslims sometimes resist inoculation due to concerns that some vaccines come from pork or pork, which Muslims are prohibited from consuming (43).

Table 1 Halal Standard in Indonesia and Malaysia

No	Standard	Indonesia	Malaysia
1	Not contain prohibited animal (and its derivatives)	Not containing pork or ingredients that are derived from pigs.	It does not contain any parts or products or animals that are non-halal according to Islamic law.
2	Slaughtered animal (and its derivatives)	All meat must come from animals that are slaughtered according to Islamic procedures.	Parts or products of animals that are not slaughtered according to Islamic law.
3	Not poisonous or hazardous, Do not intoxicate	Not containing wine and its derivatives.	Safe for consumption, non-poisonous, non-intoxicant, or non-hazardous to health.
4	Not contaminated with najis	Not containing other ingredients that are banned or classified as unclean: substance derived from dirt, etc	It was not manufactured or processed using equipment contaminated with najis, according to Shariah Law.
5	Not contained with najis	Not containing other ingredients that are banned or classified as unclean: carcasses, blood,	Does not contain najis according to Islamic law.

6	Do not contain part of human being	It did not contain other banned ingredients or classified as unclean: substance derived from human organs, dirt, etc.	It does not contain any human parts or derivatives that are not permitted according to Islamic law.
7	Process nor mixes with prohibited items	All storage, sale, processing, management, and public means of transportation for the Halal products cannot be used for pigs or other illicit goods.	During the preparation, processing, handling, packaging, and distribution of food, it is physically separated from any other food that does not meet the requirements stated in the law or any other things that have been considered as najis by Shariah law (6).

In table 1, there is no difference in halal standards between Indonesia and Malaysia. However, the implementation can be different in the antimeningococcal conjugate vaccine, which has been certified halal by the Indonesian HTC authority (<http://www.id.novartis.com/news-detail-vc2010.html>) but not by its Malaysian partner. The technical capacity of this regulatory body needs to be continuously improved and aligned to meet the anticipated increase in applications for halal drug approval. In addition, much research is developing on tests for DNA and protein sources, which will make it easier to distinguish HPC sources. (12).

Today, the occurrence of the above differences is very easily known to the public from various sources. Although, as a result, health authorities are concerned that there will be parents who may refuse the national immunization program for their children or the covid 19 vaccination program, they are concerned that the vaccine used may violate some strict religious rules (43).

#### 4.2 Gelatin

Based on research, world production is around 516.8 thousand Metric Tons per

year, with 45 percent coming from pigskin, 29.4 percent from cow skin, 23.1 percent from bone, and 1.5 percent from other sources. Eighty percent of gelatin in Europe comes from pork-skin. The similarity of pigs' biological systems and organ systems with systems in humans reaches 80-90 percent, both anatomically and functionally.

Gelatin is the most popular biopolymer in the manufacture of soft and hard capsules. Gelatin is used as a gelling agent, stabilizer, thickener, emulsifier, and film former. Pork skin, cow skin, and beef bones are the most common sources of gelatin. However, mammalian gelatin is rejected by some consumers due to social, cultural, religious, or health-related concerns (44). Public concern arose after a study emerged showing that of from 24 samples of hard capsules and soft capsules, 12 samples contained pig DNA in both PCR methods (45).

#### 4.3 Ethanol

Some drugs are categorized as 'haram,' especially suspensions and cough syrups which usually contain alcohol and are not used in an emergency. Pharmaceutical



products or drug-containing alcohol will then be categorized as “haram.” Other forms of alcohol, such as isopropyl alcohol, butanol, or cetyl alcohol, are not considered haram. Topical drugs containing alcohol are considered halal if used externally (not for oral use) because alcohol can be lost through evaporation.

Drugs containing alcohol will be considered Halal if no suitable alternative is available. So seek treatment, but do not use haram drugs (Hadith narrated by Bukhari). Alcohol is haram. Prophet Muhammad said, “Wine is a disease, which will not reduce disease, because it is itself a disease.”

