Halal Gelatin and its Business Opportunity in Indonesia

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ABSTRACT

Nowadays, halal food is not only a necessity for Indonesian and world Muslims but it has become a business and economic opportunity for everyone. As written by Dinar Standard in the 2019-2020 Global Islamic Economic Report, that the amount of expenditure on halal food for the Muslim world in 2018 was US 1.37 Trillion and is expected to increase to US 1.97 Trillion in 2024. With an average growth of 6.3% (CAGR). This is not only due to the growth of the Muslim population in the world which currently reaches 1.8 billion people, but also the growth of GDP and income per capita and plus middle-class Muslims in Muslim-majority countries. Gelatin is one of the important ingredients in halal industry. Its application is very wide, raging from food, cosmetics, personal care and pharmaceuticals. This paper discusses the need and opportunity of gelatin production in the largest Muslim country, Indonesia.

1. Introduction

Fundamentally, a Muslim is not allowed to eat food that is *haram*; forbidden by the Quran, such as pigs, animals that are fanged, dirty and live in two realms. It is believed that these animals have caused the Coronavirus/Covid-19 that recently appeared in Wuhan, China. Thus, Muslims have been obliged as well as all humans to eat halal food. Additionally, the food must be in good condition/*thayyiban*.

Along with the current development, the process of making halal food starts from the preparation of basic ingredients, manufacturing, packaging to the delivery process to consumers. In halal terms, the process is called halal supply chain and halal value chain (Tieman, 2011). Therefore, halal food is often called as healthy and safe food because the process could be traced from the beginning to the end or widely known as 'from farm to table'.

Furthermore, this process actually has involved many several mixtures of materials and areas of expertise. As processed foods do not solely depend on one kind of food ingredient, they could be added with various ingredients such as addictive substances, dyes, thickeners, flavourers, sweeteners, gelatin and other substances. In consequence, the processed foods could be considered as difficult to recognized directly by consumers.

The challenge however, starts from the basic ingredients that are found easily in large quantities at relatively inexpensive prices. These are actually included into non halal raw materials that are derived from pigs. The raw material products are mainly from lard, pork bones, pork rinds and other parts of the pork. One of the products have been widely used for the food, cosmetics and

pharmaceutical industries. The ingredient is often called as gelatin; a product of addictive substances for food ingredients popular in the community such as ice cream, candy, yogurt, chocolate and even capsules. As stated by a food technology expert Prof. Dr. Irwandi Jaswir, in an unpublished talk, the supply of gelatin to the industry in the world was ascertained 90% is not halal; with 60% coming from pigs and the rest of it taken from halal animals, but processed not necessarily in halal ways as stated in the Gatra magazine.

To determine whether or not a food product containing halal gelatin, undoubtedly, the support of laboratories and experts is certainly compulsory. Up to the present time, halal products in developed countries could be further coded for food products. Using this method, they could easily be detected in the halal process of the products. On that occasion, they are accessed using the halal scan application.

Indonesia, a country with the largest Muslim population in the world, reaching 220 million, or about 25% of the world's Muslim population[3], requires halal food products from basic raw materials to the final products. Therefore, a large amount of gelatin as a food raw material is demanded in Indonesia. The consumption of halal food for Muslims in Indonesia in 2018 is US $ 173 billion and is expected to grow around 4.8% every year in 2025 to 248 according to the 2019-2020 Global Islamic Economic Report.

As far as this issue is concerned, gelatin, a raw material for food, cosmetics, pharmaceuticals, is actually an imported product. The companies producing and trading gelatin also appear to be very limited. It is time for Indonesia to have and take the opportunity in producing gelatin by utilizing the existing sources of raw materials in this country. Apart from raw materials such as cow and goat skin fat, according to the latest research developed by Jaswir et al. (2017), gelatin could be produced from raw materials of bones and fish scales, especially Tilapia which are widely available in Indonesian territories.

