Comparative Analysis and Harmonization of Global Halal Standards

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ABSTRACT

Muslim awareness of halal lifestyles has developed into a lucrative business opportunity on global scale. Currently, there is no globally recognized halal standard as a reference for the establishment of a global halal system. The absence of global halal standard restricts the growth of halal industries. The purpose of this study was to identify and compare the halal standards applied in some countries as well as to propose a global halal standard for harmonization. A comparative analysis methodology was applied by conducting an in-depth review on five halal standards frequently used as references in some countries (OIC/SMIIC 1: 2011, UAE.S/GSO 2055-1:2015, MS 1500:2009, MUIS-HC-S001, HAS 23000). The review focused in aspects that directly affects to the halal status of food products (materials, processing facilities, and products). There are similarities, differences and incompleteness in five halal standards in terms of material, product and facility aspect. The same standard can be directly adopted as a proposed global halal standard, whereas for those differed and incomplete standards, depth analysis was conducted and new clauses are proposed. There are 24 clauses that are harmonized in proposed global standard, while five clauses require further discussion among Islamic scholars. SMIIC is being considered as a center for the harmonization of international halal standard.

1. Introduction

Muslim awareness of halal lifestyles has grown into a lucrative business opportunity on a global scale, as it has the trend toward halal products consumption. Muslim food expenditure increased for 3.1% in 2019, from $1.13 trillion to $1.17 trillion, and is expected to slightly decline in 2020 before increasing to $1.38 trillion in 2024. Global Muslim spending is expected to decline by 8% in 2020, before returning to pre-pandemic levels by the end of 2021 (DinarStandard, 2020).

The high level of expenditure in the halal sector is supported by the halal regulations in various countries, particularly those pertaining to halal certification and labeling (Dahlan & Sani, 2017). In order to be able to take part in the halal product business, it is critical for producers to understand the halal certification requirements (Batu & Regenstein, 2014). One of the requirements for halal certification is the implementation of halal standards by food producers.

In general, halal standards cover aspect of material, product, facility and management system. The material aspect includes halal materials used in the production process. The product aspect includes

the name and sensory profile of the product that must be adhere to Islamic law and avoid misleading information for consumers. The facility aspect includes production facilities and equipment must be free from najis materials. The management system aspect includes halal policies, halal personnel, and planning and evaluating the implementation of standard.

Many countries do not have halal standards and refer to halal standards in other countries. Halal certification bodies (HCB) that do not have halal standards usually adopt a single halal standard or as a combination of several halal standards in their halal certification process. Although over forty HCB in the U.S., but only sixteen HCB were recognized by JAKIM (Malaysia), and only five HCB are recognized by MUI (Indonesia) (Riaz & Chaudry, 2004). One of the considerations for HCB recognition is the reference of halal standards at the HCB.

Recognition of HCB has an impact on the acceptance of halal products in a country only those from recognized HCB. Currently, if an imported retail food product in Indonesia wants to include a halal logo on its label, the product must be re-certified in Indonesia, even if it has been certified by a recognized HCB in the country of origin. Similarly, imported retail products in Malaysia that want to include a halal logo on its label must be re-certified in Malaysia.

Currently, there are at least fifteen halal standards worldwide but there is no globally recognized as a halal standard. The absence of universal halal standards causes the slow growth of the global halal industries (Latif et al., 2014; Elasrag, 2016; Jaswir, 2019; Azam & Abdullah, 2021). Harmonization of global halal standards will be beneficial for producers, HCB, consumers, and government. Food industry in Indonesia faces the challenge of halal certification mandatory under the Law Number 33 of 2014, which include imported products. Harmonization of global halal standards is expected to facilitate the mandatory of halal certification in Indonesia.

Azam and Abdullah (2021) identified the similarities and differences of four halal standards (SMIIC, JAKIM, MUIS, MUI) covering nine aspects (slaughtering, halal materials, business profiles, buildings, equipment, workers, packaging and labels, logistics, management and documentation). However, this study did not cover in detail in the aspect of material and facility that significantly affects to the halal status of food products. The study did not cover the product aspect and UAE standard that frequently applied in European Union as well. In addition, there was no a proposed global halal standard that will be beneficial for harmonization. For this reason, the purpose of this study was to compared the halal standards applied in several HCB and several countries with focus on materials, products and facility aspects, and to propose a global halal standard.