#### **4.4 Enzymes**

The global enzyme market was valued at \$8,636.8 million in 2019 and is projected to reach \$14,507.6 million in 2027, with a CAGR of 6.5% from 2020 to 2027. This has led to the growth of Halal enzyme production for several industries producing various types of detergents, food, beverage, textiles, biofuels, animal feed, etc. Several enzymes have been widely used to produce various food products due to their advantages during processing, such as improved quality and reduced processing time and costs. Therefore, it is necessary to trace the components that can threaten the halal guarantee. As far as many Muslims are concerned about the use of enzymes in food and food products, halal authorities have tried to state the halal status of enzymes and their origins. Following the latest advances in biotechnology and the approved benefits of microbial-derived enzymes, fermentation has become the primary mode of production. Therefore, it is important to evaluate the culture media, substrates, components, and treatments to assess non-compliance with Halal

assurance. In addition, some enzymes are produced by genetically modified microorganisms, and further investigation is needed to identify their utilization by the halal food industry if non-Halal animal genes are used. As part of the halal assurance, the halal status of additives and processing aids must be clarified to ensure that the halal requirements are met. Halal-approved materials and processing aids produced with appropriate techniques confirm that the enzymes produced are truly Halal (46).

Drivers of the worldwide enzyme market include biotechnology, pharmaceutical, food & drink, and bio-fuel industry. The expansion of enzyme markets is projected to be driven by enzymes in the pharmaceutical sector that synthesize medicinal substances to manufacture active pharmaceutical ingredients (APIs). Furthermore, greater use of enzymes is consistent with developing several chronic illnesses such as digestive and inflammatory disorders.

The market is split according to type into proteases, carbohydrases, lipases, polymerases, nucleases, etc. Based on its source, microorganisms, plants, and animals have a global enzyme market. Enzyme molecules can seldom be synthesized by chemical means, making it simpler to get them from living creatures, such as plants and animals. Due to their wide availability and inexpensive manufacturing costs, microorganisms constitute the major source of enzymes. Due to its massive production, development, and general use of genetically modified microorganisms, the microorganism-derived enzyme segment will dominate in 2019. Purification of microbe enzymes compared with plant enzymes is, nevertheless, difficult.

The use of microbial enzymes is more in line with halal food production because it eliminates enzymes derived from animals. Sources of animal enzymes are of concern to halal consumers. For example, cheese and whey produced using animal enzymes are harams if the source is haram animals. (34).

## **5. The key player in the halal implementation**

### **5.1 Government**

The government, in this case, the Ministry of Health and the Halal Product Assurance Agency (BPJPH), along with the Food, Drug, and Cosmetics Study Institute of the Indonesian Ulema Council (LPPOM MUI), need to work together to encourage the pharmaceutical industry to obtain halal certificates.

Before 2014, HTC and labeling were optional or voluntary, and now they are mandatory. Halal regulations were issued under Law Number 33 of 2014, or precisely since its promulgation on October 17, 2019. The Halal Product Assurance Act was drafted in 2006. The applicable rules are that products that enter, circulate, and trade in Indonesian territory must be certified halal (article 4). Business fields with halal certificates must include Halal Labels on their products (articles 25 and 38). Likewise, those who produce products from non-halal goods must also include information that is not halal (article 26). There are tiered administrative sanctions for those who violate these provisions. This law provides guidelines for business actors to apply for halal certificates and other technical matters. In addition, there are derivative regulations, namely Government Regulation Number 31 of 2019 and Regulation of the Minister of Religion Number 26 of 2019. Unfortunately, the

Ministry of Finance has not yet issued a regulation on certification rates. The absence of this regulation means that the certification process cannot be carried out in its entirety. The Minister of Religion then issued a Decree of the Minister of Religion Number 982 of 2019, which returned the process and rates to the previous certification mechanism, namely according to the rules imposed by the Institute for the Study of Food, Drugs. And Cosmetics of the Indonesian Ulema Council (LPPOM MUI). Moreover, the Omnibus Law Bill is currently being rolled out, which mentions the Halal Product Guarantee Act (21).

There is a reduction in HTC from 1,891 medicinal products in 2019 to 830 medicinal products in 2020. Article 141 paragraph 1 of the PP states a phased-in obligation to be certified halal for drugs, with the longest period being 2034 for hard drug products. The long transition period is suspected of triggering the decline in HTCs of medicinal products in 2020.

This is because the number of halal-certified pharmaceutical products (drugs and vaccines) is only 2,586 products, while those recorded at BPOM as of March 24 are 19,483. This means that the opportunity for HCT is still very wide.

The halal drug market in Indonesia is also increasingly open, along with the increasing number of Sharia Hospitals in Indonesia, prioritizing the use of halal-certified pharmaceutical products. Currently, there are around 500 hospitals in Indonesia that are members of the Islamic Health Ulema Council (MUKISI), 22 hospitals have been certified Sharia (18 Islamic Hospitals and 4 Government Hospitals), and 65 hospitals are still in the process of mentoring to become Sharia Hospitals (2).



