

Will plant-based pork meat substitutes receive halal certification?

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Abstract

The use of plant-based meat substitutes is growing globally for nutritional and environmental reasons. The production of meat-free food in some cases meets the needs of vegans. It may also help and/or simplify meeting religious requirements e.g., halal products for Muslim consumers. It is interesting to extend the understanding of this meat substitute from the Islamic religious perspective as Muslim believers are more concerned about the permissible food/meat which is labelled as halal. This article will report the analysis of how Islam is expected to address a plant substitute for pork, normally a prohibited (haram, unlawful) meat. The arguments presented by different scholars and several existing guidelines related to halal certification from selected Muslim countries such as Malaysia. If all the materials used in plant-based pork are considered permissible, concern over halal certification procedures remains a debatable issue. Another concern is the effect of halal certification on Shariah compliance companies that serve pork plant-based meat. All these concerns are suggested to be addressed by International Fatwa Bodies, as well as JAKIM as one of the key players in the halal industry.

1. Introduction: What is a pork substitute?

The presence of essential micronutrients, such as iron, zinc, selenium and vitamin B-12 through meat consumption, aids the human body in many crucial metabolic and physiological processes (Vaes *et al.*, 2009; Welch *et al.*, 2009). However, due to inefficiencies of meat production, undesirable effects on the environment, ethical issues and negative impacts of meat consumption on human health, the food industry is exploring a new alternative for meat by substituting with non-animal proteins that can closely replicate the appearance, taste, viscosity and texture of raw meat properties (Lang, 2020). Different structuring techniques have produced fibrous meat-like textures with plant-based meat alternatives, such as extrusion, mixing proteins and hydrocolloids, freeze structuring, shear-cell technology

and electrospinning (Dekkers *et al.*, 2018). Common plant-based proteins, namely soybeans, rapeseed or canola, wheat, rice, oats, peas, beans, lupines and algae, are used as raw materials in processing plant-based meat alternatives (Tziva *et al.*, 2020). Among the advantages of plant-based meat are lower fat content, zero cholesterol, rich in calcium, and low calories. These materials also contribute to preserving the environment because they do not require animal husbandry, which is detrimental to environmental sustainability (Sha and Xiong, 2020). Despite the advantages, the texture and taste of meat alternatives do not precisely replicate real meat or chicken properties because the nature of meat itself is relatively complex. Therefore, consumers still reserve negative views toward meat alternatives, but they found that meat alternatives are similar to processed meat and have the best chance of replacing meat (Michel

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et al., 2021). In 2021, the plant-based meat market was USD 5 billion and expected to reach USD 8.3 billion in 2025, double from five years before. Pork plant-based meat is one of the main markets with several products such as burger patty, sausages, hot dogs, bacon chips, deli slides and shreds. This increase shows that plant-based meat is receiving a lot of acceptance among consumers and investors (Market Research Report, 2020; Markets and Markets, 2021).

In early 2020, Impossible Meat, a company in the United States, introduced a new product called “Pork Made from Plant”. Impossible Meat, on their website, claims that their plant-based meat products contain heme, an essential molecule found in both animals and plants which produces the meat-like “bloody” taste and appearance (Brown, 2018). Interestingly, soy leghemoglobin, a type of heme protein that originates in legume roots, matches the essential properties of heme in animal meat (Ismail et al., 2020). Even though there are significant differences in the amino acid sequence between leghemoglobin and animal heme counterparts, iron absorption of leghemoglobin showed comparable bioavailability to bovine haemoglobin in the human epithelial cell culture model (Proulx and Reddy, 2006). Therefore, plant-based heme proteins are mass-produced through the fermentation of genetically engineered yeast (Brown, 2018). The heme proteins are mixed with other plant-based ingredients to create a final taste similar to real meat. The Islamic perspective on genetically modified organisms is complicated as it involves various considerations beyond the classification of *halal* and *haram* (impermissible) (Alhariri, 2020). Islamic law establishes no definitive provisions regarding these issues. However, the decision can be made within the scope of *maslahah* (benefit) and *maqasid al-shari'ah* (the higher objectives of *shari'ah*), with the ultimate goal of attaining the righteous and eliminating the harmful (Erol, 2021). In addition, most of the *fatwa* councils worldwide have pronounced that genetically modified organism is permissible, provided that certain conditions are fulfilled: 1) the gene found in the genetically modified organism must originate from *halal* sources; 2) the technology is beneficial to human beings and poses no harms; 3) any threat to the five aspects of *maqasid shari'ah* does not prevail over *maslahah* (Bouzenita, 2010).