2. Materials and methods

The study was conducted from March 2020 to March 2021 in Indonesia. The materials used in this study were halal standard data issued by several countries which are widely used by halal certifier body. This study employed a comparative analysis method by conducting a literature review on global halal standards. The scope of this study was limited to the halal standard applied for food industry. The study was conducted through the following steps:

2.1. Mapping of halal standards

Mapping of halal standards was conducted by identifying halal standard used as a reference at the HCB, by checking the website of HCB. Halal standards applied by more than three HCB and three countries were then selected.

2.2 Comparison of halal standards

Comparison of halal standards was done by analyzing the completeness, similarities and differences of the halal standards selected in the first stage. The clause of comparison was focused on the aspect of material, product and facility that directly affect the halal status of food products, while the management system aspect was not included as it does not directly affect to the halal status of the product.

2.3. Preparation of proposed global halal standards

Preparation of proposed global halal standard was carried out based on the results of the comparison of halal standards and literature studies. The similarities found in the comparative analysis was directly used as a proposed global halal standard. If there are differences and incompleteness in standards, then a depth analysis was carried out by exploring relevant literature studies (halal fatwas, halal standards, regulations, journals and articles).

3. Results and Discussion

3.1. Mapping of halal standards

Based on information on the websites of several HCB in the world, various standards used by HCB were identified as shown in Table 1. From the fifteen halal standards evaluated, there are five standards that are used as references in more than three HCB and three countries, that is OIC/SMIIC 1:2011 (IOC), UAE.S/GSO 2055-1:2015 (UAE), MS 1500:2009 (Malaysia), MUIS-HC-S001 (Singapore) and HAS 23000 (Indonesia). This fact is in accordance with the study of Azam and Abdullah (2021). Based on this identification, these five standards were selected for comparison at further study.

Table 1. List of Halal standards and the number of HCB/countries adopted the standards

	Halal Standard	Amount of HCB/Country
1.	OIC/SMIIC 1: 2019 General Requirements for Halal Food (2nd Edition)	9 HCB in 11 countries
2.	UAE.S/GSO 2055-1:2015 Halal Food – Part 1: General Requirements for Halal Food	32 HCB in 22 countries
3.	MS 1500:2009 Halal Food – Production, Preparation, Handling and Storage – General Guidelines (2nd Revision)	41 HCB in 31 countries
4.	MUIS-HC-S001 General Guidelines for the Handling and Processing of Halal Food	31 HCB in 24 countries
5.	HAS23000 Criteria of Halal Assurance System	26 HCB in 17 countries
6.	BAS 1049:2010 Halal Food - Requirements and Measures	1 HCB in 1 country
7.	CAC/GL 24-1997	3 HCB di 3 countries
8.	Halal Standards for Halal Certification 2008	1 HCB di 1 country
9.	PBD 24:2007 Halal Food	2 HCB di 2 countries
10.	THS 24000: 2552 General Guidelines of Halal Products	1 HCB di 1 country
11.	SASO 2172 “General Requirements for Halal Food”	2 HCB di 2 countries
12.	ES:4249/2003 Requirements and Provision for Labelling Halal Food	1 HCB in 1 country
13.	PS:3733-2016 Pakistan Standard Specification for Halal Food Management Systems Requirements for Any Organization in the Food Chain	2 HCB di 1 countries
14.	Uganda Standard US 909:2011 General Standard for Halal food	1 HCB in 1 country
15.	Austria Standard ONR 142000:2009 Halal food – Requirements for the food chain	1 HCB di 1 country

3.2 Comparison of halal standards

Comparative analysis was carried out on five selected halal standards, which includes analysis of similarities, differences and completeness. The comparison clauses were focused on the aspect of material, product and facility that directly affect the halal status of the product, while aspect of the management system was not included in this study.

Table 2 shows the comparison of the five halal standards from the aspect of material. From a total of twelve clauses, there are five clauses that are have similarity in all halal standards, that is the origin of material, halal material, *haram* (prohibited) material, microbial material and packaging material.

On the clause of halal materials and *haram* materials, there are standards that list more complete materials than that of other standards. For example, the UAE standard does not list venomous animals, amphibians, donkeys as *haram* materials, but these animals are listed in the SMIIC, MS and MUIS standard. HAS contains the fewest halal materials and *haram* materials.