The government also promised to pay for half of the costs involved in upgrading processing facilities to make the meat industry compliant with halal standards. The move made by the Prime Minister is followed by many activities promoting halal in Japan. One, in particular, is through halal tourism (15). They believe the ethical and obedience values of Japanese that generally are missing even among Muslims could be maximized in the production of halal for the benefit of the state. In short, Japan could excel in the halal industry only when the people could see the importance of halal to the state (15). The Australian Food and Industry Council considers third-party certification of this kind ‘very common,’ and groups halal food certification with kosher food certification and the National Heart Foundation’s ‘Tick’ logo (Australian Food and Grocery Council n.d.). As a typical form of food certification, the halal variety also has comparable economic benefits, not least of which is its potential to open doors for local Australian foodstuff manufacturers to major export markets in predominantly Islamic countries, an industry the Australian Department of Agriculture valued at AUD 31.8 billion in 2012–2013 (Australian Government, Department of Agriculture 2014) (47).

## 5.2 Pharmaceutical Industry

The HPC industry is a pharmaceutical industry that, in its planning, development, operation, production, marketing, distribution, storage, supply chain, and development, always considers the regulation of halal product guarantees according to Islamic Sharia (48,49).

Pharmaceutical Industry challenge in implementing halal: (1) The conflict between the reluctance to carry out HTC

and consumer demand for HPC products. (2) The implementation of UUJPH has not yet been implemented because the implementing regulations have not been established and enforced, and BPJPH is not yet operational. (3) The difference between HTC carried out by the Indonesian Ulema Council (as mandated by Article 60 UUJPH) and HTC by BPJPH (Article 5 paragraph 3, Article 6-point c and Chapter V) (4) Materials are still imported from various countries. (6) Halal Supervisors in the Pharmaceutical Industry need to be retrained following the transfer of authority for HTC from MUI to BPJPH and the existence of a Halal Supervisor certification obligation. (7) Selection of production, storage, and supply chain facilities free from products that are not halal or haram (31).

Implementing halal labeling will disrupt the domestic distribution system of medications resulting from disease prevention programs, as virtually all active components of currently circulated imported medications do not have halal approvals. One of the main reasons for the slow pace of HTC for the pharmaceutical industry is that 95% of raw materials for medicines are imported from abroad, namely from China, India, America, and Europe. The Ministry of Health has set a target to reduce imported raw materials to 70%. However, this opportunity must be maximized (50,51).

HPC production guide (1) All materials used in production (starting materials, excipient, additives, auxiliary materials, and packaging materials) must be halal, not derived and/or derived from haram or unclean materials. (2) Materials or products are not mixed or contaminated with unclean or unclean materials originating from additives, auxiliary materials, and

production facilities. (3) Production facilities are only used to produce halal ingredients or products equipped with ways to prevent contamination of haram materials. (4) Facilities for storage and transportation of materials and products are not mixed with haram and unclean materials (Halal Supply Chains) (31).

### 5.3 HealthCare Service

Medicines have become a necessity now to maintain health (13,52). Drugs circulating in Indonesia can be classified as OTC, Potent drug; Pharmacist Mandatory Medicines; and Psychotropic Drugs and Narcotics. OTC drugs can be used without a doctor's prescription, also known as over-

the-counter drugs (53). There are usually three players in this context, doctors, pharmacists, and consumers (6,13,52). Consumers usually cannot judge which drug is right for them, then the doctor's role to choose the most suitable drug for his patient by keeping in mind the patient's religious beliefs. However, most patients are not aware of these ingredients in their medications. Therefore, clinicians and pharmacists must be proactive and allow patients to make informed decisions about their medical care. In addition, the public should be more educated about the halalness of drugs. Pharmacists and doctors have an important role in preparing HPC products (54)

### 5.4 Costumers

The existence of a halal certificate can have a positive impact on producers and consumers. Here are some benefits of HTC: (1) It provides peace of mind because a product is safe for consumption or use. (2) Halal assurance from strict HTC procedures (55,56).