Impossible Meat claims to have obtained *halal* certification from IFANCA, a *halal* certification body in the United States (FSR Magazine, 2018). However, it was refuted by IFANCA that the *halal* certification for Impossible Meat was for another product, not for the plant-based pork substitute as claimed by the company (Whitehead, 2018). Given this controversial background

and the need to unravel the status of alternative meat from *halal* perspectives, the present study aims to have a deeper understanding of the issue and analyse the acceptance of a plant-based pork substitute from the Islamic perspective and *halal* certification procedures. This paper argues that plant-based meats are acceptably *halal*, including plant-based pork, but are challenging to be awarded *halal* certification. The following section discusses further the topic of *halal* accreditation.

2. Islamic perspective on a plant-based pork substitute

In general, Islam allows Muslims to eat all types of plant foods unless they bring harm to human beings. This principle is based on the following Islamic legal maxim: *al-asl fi al-ashya' al-ibahah* (Permissibility is the original state of things) and *al-asl fi al-at'imah al-hill* (Halal is the original state of all foods) (Al-Suyuti, 1990), unless there are shreds of evidence claiming the opposite, forbidding specific actions such as the prohibition of eating pork, drinking alcohol or the existence of harm to human beings (Al-Suyuti, 1990). These two maxims are derived from the saying of God in the Quran, Chapter 45 (sura *al-Jathiyah*), verse 13: “And He has subjected to you whatever is in the heavens and whatever is on the earth”, and Prophet Muhammad’s (PBUH) saying: “Whatever God has made *halal* is *halal*, and whatever that He made *haram* is *haram*, and whatever concerning which He has remained silent is forgiven” (Quran, 45:13). The of ‘forgiven’ in the Prophet’s saying is ‘it is allowed until proven prohibited’. Therefore, Muslim scholars agree that genetically modified food could be *halal* certified as long as it brings no harm to humans and no involvement from human genes or *haram* (impermissible) animals (Idris et al., 2020).

When it comes to a ‘pork substitute patty burger’ or other ‘meat’ that uses plants solely as the primary source of ingredients, *halal* is not an issue. This situation differs from cultured meat production which requires the animal to be slaughtered before the stem cells are harvested and cultured in a suitable medium (America Fiqh Academy, 2021). By extracting stem cells from animals that are *halal* for Muslims, slaughtering them as proscribed by the *shari'ah*, and not using animal serum or any derived materials from non-*halal* sources as the culture medium such as microalgae from soya waste, the cultured meat can be made *halal* (Hamdan et al., 2018; Kim, 2019; Hamdan et al., 2021a; Begum, 2021). The obligation to use slaughtered animals for *halal* cultured meat production came from the *hadith* narrated by Abu Waqid al-Laythi; he said that when Prophet Muhammad PBUH arrived in Medina and the people of Medina at

that time cut the camel's hump and goat's limbs alive. Then, the prophet said: *Whatever is cut from a living animal is a carcass (and consequently, considered as unclean)* (Al-Baihaqi, 2003; Al-Tirmidhi, 2000). This *hadith* shows that cultured meat originated from stem cells derived from halal slaughtered animals is halal (Hamdan et al., 2021b; Mohd Riza et al., 2022). The prohibition of blood and serum as the culture medium is also mentioned in the Quran: *He has made unlawful to you only carrion and blood and the flesh of swine and that over which there has been pronounced the name of anyone other than Allah's* (Quran, 2:173). However, in the case of a "Halal Pork Substitute Patty Burger", concerns arise from the name used for the product, especially when entering a dominant Muslim market. Is it appropriate for the manufacturer to use the term "halal" solely due to the ingredients used to make the "meat" entirely plant-based?