2. The Basic Concept of Halal Food

Nowadays, halal food has become a global trend and valuable industry, due to the collective awareness of the world's Muslims to implement the religious teachings, as stated in the Quran Surah Al-Baqarah verse 168: *"O mankind, eat from whatever is on earth [that is] lawful and good and do not follow the footsteps of Satan. Indeed, he is to you a clear enemy"*. In this verse, it has been stressed that halal is not only for Muslims, but also for all humankind.

Surely, halal products are not only about the raw materials, but also the processes from upstream to downstream of the products. A product could be declared halal as long as the fulfilled requirements are present such as the process of getting raw materials, the manufacturing process at the factory and distribution to the hands of consumers. The process from upstream to downstream should be carried out honestly and measurably so that the product could be consumed by the Muslims in comply with the principles outlined by the Quran.

Essentially, ensuring whether a food product is halal or not, is not as simple as one might imagine. On the contrary, this is also not as difficult as described by some people. In Indonesia, for example, the issue of halal food has still often been regarded as normal or common to be discussed in everyday life. Due to a large number of Muslim populations, foods that are sold in traditional food restaurants, such as Padangnese Restaurants, soup (*soto*) and meatballs stalls, and other restaurants that are usually identical with the owner's typical Muslims attire together with Muslim employees. Those certainly have been considered as halal foods by the community.

According to Tieman (2011), the process of halal products to be consumed by humans had to go through stages that were adjusted to the Islamic Halal Supply Chain rules. The Halal Supply Chain process is beneficial to keep the products that will be processed into halal products to maintain their halal status.

The halal level of a product has been divided by Tieman (2011) in sever. The first is halal, which is obtained by the public as an end product, which also could be found in markets, malls and retail stores. Consumers could actually identify whether a product is halal or not through a certification logo issued by authorized institutions such as MUI (Indonesian Ulema Council) or Jakim in Malaysia. Currently, the halal certification process has been handled by BPJPH (Halal Product Assurance Organizing Agency) with a *fatwa,* an Islamic legal opinion issued by MUI.

Secondly, in terms of processing the halal product (halal supply chain) which is called as "from farm to fork" process, from seedlings to restaurant tables. The process starts from manufacturing, packaging, transportation and logistics, ports, even container transports which must be particularly halal as well as not contaminated with other non halal products.

At present, Muslim consumers increasingly need products that have a halal value chain, moreover coupled with competitive prices as other conventional products. In addition, if halal food products are intended for sale both domestically and abroad, a more integrated series of processes called "The Integrated Halal Trade" involving external services where services from external parties will be involved, as shown in the picture 1.

Fig 1. Halal Trade Supply Chain
Source: Halal Development Center Malaysia

Concerning the issue of Halal Trade Supply Chain above, it is shown an integrated process from upstream to downstream. Without doubt, this will entirely become a big business opportunity. Moreover, examining more into the processed food products, the process is very dependent on raw material mixtures such as preservatives, thickeners and also elasticities such as gelatin, additives, dyes and other substances.

3. Global Food Economy Dimensions

The increasing awareness of Muslims concerning the need for halal foods and drinks, could be seen together with the number of Muslim populations reaching 1.8 billion with increased per capita income. Consequently, the number of halal food consumption needs is automatically increasing. Referring to the 2019-2020 Global Islamic Economy Report in 2018, The Global Muslim Market consumption in the food sector reached 1.37 Billion Dollars or 17% of the global market and will

evidently increase by 18% in 2024 by 1,970 Billion Dollars. The amount is consumed by non-OIC countries by 17% while OIC countries consumed by 84%. Nevertheless, it is interesting that Indonesia ranks first on Top Muslim Consumer Food Expenditure Markets.