Halal is now a lifestyle, which is not limited only to Muslims (57,58). HTC provides the benefits and quality it offers to consumers. Recently, the halal industry offered great

opportunities and benefits to industry players worldwide, including non-Muslim countries (33). Although the market is large, the credibility of the halal label is now being questioned. In 2013, pig DNA was found in halal food in the UK (59). This incident makes consumers skeptical of the halal label. The controversy crisis occurred in 2014 when a laboratory test report was leaked. It showed that two Cadbury Dairy Milk products contained porcine DNA (60)

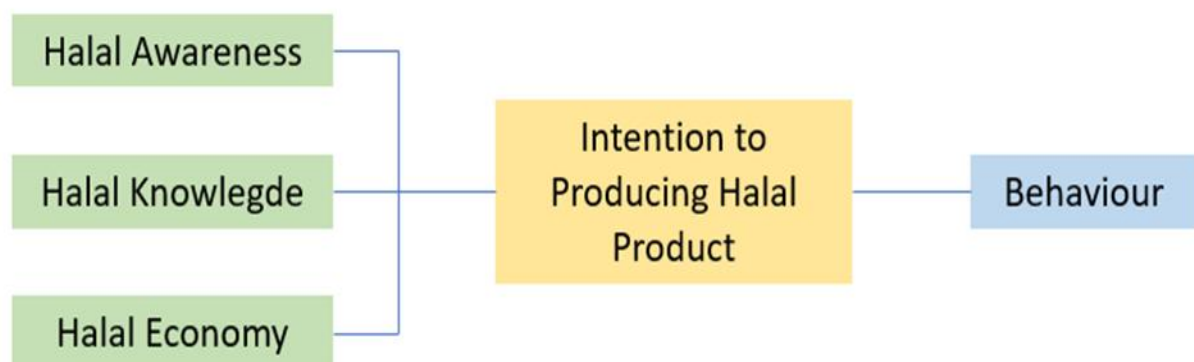


Fig 1 Factor-factor influencing halal behavior

Some factors influencing consumers to choose halal products are consumer knowledge about halal and consumer religiosity (halal awareness). Religiosity has more influence on behavior than halal knowledge. Economy factor still plays as a decision consideration to buy the halal product (Fig 1). As a marketer or producer,

## **6. Media social as Tools Public Awareness**

Several components in the individual factors included cognitive and affective domains in identifying their effects on one's behavior. On the other hand, environmental factors referred to the influence of other people's behavior and nonhuman factors such as printed and electronic media (62). Internet social media is one of the agents of socialization that acts as a tool in mass communication because Internet social media can reach a wider and relatively larger audience and heterogeneous (63,64). Therefore, media, both online and offline, play an important role in providing education and creating awareness of halal among Muslim consumers. Social media is a communication medium and information that can disseminate information massively and be accessed by the general public (65). Indonesia's lack of readiness to compete in the halal product market is due to the lack of public awareness of the importance of halal products (66,67). The lack of knowledge and understanding of halal products is what causes it. This causes a lack of public awareness of halal food. If awareness and public awareness of halal food products are low, producers will not get HTC. However, if people's awareness is high, they will buy halal-certified products, and producers will compete to register their products to get halal certificates (65). Social media are applications that enable people to interact with each other and build social networks that increase social capital. Social media can distribute their messages to thousands of people, encouraging them to build strong connections and firm loyalty

HTC is a branding strategy for those who can see opportunities (34). Cultural influences determine the applicability and importance of quality signals. The concept of halal itself is now accepted as a quality system. Halal is no longer just a matter of religion but has become a global symbol for quality assurance (25) (61).

(68). The digital world makes no boundaries; what happens in other countries is easy to know and share with the community quickly. Therefore, halal awareness in another country will grow upside by side, as a Muslim country.

## **7. Perspective**

The halal concept will become a global symbol that is synonymous with quality in the mainstream market. The demand for halal products is related to the belief that halal food is healthier, safer, and tastier, which appeals to Muslim and non-Muslim consumers. Islamic rules and principles, referred to as Sharia, significantly influence their needs and behavior (69).

Countries with fewer Muslim populations, namely Thailand, UK, and Australia, can seize opportunities for halal food in the global market. Countries such as Thailand, Australia, UK, and Japan have implemented commercial agriculture in their supply management to support their halal food production. In addition, awareness to consume halal food also comes from non-Muslims because of the safety and freshness of the food (3).

Islam is a simple and easy religion to follow. If there is an emergency or saving lives, the use of 'haram' drugs is allowed. However, we need guidelines when referring to emergency or lifesaving situations. Actually, 'haram' drugs can be avoided because only a small part of the total drug through research. Based on the above scenario, awareness about 'halal' drugs should be developed among all components. The government is the main key in implementing halal drugs. The

awareness of Muslims will force changes and demand 'halal' references to certain medicines for the community. Furthermore, universities should highlight knowledge of 'halal' drugs in future academic curricula (70).