Table 2. Comparative analysis of five halal standards from the aspect of material

Comparison Clauses	Similarities	Differences	Completeness
Origin of material	Products must not be produced from materials that *haram*, toxic, intoxicating, or harmful.	-	-
Halal materials	The *halalness* of plants, halal animals (e.g. aquatic animals) and animals slaughtered according to Islamic law.	-	HAS and UAE contain the fewest *halal* materials. SMIIC contain the most complete halal materials.
Haram materials	The *haramness* of materials from pork, *khamr*, blood, carrion and animals that are not slaughtered according to Islamic law.	-	HAS and MUIS contain the fewest *haram* materials. UAE and MS contain the most complete *haram* materials.
Alcohol	-	SMIIC prohibit products containing alcohol, while other standards prohibit alcohol derived from *khamr*	-
Istihalah of *khamr*	-	-	Only HAS stipulate the *istihalah* of *khamr* is halal.
By-products of the *khamr* industry	-	SMIIC prohibit yeast from the *khamr* industry, while HAS23000 allow it.	UAE, MS and MUIS do not stipulate this clause.
Microbial material	SMIIC, UAE, MS and HAS allows microbes except those that are toxic and harmful	SMIIC, UAE, MS require halal culture medium, while HAS allows *haram* culture medium with conditions.	MUIS do not stipulate this clause.
GMO material	-	HAS prohibit the origin of GMO genes from pigs or humans. SMIIC, UAE, MS prohibit the origin of genes from all *haram* materials.	MUIS do not stipulate this clause.
Packaging material	Not be made from *haram* and hazardous materials	-	HAS and MUIS do not stipulate this clause.
Adequacy of material documents	UAE and HAS stipulate that there must be halal material document.	-	SMIIC, MS, MUIS do not stipulate this clause.
Material change procedure	-	-	Only HAS stipulate that material change must be approved by HCB before use.
Incoming material inspection procedure	-	-	Only HAS stipulate that every incoming or purchased material must be checked to ensure the halal conformity.

On the clause of alcohol materials, only the SMIIC standard prohibits products containing alcohol but does not explain the source of alcohol, while other standards prohibit alcohol from *khamr*/liquor. However, IIFA (2018) explained that the SMIIC standard allows alcohol that does not come from *khamr* on the condition that it does not cause drunkenness. It is concluded that all standards have the same requirement related to *halalness* of alcohol that does not come from *khamr*.

On the clause of *istihalah* of *khamr*, only the HAS standard allows it, while other standards do not stipulate it. *Istihalah* is defined as a complete transformation of one material to other material, occurred physically and chemically (Jamaludin *et al.*, 2011). *Istihalah* of *khamr* is reacting *khamr* with other materials (such as chemicals, enzymes, microbes) to produce new products. The example

of *istihalah* from *khamr* is the conversion of wine into vinegar which is completely changes both physically (odour, colour and taste) and chemically (chemical structure). In general, Islam recognizes vinegar as a halal food and favored by the Prophet Muhammad SAW. However, Prophet Muhammad SAW did not particularly mention the method of making it and the source used in the process (Harahap *et al.*, 2020). On this clause, still need further discussion between Islamic scholars.

On the clause of by-products of the *khamr* industry, SMIIC prohibits yeast from the *khamr* industry, while HAS allows it and other standards do not stipulate it. HAS allows yeast from the *khamr* industry on condition that *syar'i* washing is carried out to remove *najis* (impurity) of *khamr*. Based on the MUI Fatwa number 10 of 2011 which is the legal basis of HAS, yeast is microbe that pure. Yeast may convert raw materials containing carbohydrates into beer, then separated and the yeast itself does not change. Therefore, yeast from by-products of beer industry is considered *mutanajjis* (contaminated with *najis*) that can become pure after being washed until the color, taste and smell of the beer are removed. Yeast extract from *khamr* industry can be utilized for several products (such as flavor, seasoning, supplement) and it contains mineral, vitamin and protein (LPPOM MUI, 2014). On the contrary, hadith clearly indicates that Prophet Muhammad PBUH prohibits his companion *(shahabat)* from taking *khamr* as an ingredient for processing vinegar. This is because this khamr fermentation was not a natural process (Kashim *et al*., 2105). On this clause, there are debatable opinion, hence it needs in depth study among Islamic scholars to formulate the Fatwa.