Table 1. Top Muslim Consumer Food Expenditure Markets (2018 est., US$ in Billion)

No	Country	Food Expenditure
1	Indonesia	$173
2	Turkey	$135
3	Pakistan	$119
4	Egypt	$89
5	Banglades	$82

Source: The State of Global Islamic Economy Report 2019-2020

As shown in the data above, Indonesia is a large halal food market. Therefore, it has become a target for the food product market from various countries such as Thailand, Taiwan, Malaysia, Singapore and even Korea. Notwithstanding, Brazil produces halal food in the form of chicken with halal process to be exported to OIC countries with export value reaching US $ 5.5 billion. Indonesia as a country with the world's largest Muslim population (85% of the Muslim population of 260 million), unquestionably has the potential as the center of halal food products and services market.

4. Gelatin as Raw Materials for Food, Cosmetics and Pharmaceutical Products

As previously described in the halal supply chain process, many food products, cosmetics and medicines in order to be the excellent. A product known as gelatin has been needed for blending materials such as thickeners, adhesives or other functions. Gelatin has been a chemical substance that is actually dense, translucent, colorless, brittle (dried), and tasteless. Gelatin has been a compound derived from collagen fibers connecting tissue, skin, bone and cartilage hydrolyzed with acids or bases, it also has been obtained from partial hydrolysis of collagen. As a soluble protein, gelatin could be either a gelling agent or a non-gelling agent as stated by Ward and Courds (1977).

In line with the growth of the food, cosmetics and medicine industries in Indonesia, the need for gelatin has also greatly been increased. This is not only related to the sizeable population of 260 million, in which 88% of it are Muslims. Moreover, it also has the high per capita income of food products and processed foods.

Gelatin in Indonesia has currently been regarded as the most imported products, with 5 million kilograms of imported gelatin annually. The trend is increasing by about 3% per year as shown in the table 2.

Table 2. Gelatin in Indonesia

Year	Imported gelatin (kg)*	Value (Rp)	Imported food containg gelatin (gg)	Value (Rp)
2015	4.678.185	507 billion	13.403.070	501 billion
2016	5.259.445	505 billion	19.658.965	574 billion
2017	4.654.788	412 billion	16.576.796	599 billion

Source: Central Bureau of Statistics (*Badan Pusat Statistik*), (2020)

In terms of supply, in Indonesia there are only two companies producing gelatin locally, namely PT. EMS Gelatine Indonesia and CV Multi Ekstrasi (*Jurnal Akuntansi, Kewirausahaan, dan Bisnis*, 2016) . However, it is quite challenging to fulfill the needs of the industry in Indonesia. Therefore, the supply of gelatin is still influenced by international suppliers such as Nitta Gelatin, Gelita, PB Leiner, Rousselot, Sterling Biotech and Weishardt.

Indeed, international supplier products could be less expensive if the product is locally produced in Indonesia. In addition, the materials used and the processes have been considered halal. Not only gelatin production has an opportunity in the Indonesian market that is relatively large, nonetheless a real opportunity could be found to meet global demand due to only 3% of gelatin in the global market is currently halal-certified (Paul, 2016).

- The halal cosmetics sector, US $ 12.6 billion, amounted to 2.3 percent of the global cosmetics market of US $ 532.43 billion, which is expected to reach US $ 805.61 billion in 2023.
- The limitation scale challenge seems to be particularly acute in the Asia Pacific region, covering 73 percent of new halal cosmetic products launched between 2014-2016, and 35 percent of the global revenue share in 2016.
- The imports of gelatin into the OIC Region has been valued at US $ 99.6 Million in 2017.

Promising developments in several OIC countries appear with opportunities to invest including AJ Pharma a company from Saudi Arabia which has invested in the development of halal vaccines in Malaysia.

Shanghai Al-Amin Biotechnology Co. (AminBio), one of China's halal food producers, will invest US $ 24.6 million (RM100 million) in Malaysia to produce 3,000 tons of halal gelatin per year for Malaysia is considered as one of the top OKI pharmaceutical producers, experienced a shortage of 2,000 tons of halal gelatin in 2017.