Muslims will be compelled to fulfill their desires as Fard' Kifaya, where some producers must produce halal products. People are worried that many illegal products are sold in the market containing pork DNA (7). Behavioral intention to buy halal food has a significant direct positive relationship with religiosity, attitudes, subjective norms, and perceived behavioral control (71).

## 8. Conclusion

Halal is not a special product produced only for Muslims but for all consumers around the world. The main purpose of the halal specification is to protect the welfare of consumers through the production of high-quality products. There is no contradiction between technological progress and halal requirements. The rapid growth of social media has become a way of promoting halal drugs and growing media for understanding the needs of halal products. The slow pace of halal compliance requirements will also be driven by the awareness that continues to grow every year. The pharmaceutical

industry is expected to experience growth along with the awareness of halal products from Muslims. The unpreparedness of the domestic industry will be an opportunity for other countries to make Muslims a potential market.

The western pharmaceutical industry has also developed guidelines and consensus, and regulatory statements intended to protect consumers from harmful products. Some of these guidelines are different from the halal principles, some agree with the halal principles, and some are even stricter than the halal guidelines. Nevertheless, understanding the basic principles and critical points of halal can help manufacturers and other parties better understand the philosophy, process, and aspects of halal pharmacy, thus making it a guide in producing halal drugs. Halal medicine is also sustainable because it combines product ingredients and their effects and producer ethics and responsibility. The global business competition will not wait for one party to be ready, but whoever is fast, and superior is the winner.

## Conflict of Interest

The authors declare that they have no conflict of interest.

## References

1. DinarStandard. State of the Global Islamic Economy Report 2019/2020 [Internet]. Salaam Gateway. 2019. Available from: <https://cdn.salaamgateway.com/special-coverage/sgie19-20/full-report.pdf>
2. Widiasih R, Hermayanti Y, Ermiati, Maryati I, Solehati T. Halal Healthcare Tourism: Nurses' Perspectives . Malaysian J Halal Res. 2020;0(0):1–5.
3. Nurrachmi R. The Global Development of Halal Food Industry: A Survey Halal industry is the latest trend in the world market. Tazkia Islam Financ Bus Rev. 2017;11(1):41–56.
4. Razak SFA, Lee CP, Lim KM, Tee PX. Smart halal recognizer for muslim consumers. Indones J Electr Eng Comput Sci. 2019;14(1):193–200.
5. Pacific A. Global Halal Industry : An Overview. Glob Islam Financ Rep 2013 [Internet]. 2010;140–59. Available from: [http://www.gifr.net/gifr2013/ch\\_13.PDF](http://www.gifr.net/gifr2013/ch_13.PDF)
6. Tushar Saha, Tashnuva Rifat, Shimanto S. Prospects of Halal