On the clause of microbial material, there are three standards (SMIIC, UAE, MS) that require halal culture medium and only MUIS do not stipulate this clause. HAS allows culture medium from *haram/najis* materials with the conditions: (i) free of pork; (ii) the final product can be separated from its culture medium and there is washing in the next process to remove *najis* materials. Based on the MUI Fatwa number 1 of 2010, the opinion of *fuqaha* on plant lives on the shit/poop that is "Vegetable which is grown in *najis* media is pure, while some part affected by *najis* material is *mutanajjis*, that is why it can be purified by sufficient washing". Basically microbes are halal as long as they are not harmful and not contaminated with *najis.* Products of microbes grown on medium from *najis* materials (in exception to that of pork derivative) are halal if the microbes can be separated and cleaned from the medium (LPPOM MUI, 2014). On the contrary, all *haram* materials are considered *haram* for consumption and used by Muslims even though their original structure and nature had been changed into other properties (Kashim *et al*., 2105). On this clause, further discussion among Islamic scholars is needed to formulate the Fatwa.

On the clause of genetically modified organism (GMO), the HAS prohibits the origin of GMO genes from pork and human, while other standars (SMIIC, UAE, MS) prohibit the origin of genes from all *haram* materials and MUIS do not stipulate this clause. However, based on the MUI Fatwa Number 35 of 2013, the origin of GMO genes must not derive from *haram* materials and not from the human body (LPPOM MUI, 2014).

On the clause of packaging material, there are three standards (SMIIC, UAE, MS) that require packaging material shall not be made from *haram* and hazardous materials. HAS and MUIS do not stipulate this clause. Packaging material is important to be stipulated in the standard because it may contact with product. Animal origin ingredients (such as animal fat, oil, gelatin) are commonly found in the production of packaging (Talib *et al*., 2010). The halal status of animal origin materials is dubious because there is no scientific approach on how to ensure that the animal was slaughtered according to Shariah law (Talib & Johan, 2012).

Clause of material document is stipulated by UAE and HAS. The material document is important to be stipulated in the standard because it can explain the *halalness* of the material. Example of material documents are halal certificate, halal statement, flowchart and other document that explain the source of material. Although the requirement of material document is not stipulated in MS and MUIS, actually JAKIM and MUIS require it. MUIS Halal Certification Scheme stipulate that all raw materials shall be substantiated with either one or more of the following documents: (1) Halal certificates or Halal certification marks from MUIS and/or MUIS recognized halal certification bodies; (2) Product specifications; (3) MUIS Halal questionnaire; and (4) Laboratory analysis report according to MUIS requirements (MUIS, 2020). LPPOM MUI stipulates the Halal Positive List of Materials that consists of non-critical materials in terms of their *halalness* status, which refers to the

literature, abundance in nature, and consideration of commercially production scales. Materials listed in Halal Positive List of Materials does not require supporting document (LPPOM MUI, 2020).

Clause of material change procedure is only stipulated by the HAS, that is every change of material must be approved by the halal inspection agency (LPPOM MUI) before used, to ensure the *halalness* of the new material. The procedure of incoming material inspection is only stipulated by the HAS standard, in which it must be an inspection of the incoming or purchased material to ensure the conformity with HCB's approved materials, which includes checking the material name, the producer name and the country of origin. If these two procedures are not implemented, then there is a risk that the new material used is *haram*. In 2000, MUI declared one brand of a food additive in Indonesia was considered as *haram* because of the material change. The new material evidently came from *haram* source and the material change was not previously notified to HCB (LPPOM MUI 2014).

Table 3 shows the comparison of the five halal standards from the aspect of product. From a total of nine comparison clauses, there are four clauses that are have similarity in all halal standards, that is product name, packaging design/product label, traceability and legal aspect. All clauses have incompleteness in all halal standards, means there are standards that do not stipulate these clauses.