5. An Alternative Raw Material: Fish

Gelatin distributed throughout the world is mostly made of mammalian skin and bones. As a result, gelatin made of pigs is relatively less expensive compared to other raw materials such as cows, goats, camels and fish skins. The issue raises from the cost of production to the availability of raw materials in Indonesia.

Alternatively, Irwandi Jaswir and fellow researchers from the International Institute for Halal Research and Training (INHART) Malaysia have also conducted extensive studies to explore fish as a new potential source of halal gelatin. At present, fish gelatin production in the world is very minimum compared to other types of gelatin. The fish gelatin production produces solely about 1% of the world's gelatin production; 270,000 metric tons (Jamilah & Harvinder, 2002). A recent outbreak of mad cow disease or known as BSE (Bovine Spongiform Encephalopathy) has led to an ongoing increase in demand for non-mammalian gelatins and subsequently increased demand and interest for gelatin derived from fish.

Muslim consumers' requests for gelatin fulfilling halal requirements has increased fish gelatin demands as well. Notwithstanding, the results of various studies indicate that the quality of fish gelatin, in general, is not comparable to raw materials from cows and goats. Indonesia has a sufficient supply of fish, even the type of fish that is suitable to be used as raw materials for gelatin is Tilapia; due to its immense skin elasticity. Tilapia is relatively easy to find, especially in the Wonogiri areas, Semarang to West Java.

From studies and researches conducted using fish raw materials in order to have competitive selling prices, there must be a mixture or combination of other raw materials such as cows and goats. It is recommended to use materials only derived from cows and goats since the price will be comparatively more expensive than imported products or the similar products.

Meanwhile, the results of the studies carried out by the tilapia fish experts could possibly meet the production of gelatin, both in quantitative and qualitative. In addition, the results of tilapia cultivations are still carried out with other fish cultivations.

Table 3. Several Types of Fish Gelatin

Type of Fish	Yield of Gelatin
Grouper	68,47% of fish skin weight or 3,68% of total fish weight
Mackerel	67,82% of fish skin weight or 2,04% of total fish weight
Jenahak	55,21% of fish skin weight or 1,82% of total fish weight
Keris	43,57% of fish skin weight or 1,71% of total fish weight

Part of Animal	Yield of Gelatin
Fish scale	61%
Cow skin	26%
Goat skin	23%

Source: International Food Research Journal, 2009

6. Economic Calculations of Gelatin Production

The study of gelatin has been carried out with regard to and based on the needs of imported Indonesian gelatin. As data shown by BPS (2018), Indonesia has imported as much as 4 million kg of gelatin per year, or about 11 tons of gelatin per day; 360 days / year of production.

This amount of production is considered to be very economical and potential in terms of business opportunities. When looking at international prices (alibaba.com), factory prices around IDR 7500 per kilogram, the production acquisition is around IDR 135 million with full production capacity.

In Indonesia, raw materials have relatively been limited not only due to the unavailability of these materials, especially cows skins and bones. However, these are also widely used for other food needs at quite competitive prices. Likewise, goat skin and bones in Indonesia are very popular for daily food needs of the people.

In fact, transportation costs have been required by the raw material needs concerning the limitations of these raw materials. This study nonetheless was conducted an option scenario using raw materials from cows, goats and fish.

- Scenario A only uses fish as the raw materials
- Scenario B only uses cows as the raw materials
- Scenario C only uses goats as the raw materials
- Scenario D uses combination of raw materials (15% Fish, 80% cows and 15% goats).

Based on the table and other information above, it can be concluded that:

- Scenario A in which all raw materials coming from fish skin will generate more income than other scenarios with a 50% Gross Profit Margin Ratio. In consequence, the results from fish scales and skin (61%) are far above the others (cows' leather 26%, goats' skin 23%). Based on the research conducted, this scenario could still be executed if a lot of raw materials are available.
- On the other hand, the price of raw materials from cows has relatively been high because of the high demand in the consumption of other food ingredients in which the prices are quite competitive. This scenario could also be implemented because many raw materials are available.
- In scenario C, the raw material derived from goats does not produce much profit. This is also due to the availability of raw materials which are also scarce. Therefore, this scenario seems to be beyond the bounds of possibility.