- Pharmaceuticals Asian Journal of Ethnopharmacology and Medicinal Foods Prospects of Halal Pharmaceuticals. 2019;(April).
7. Elias EM, Othman SN, Yaacob NA, Saifudin AM. A study of halal awareness and knowledge among entrepreneur undergraduates. *Int J Supply Chain Manag.* 2016;5(3):147–52.
  8. Alzeer J, Rieder U, Hadeed KA. Rational and practical aspects of Halal and Tayyib in the context of food safety. *Trends Food Sci Technol.* 2018;71(November):264–7.
  9. Mathew VN, Abdullah AMR binti A, Ismail SN binti M. Acceptance on Halal Food among Non-Muslim Consumers. *Procedia - Soc Behav Sci* [Internet]. 2014;121:262–71. Available from: <http://dx.doi.org/10.1016/j.sbspro.2014.01.1127>
  10. Carneiro-Da-Cunha JA, Macau FR, Alssabak NAM. International inter-organisational religious knowledge transfer. *Int J Netw Virtual Organ.* 2013;13(3):282–95.
  11. Rahmah M. Digital Technology for Halal Certification of Patented Drug in Indonesia: A Panacea for the Pain. 2019;(October). Available from: <http://repository.unair.ac.id/98999/>
  12. Norazmi MN, Lim LS. Halal pharmaceutical industry: opportunities and challenges. *Trends Pharmacol Sci* [Internet]. 2015;36(8):496–7. Available from: <http://dx.doi.org/10.1016/j.tips.2015.06.006>
  13. Sadeeqa S, Sarrieff A, Masood I, Atif M, Farooqi M. Evaluation of knowledge, attitude, and perception regarding Halal pharmaceuticals, among general medical practitioners in Malaysia. *Arch Pharm Pract.* 2013;4(4):139.
  14. Wan Sulong WM, Husain S, Ismail MZ, Othman MS, Mohd Zin Z, Mohd Ghazali R. Halal Food Facilities in Japan from The Perspective of Malaysian Muslim Tourists. *Int J Acad Res Bus Soc Sci.* 2020;10(11).
  15. Alhabshi S. Could Japan Excel In The Halal Food Industry? *Res J Commer Behav Sci* [Internet]. 2016;05(10):1–11. Available from: [https://www.researchgate.net/profile/S-harifah-Alhabshi/publication/268390941\\_Local\\_Government\\_Issues\\_in\\_Malaysia/links/57b27bbc08ae15c76cbb400a.pdf](https://www.researchgate.net/profile/S-harifah-Alhabshi/publication/268390941_Local_Government_Issues_in_Malaysia/links/57b27bbc08ae15c76cbb400a.pdf)
  16. Nurrachmi R. The Global Development of Halal Food Industry: A Survey. *Tazkia Islam Financ Bus Rev.* 2018;11(1).
  17. Sohaib M, Jamil F. An Insight of Meat Industry in Pakistan with Special Reference to Halal Meat: A Comprehensive Review. *Korean J Food Sci Anim Resour* [Internet]. 2017/07/28. 2017;37(3):329–41. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/28747818>
  18. Said MF, Adham KA, Muhamad NS, Sulaiman S. Exploring halal tourism in Muslim-minority countries: Muslim travellers' needs and concerns. *J Islam Mark.* 2020;
  19. Jalil NSA, Tawde A V, Zito S, Sinclair M, Fryer C, Idrus Z, et al. Attitudes of the public towards halal food and associated animal welfare issues in two countries with predominantly Muslim and non-Muslim populations. *PLoS One* [Internet]. 2018/11/01. 2018;13(10):e0204094. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/30379818>



20. Hudaefi FA, Jaswir I. Halal Governance in Indonesia: Theory, Current Practices, and Related Issues. *J Islam Monet Econ Financ*. 2019;5(1):89–116.
21. Sidqi A, Ruhana A. Intermestic Factors of Indonesia's Halal Certification. 2021;(May).
22. Abdullah FAA, Borilova G, Steinhauserova I. Halal Criteria Versus Conventional Slaughter Technology. *Anim* [Internet]. 2019/08/08. 2019;9(8). Available from: <https://www.ncbi.nlm.nih.gov/pubmed/31387323>
23. Aghwan ZA, Bello AU, Abubakar AA, Imlan JC, Sazili AQ. Efficient halal bleeding, animal handling, and welfare: A holistic approach for meat quality. *Meat Sci* [Internet]. 2016/07/29. 2016;121:420–8. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/27468102>
24. Basir NSA, Chik CT, Bachok S, Baba N, Hamid R, Salleh MM. Motivational factors for halal certification adoption among small and micro enterprises in Malaysia. *Int J Supply Chain Manag*. 2018;7(4):391–6.
25. Ab Talib MS, Ai Chin T, Fischer J. Linking Halal food certification and business performance. *Br Food J*. 2017;119(7):1606–18.
26. Kartiwi M, Gunawan TS, Anwar A, Fathurohmah SS. Mobile Application for Halal Food Ingredients Identification using Optical Character Recognition. 2018 IEEE 5th Int Conf Smart Instrumentation, Meas Appl ICSIMA 2018. 2019;(June 2019):1–5.
27. Chik T. International Journal of Administration and Halal Crisis Management in Small Medium Food Enterprises. 2018;4(2):5–10.
28. Ridwan AH, Hasanuddin M, Fatahillah IA, Fauzia I. Authorization of halal certification in Indonesia, Malaysia and Singapore. *Int J Psychosoc Rehabil*. 2020;24(8):7992–8011.
29. Aji HM. Examining the moderating role of high-versus-low scepticism toward Halal labels: findings from Indonesia. *Int J Islam Mark Brand*. 2017;2(4):278.
30. Imam Salehudin, Luthfi BA. Marketing Impact of Halal Labeling toward Indonesian Muslim Consumer's Behavioral Intention Based on Ajzen's Planned Behavior. In: International Conference on Business and Management Research. 2010. p. 1–18.
31. Ibrahim S. Readiness of Industrial Pharmacy and Implementation of JPH Law on Pharmaceutical Products. In: Pertemuan Ilmiah Tahunan 2017. 2017. p. 1–4.
32. Alserhan BA, Bayirli M, Zakzouk F. Awareness towards Halal pharmaceuticals: an analysis of pharmacists' views. *Int J Islam Mark Brand*. 2020;5(1):43.
33. Majdina F. Religion and Cosmetics : Guidelines for Preparing Products Aimed at the Muslim World Based on the Interpretation of Religion and Cosmetics : Guidelines for Preparing Products Aimed at the Muslim World Based on the Interpretation of Halal Cosmetics in Mala. 2021;(May).
34. Ahmad AN, Rahman AA, Rahman SA. Assessing Knowledge and Religiosity on Consumer Behavior towards Halal Food and Cosmetic Products. *Int J Soc Sci Humanit*. 2015;5(1):10–4.
35. Ab Talib MS, Abdul Hamid AB, Chin TA. Can halal certification influence logistics performance? *J Islam Mark*. 2016;7(4):461–75.