Table 3. Comparative analysis of five halal standards from the aspect of product

Comparison Clauses	Similarities	Differences	Completeness
Name of product	HAS and MS stipulate that product name must not lead to *haram* products.	-	SMIIC, UAE and MUIS do not stipulate this clause.
Sensory profile of product	-	-	HAS stipulates that the sensory profile should not lead to *haram* products.
Packaging design/label	SMIIC, UAE, HAS stipulate the halal logo on the label. SMIIC & UAE stipulate information of certain material on the label.	-	MS stipulates the packaging design must not be misleading. MUIS do not stipulate this clause.
Advertisement	-	-	MS stipulates that it must not be contrary to sharia law and not vulgar.
Brand of retail product	-	-	Only HAS stipulates that retail food products with the same brand sold in Indonesia must be registered for all their variants.
Traceability	SMIIC and HAS stipulate the traceability of product.	-	HAS stipulates the traceability if there is material coding and packaged/relabeled material.
Handling of non-halal product	-	-	HAS stipulates the handling of non-halal product.
Legal aspect	SMIIC, UAE and MS stipulate products must comply with legislation.	-	UAE, MUIS and HAS do not stipulate this clause.
Product testing	-	SMIIC stipulates testing of *haram* substances. HAS stipulates testing of pork & ethanol for certain product.	UAE, MS and MUIS do not stipulate this clause.

Name and sensory profile of the product are important to be stipulated in the standard so that the product will not to lead to *haram* products. These clauses are a form of caution so that Muslim consumers do not approach and consume *haram* products. If someone used to consume products that lead to *haram* products, it is feared that he/she will get used to the taste, aroma, or texture of that *haram* product (LPPOM MUI, 2021). The reason for caution also applies to clause of packaging design, advertisement and brand of retail product. Due to caution reason, global halal standard may

adopt these clauses but not mandatory aspect especially for advertisement and brand of retail product that difficult to controlled by company.

On the clause of traceability, SMIIC and HAS stipulate the traceability of product. Although the traceability is not stipulated in MS, actually JAKIM require it. Referring to "Guidelines for Halal Assurance Management System of Malaysia Halal Certification", the traceability is the ability to verify the history, location or application of an item by means of documented recorded identification (Department of Islamic Development Malaysia, 2012). Besides stipulate the identification of halal products, HAS also stipulates material coding and repackaged/relabeled materials. If there is internal material coding, the company must ensure that materials with the same code has the same halal status, to prevent using of *haram* material in halal product. If there are repackaged/relabeled materials, the conformity of the name and producer information contained in the new label/packaging should be traceable to the original label so that the halal status of the material can be assured.

On the clause of handling of non-halal products, only HAS stipulates this, that non-halal products must not be sold to consumers who require halal products, and must be withdrawn if they are already sold (LPPOM MUI, 2012). Although this clause is not stipulated in MS standard, actually JAKIM requires the corrective action and recall procedure if there is non-compliance product (Department of Islamic Development Malaysia, 2012). On the clause of legal aspect, SMIIC and MS stipulate that the products must comply with legislation. Legal aspect is important to be stipulated in the standard because it related to the regulation that applied in every country.

On the clause of product testing, SMIIC stipulates testing of *haram* substances, while HAS stipulates testing of pork and ethanol for certain product. Although the product testing is not stipulated in MUIS standard, actually MUIS requires that laboratory analysis report according to MUIS' requirements may be required to confirm that the products are Halal (MUIS, 2020).

Table 4 shows the comparison of the five halal standards from the aspect of facility. From a total of eight comparison clauses, there are similarities in halal standards on all clauses. There are five clauses that have differences in standards and six clauses that have incompleteness in standards.

Table 4. Comparative analysis of five halal standards from the aspect of facility

Comparison Clauses	Similarities	Differences	Completeness
Scope of facility	Production, storage, transportation and serving equipment	-	-
Production facility	Must be free from *najis* contamination and meet hygiene & sanitation requirements.	SMIIC, UAE, MS, MUIS stipulate that facility must be halal dedicated, HAS allows the facilities used interchangeably with *haram* products on conditions.	HAS does not stipulate hygiene and sanitation requirements.
Production	Products are produced using halal materials and equipment that is free from *najis* contamination.	-	SMIIC stipulate production shall be done by person not assigned in non-Halal processing area.
Storage and transportation	Must ensure that there is no contamination of materials/ products by *najis* materials.	HAS allows halal storage & transportation together with *haram* products, other standards must be segregated.	SMIIC, UAE, MS and MUIS stipulate that product that are store and transport must be halal identified.
Display and serving	Facilities are only dedicated to halal products and free from *najis* contamination.	-	SMIIC, UAE, MS, MUIS stipulate that product that are displayed and served must be halal identified.
Converting non-halal facilities into halal facilities	Through heavy *najis* washing before halal production. After washing, it can no longer be used to produce *haram* products.	MS, MUIS, HAS stipulate the convert of facilities contaminated by pork, while SMIIC and UAE by all *haram* products.	MS stipulate that washing must be verified by a competent authority.