- In Scenario D, a trial of mixing raw materials of various types with an estimated percentage (15% fish skin, 80% cow skin, 5% goat skin) based on the availability of raw materials and the result is 42% gross profit margin ratio that can be produced. If the company does not want to depend on just one type of leather supplier, in which the option for the company could actually be chosen. The mix percentage could still be changed to get a higher profit margin. However, it is recommended to change the percentage of fish skin and cow skin (due to data availability of fish skin using only tilapia. Therefore, there is a possibility that more fish skin is available).

Table 4. Scenario of Raw Materials Use for Gelatin Factory

Production Capacity	5 tons/day = 150 tons/month		***Selling Price***	IDR 75.000
	Scenario A	**Scenario B**	**Scenario C**	**Scenario D**
Fixed Costs				
Machine Depreciation	306.755.729	306.755.729	306.755.729	306.755.729
Truck Depreciation	10.640.625	17.734.375	21.281.250	17.734.375
Maintenance	147.242.750	147.242.750	147.242.750	147.242.750
Direct Labor	127.054.785	127.054.785	127.054.785	127.054.785
Building Depreciation	104.166.667	104.166.667	104.166.667	104.166.667
	695.860.556	**702.954.306**	**706.501.181**	**702.954.306**
Variable Costs				
Raw Material	3.934.426.230	4.615.384.615	7.826.086.957	4.673.775.975
Electricity	165.000.000	165.000.000	165.000.000	165.000.000
Transportation (Solar)	180.000.000	300.000.000	360.000.000	300.000.000
Packaging	90.000.000	90.000.000	90.000.000	90.000.000
Other Costs	506.528.679	587.333.892	914.758.814	593.173.028
	4.875.954.908	**5.757.718.508**	**9.355.845.770**	**5.821.949.003**
Total costs per month	5.571.815.464	6.460.672.813	10.062.346.951	6.524.903.308
Total costs per day	185.727.182	215.355.760	335.411.565	217.496.777
COGS per kg	**37.145**	**43.071**	**67.082**	**43.499**

Gross Profit Margin	Gross Profit Margin	Gross Profit Margin	Gross Profit Margin
37.855	31.929	7.918	31.501
GPM Ratio	**GPM Ratio**	**GPM Ratio**	**GPM Ratio**
50%	43%	11%	42%

In the future, if a larger amount of raw material from fish is available, the prospect of using fish as gelatin raw material from fish will have greater benefits. Moreover, fish cultivation in Indonesia is relatively effortless but for the time being it has not been managed optimally and integratedly.

7. Conclusions

Indonesia as the largest Muslim country had consumption of processed food products and halal services in 2017 amounting to US 218.8 million, mainly from the food sector, processed beverage products, as well as from the cosmetics and pharmaceutical sectors. According to data compiled by the Indonesian Halal Lifestyle Center and Dinar Standard in the Indonesian Halal Economy and Strategy Roadmap 2018/2019, the total expenditure for food is US $ 170.2 Million, fashion US $ 20 Million, halal tourism US $ 10 Million, Pharmacy US $ 5.2 Million, Cosmetics US $ 3.9 Million and recreational media for US $ 9.6 Million. As the main raw material for processed products that are consumed by many people in Indonesia and the world such as ice cream, yogurt, chocolate, including cosmetics, pharmaceutical ingredients are using gelatin raw materials. As stated by Prof. Irwandi Jaswir, most of the gelatin's raw materials are not halal or processed through non-halal methods. Therefore, in his research Prof. Irwandi explained that the raw material of gelatin aside from cow, goat and camel skin, can also be produced with raw materials from the scales and bones of tilapia which are found in large quantities and cultivated in Indonesia.

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