36. Noordin N, Noor NLM, Samicho Z. Strategic Approach to Halal Certification System: An Ecosystem Perspective. *Procedia - Soc Behav Sci*. 2014;121(June 2015):79–95.
37. Mohd Nawir N, Mohd Nasir NI. Consumers' Attitude Toward the Food Safety Certificate (FSC) in Malaysia. *J Food Prod Mark* [Internet]. 2014;20(October 2014):140–50. Available from: <http://dx.doi.org/10.1080/10454446.2014.921879>
38. Giyanti I, Indriastiningsih E. Impact of Halal Certification on The Performance of Food Small Medium Enterprises. *J Ilm Tek Ind*. 2019;18(2):116–23.
39. Aziz YA, Chok NV. The Role of Halal Awareness, Halal Certification, and Marketing Components in Determining Halal Purchase Intention Among Non-Muslims in Malaysia: A Structural Equation Modeling Approach. *J Int Food Agribus Mark*. 2013;25(1):1–23.
40. Marzuki SZS, Hall CM, Ballantine PW. Restaurant managers' perspectives on halal certification. *J Islam Mark*. 2012;3(1):47–58.
41. Aziza N, Prasnowo MA, Khoirul Hidayat. Halal Tourism, Certification Regulation, and Research Institute Insight From IMT-GT Countries: A Review. *Int J Sci Technol Manag*. 2020;1(3):265–72.
42. Battour M, Hakimian F, Ismail M, Boğan E. The perception of non-Muslim tourists towards halal tourism: Evidence from Turkey and Malaysia. *J Islam Mark*. 2018;9(4):823–40.
43. Latiff JA, Zakaria Z, Man S. The Challenges in Implementation of Halal Vaccine Certification in Malaysia. 2021;9(1):359–64.
44. Ahmed MA, Al-Kahtani HA, Jaswir I, AbuTarboush H, Ismail EA. Extraction and characterization of gelatin from camel skin (potential halal gelatin) and production of gelatin nanoparticles. *Saudi J Biol Sci* [Internet]. 2020/06/04. 2020;27(6):1596–601. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/32489300>
45. Luxminarayan L, Neha S, Amit V, Khinchi MP. Pork DNA Contamination in Pharmaceutical Products: A Review. *Asian J Pharm Res Dev*. 2017;5(2):1–8.
46. Vahid L, Nikzad N, Foroughi E. Halal Assurance Systems in Enzyme Market. *J Human, Heal Halal Metrics*. 2020;1(1):66–73.
47. Debney B. Halal Certification Uproar : The Muslim Scapegoat as National Safety Valve. In: The 'Muslim Question' and Citizenship in Australia Deakin Symposium, December 2015. 2015. p. 1–8.
48. Gok C. New Product for Halal Tourism : Halal Honeymoon New Product for Halal Tourism : Halal Honeymoon. 2021;(March).
49. Mazlan AI, Hamzah HZ. Malaysian Halal Export Market : Case Study on Developing Countries. *Persidang Kebangs Ekon Malaysia ke-10 (PERKEM 10)*. 2015;(September 2015):99–107.
50. Lusiana R, Cristiawan EC, Hayati DM, Setiawan D. Intelligente Salzfabrik : Self-Integrated Pharmaceutical Raw Materials Industry in Indonesia. *Oisaa J Indones Emas*. 2015;69–73.
51. Firdaus F, Andadari RK, Putra HMM, Sulandjari S. Supply Chain Management on Inventory Indonesian Drug Industry. *J Adv Multidiscip Res*. 2021;1(2):63.