Comparison Clauses	Similarities	Differences	Completeness
Facility washing procedure	Materials used in washing and sanitizing must not contain *haram* ingredients.	MUIS stipulate washing of medium *najis* must be with water, while HAS could be with non-water.	SMIIC and MS only stipulate washing the heavy *najis*.
Heavy *najis* washing procedure	Required to wash seven times, one of which shall be water mixed with soil/other materials.	SMIIC, UAE, MS, MUIS must be soil, while HAS could be other materials.	-

The most different standard related to facility is that the HAS which allows halal facilities to be used interchangeably with *haram* products. Facilities that are used to produce other products made from *haram*/*najis* materials are categorized as *mutanajjis* (contaminated with *najis*). If the facility is exposed to medium *najis* (other than pork) then it can be washed according to the usual washing procedure. Therefore, the halal facilities may be used interchangeably with *haram* product on condition that the *haram* product does not contain pork and washing are conducted prior to halal production.

On the clause of facility washing procedure, MUIS stipulates medium *najis* must be washed with water, while HAS allows use non-water. Based on the MUI Fatwa number 9 of 2011, there is Hadits explained the way to purify something affected by medium impure *(najis mutawassithah)* by only wiping: "The Companion of Rasulullah PBUH have a war against infidels with the sword, then they wiped their swords then prayed *(Shalat)* with their sword". There are production facilities that could not be washed by water, because it may affect to the quality of the product. For example, production facilities of oil are washed with oil, production facilities of lactose are washed with powder material, either finished product or one of material inside the product. The fatwa stipulates the production facility is allowed to be washed with non-water, in condition the trace of *najis* thing such as smell, taste and color is disappeared (LPPOM MUI, 2014). On this clause, further discussion among Islamic scholars is needed to formulate the Fatwa.

On the clause of heavy *najis* washing procedure, SMIIC, UAE, MS, MUIS required to wash seven times, one of which shall be water mixed with soil, while HAS allows the use other materials to replace soil. Based on the MUI Fatwa number 4 of 2003, the way to wash the heavy *najis* is by washing with water seven times, one of them with soil/dust or by other alternative which has the same cleaning power and capability (LPPOM MUI, 2014). On this clause, further discussion among Islamic scholars is needed to formulate the Fatwa.

3.3 Preparation of proposed global halal standards

Preparation of a proposed global halal standard is carried out based on the results of the comparison of halal standards and literature studies. The similarities found in the comparative analysis is directly used as a proposed global halal standard. If there are differences and incompleteness in standards, then an in-dept analysis is carried out based on literature studies in the previous stage. The proposed global halal standards are shown in Table 5. From a total of 29 comparison clauses, there are five clauses that need further discussion between Islamic scholars, that is *istihalah* of *khamr*, by-products of *khamr* industry, culture medium of microbes from *najis* materials, washing of medium *najis* with non-water, and other material than soil for washing of heavy *najis*.

Table 5. The proposed global halal standards

Aspect	The proposed global halal standards	Note
Material		
Origin of material	Products must not be produced from materials that *haram*, toxic, intoxicating, or harmful.	Refer to all standard
Halal materials	The halalness of plants, halal animals (e.g. aquatic animals) and animals slaughtered according to Islamic law, etc	Refer to SMIIC (most complete).
Haram materials	The *haramness* of materials from pork, *khamr*, blood, carrion, animals that are not slaughtered according to Islamic law, etc	Refer to UAE and MS (most complete).

Aspect	The proposed global halal standards	Note
Alcohol	Alcohol should not come from *khamr* industry (alcoholic beverage industry)	Refer to UAE, MS, MUIS, HAS.
Istihalah of *khamr*	The *istihalah* of *khamr* is halal. *Istihalah* is reacting *khamr* with other materials (such as chemicals, enzymes, microbes) to produce new products.	Need further discussion between Islamic scholars.
By-products of *khamr* industry	By-products of *khamr* industry, such as brewer yeast, can be used after washed to remove *najis* of *khamr*	Need further discussion between Islamic scholars.
Microbial material	Microbes are halal except those that are toxic and harmful. Products of microbes grown on medium from *najis* materials (besides pork) are halal if the microbes can be separated and cleaned from the medium.	Need further discussion between Islamic scholars related culture medium from *najis* materials.
GMO material	GMO genes must not derive from *haram* materials	Refer to SMIIC, UAE, MS.
Packaging material	Packaging material shall not be made from *haram* and hazardous materials.	Refer to SMIIC, UAE, MS.
Material document	Materials must supported by material document that prove the *halalness* of material, except non-critical materials.	Refer to UAE and HAS
Material change procedure	Change of material must be approved by HCB before use to ensure the *halalness* of the new material.	Refer to HAS
Incoming material inspection procedure	There must be an inspection of the incoming or purchased material to ensure the conformity with HCB's approved materials, which includes checking the name of the material, the name of the producer and the country of origin.	Refer to HAS
Product		
Product name	Product name must not lead to *haram* products	Refer to HAS and MS
Sensory profile	Sensory profile of product should not lead to *haram* products	Refer to HAS
Packaging design/label	Stipulate the halal logo on the label (not mandatory)	Refer to SMIIC, UAE, HAS
Advertisement	Must not be contrary to sharia law and not vulgar (not mandatory)	Refer to MS
Brand of retail product	For retail products, all products with the same brand that claimed as halal product must be registered (not mandatory)	Refer to HAS
Traceability	Must ensure the traceability of certified products to ensure the certified products are made from approved materials in facilities that free from *najis*. Traceability also includes material coding and repackaged/relabeled materials.	Refer to HAS
Handling of non halal product	Non halal products must not be sold to consumers who require halal products and must be withdrawn if already sold.	Refer to HAS
Legal aspect	Products must comply with legislation	Refer to SMIIC & MS
Product testing	Testing of *haram* substances (such as ethanol and pork) for certain product	Refer to SMIIC & HAS
Facility		
Scope of facility	Production, storage, transportation and serving equipment	Refer to all standard
Production facility	Must be free from *najis* contamination.	Refer to all standard
	Meet hygiene & sanitation requirements.	Refer to SMIIC, UAE, MS, MUIS
	The halal facilities may be used interchangeably with *haram* product on condition that the *haram* product are pork free and washing are conducted prior to halal production.	Refer to HAS
Production	Products are produced using halal materials and equipment that is free from contamination of *najis*.	Refer to all standard
Storage and transportation	The halal facility may be used together with *haram* products but must ensure that there is no contamination of materials/ products by *najis* materials.	Refer to HAS
Display and serving	Facilities are only dedicated to halal products and free from *najis* contamination.	Refer to all standard
Converting non-halal facilities into halal facilities	Convert the facilities contaminated by pork through heavy *najis* washing before halal production. After washing, it can no longer be used to produce *haram* products.	Refer to MS, MUIS, HAS

Aspect	The proposed global halal standards	Note
Facility washing procedure	Materials used in washing and sanitizing must not contain *haram* ingredients. Washing of medium *najis* can be with water and non-water.	Need further discussion between Islamic scholars related washing with non-water.
Heavy *najis* washing procedure	Must be washed 7 (seven) times with water, and one of them with soil or other materials that has ability to remove the taste, aroma, and color of *najis*	Need further discussion between Islamic scholars related other material than soil.

The initiative for setting up a global halal standard can come from SMIIC which can be accepted by all members of the Organization of Islamic Cooperation (OIC) (ITC, 2015). The OIC is the second largest international organization after the United Nations, with 57 countries from four continents (OIC, 2021). Annisa (2019) also recommends SMIIC as an international halal standard harmonization institution with consideration of SMIIC's position as an OIC affiliated institution that guarantees the authority to issue harmonization of international halal standards.

4. Conclusion

There are five standards that are used as references in more than three HCB and three countries, that is OIC/SMIIC 1:2011, UAE.S/GSO 2055-1:2015, MS 1500:2009, MUIS-HC-S001 and HAS 23000. There are similarities, differences and incompleteness in five halal standards in terms of material, product and facility aspect. The same standard can be directly adopted as a proposed global halal standard, whereas for those differed and incomplete standards, depth analysis was conducted and new clauses are proposed. There are 24 clauses that are harmonized in proposed global standard, while five clauses require further discussion among Islamic scholars. SMIIC is being considered as a center for the harmonization of international halal standard.

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