52. Sadeeqa S, Sarriiff A, Masood I, Atif M, Farooqui M. KAP among doctors working in hospitals, regarding Halal pharmaceuticals; a cross sectional assessment. *Acta Pol Pharm - Drug Res.* 2015;72(3):615–24.
53. Asmuni A, Jamil M, Rafianti F. Dynamics of Application of Halal Certification on Medicine Products in Indonesia. *Budapest Int Res Critics Inst Humanit Soc Sci.* 2020;3(4):2938–47.
54. Syahrir A, Rahem A, Prayoga A. Pharmacist Behavior of Halal Labelization on Pharmaceutical Product. *J Halal Prod Res.* 2019;2(1):25.
55. Farid M, Basri H. The Effects of Haram Food on Human Emotional and Spiritual Intelligence Levels. *Indones J Halal Res.* 2020;2(1):21–6.
56. Briliana V, Noviana R. The antecedents and outcome of halal cosmetic products: a case study in jakarta indonesia. *Int J Business, Econ Law.* 2016;11(2):1–9.
57. Rahim N@ F binti, Shafii Z, Shahwan S. Awareness and Perception of Muslim Consumers on Halal Cosmetics and Personal Care Products. *Int J Business, Econ Manag.* 2015;2(1):1–14.
58. Sulaiman Y, Kamariah Nik Mat N, Hasmini Abd Ghani N. The Antecedents of Halal Consumption Pattern: The Mediating Role of Muslim Lifestyle, Risk Perception and Trust. *Int J Eng Technol.* 2018;7(4.38):1006.
59. Fuseini A, Wotton SB, Knowles TG, Hadley PJ. Halal Meat Fraud and Safety Issues in the UK: a Review in the Context of the European Union. *Food Ethics.* 2017;1(2):127–42.
60. Yu CZ, Chan TJ. Cadbury Malaysia Porcine DNA Case: Lessons from Crisis Management and Cultural Perspectives. *Malaysian J Soc Sci Humanit.* 2020;5(8):33–8.
61. Annabi CA, Ibidapo-Obe OO. Halal certification organizations in the United Kingdom: An exploration of halal cosmetic certification. *J Islam Mark.* 2017;8(1):107–26.
62. Arif Muham M, Abu Bakar E, Mastura Mu A, Ahmad S, MdJusoh Z. Assessing the Influence of Consumer Education, Personality and Social Media in Halal Purchase Behavior. *Asian J Sci Res.* 2019;12(3):333–9.
63. Ohiagu OP. Internet as Medium of the Mass Media. *Kiabara J Humanit [Internet].* 2011;(January 2011). Available from: <http://bit.ly/1waNuAu>
64. Genner S, Süß D. Socialization as Media Effect. *Int Encycl Media Eff.* 2017;(March):1–15.
65. Khasanah M. Peranan Media Sosial Sebagai Agen Sosialisasi Halal dalam Membangun Kesadaran Halal: Studi Netnografi. *Al-Tijary.* 2020;5(2):139–57.
66. Mubarok FK, Imam MK. Halal Industry in Indonesia; Challenges and Opportunities. *J Digit Mark Halal Ind.* 2020;2(1):55.
67. Peristiwa H. Indonesian Halal Food Industry : Development, Opportunitie and Challenges on Halal Supply Chains. *J Islam Stud Humanit.* 2019;4(2):218–45.
68. Damota MD, Uninversity MW. The Effect of Social Media on Society. *New Media Mass Commun.* 2019;(January 2019):6–11.
69. Abu Bakar B, Tan E, Lim T. Halalfying travel: Reaching for the

Muslim millennial travelers. Book review View project Muslim Millennials Travel Behaviours View project. 2018;(July). Available from: <https://www.researchgate.net/publication/326317708>

70. Aziz NA, Majdina H, Hassan Y, Zulkifly HH, Wahab MSA, Aziz MSA, et al. Assessment of the Halal Status of Respiratory Pharmaceutical Products in a Hospital. *Procedia - Soc Behav Sci* [Internet]. 2014;121(January 2016):158–65. Available from: <http://dx.doi.org/10.1016/j.sbspro.2014.01.1117>
71. Suleman S, Sibghatullah A, Azam M. Religiosity, halal food consumption, and physical well-being: An extension of the TPB. *Cogent Bus Manag* [Internet]. 2021;8(1). Available from: <https://doi.org/10.1080/23311975.2020.1860385>