In answering this question, the Islamic perspective establishes two main views: the first view is derived from the Islamic legal maxim known as *al-'ibrah bi al-musammayat, la bi al-asma'* (the determination of a substance is dependent on its essence, not its name) (Al-Qarafi, 2010). Based on the Islamic legal maxim as mentioned, if a company names its product a "Plant-based Pork Substitute Burger" because the taste and texture are the same as a pork burger, but the ingredients are plant-based, it may be halal. Despite the name being changed to 'meat', the product maintains its halal status due to the permissibility status of its sources (plant-based ingredients). Therefore, a Plant-based Pork Substitute Burger will remain halal based on the halal status of the plant-based ingredients, which is originally halal until proven *haram* (impermissible) or unclean.

Muslim jurists also apply a deductive analogy (*qiyas*) in deriving the permissibility of plant-based pork consumption. The two examples of drinking water with an intention and believing that the water is alcohol and having sexual intercourse with his wife but believing or imagining the partner is not his wife. In these two cases, the water will remain as water; the wife will remain his wife. However, the debate among scholars is focused on the act, intention and belief of doing such unlawful action. With regards to this view, there are two opinions among Muslim scholars; some scholars allowed this imaginary intention based on the Prophet saying: "Indeed, Allah does not count on what is said (whispered) in himself" (Al-Bukhari, 2000; Al-Naisaburi, 2000). However, some scholars forbid it, whether it is at the stage of *makruh* (reprehensible or hateful) or *haram* (forbidden or inviolable) based on the *hadith* narrated by 'Umar al-Khattab: "Actions are according to intentions, and everyone will get (rewarded

or punished) what was intended" (Al-Bukhari, 2000; Al-Naisaburi, 2000).

As the Islamic teachings prohibit pork consumption and the previous Quranic verse asserted the prohibition, it can be concluded that consuming plant-based pork substitutes with the intention or belief of eating pork is considerably prohibited. In addition, some Muslim scholars such as Al-Ghazali opined in his book, *al-Ihya'*, Chapter Ethics of Hearing and Intense Feeling, that the perpetrator is punishable by law: "Whoever drinks plain water in a bottle of alcohol, the act is unlawful and can be sentenced" (Al-Ghazali, 2005). Al-Bahuti elaborated al-Ghazali's statement further by saying: "It is prohibited to imitate the alcohol drinkers, the person can be sentenced, even if the water is halal. If he gathers with a group of people that serve plain water with a bottle or a cup of alcohol and talks like they are drunk, this action is considered as *haram* because of imitation of a *haram* act, based on the Prophet Muhammad PBUH saying: He who imitates any people (in their actions) is considered to be one of them" (Abu Dawud, 2000; Al-Bahuti, 1997). From the different views and perspectives discussed above, the explanation of al-Bahuti should be taken into consideration in evaluating the halal status of a plant-based pork substitute. Can the product be eligible for halal certification?

3. Halal certification for a plant-based pork substitute?

The name of the product is essential to shape the acceptance and social perception of the product itself. For example, to make the fish more attractive to seafood consumers, the *Patagonian toothfish* was renamed Chilean Seabass by Lee Lantz in 1977 before entering the American market (Knecht, 2007; Rutkin, 2016). In highlighting the importance of a product's name in the application for halal certification, JAKIM's (Department of Islamic Development Malaysia) Manual Prosedur Pensijilan Halal Malaysia (Domestik) 2020 [Malaysian Halal Certification Procedure Manual 2020] stated that a halal certificate will not be issued to, among others, products which have names/brands that refer to non-halal products or are synonymous with or resemble non-halal products or containing any information that would be misleading to the concept of halal itself. Therefore, JAKIM will not issue halal certificates to non-alcoholic liquor or beer producers even though they may be on a production line having all the halal assurance systems in place (Chow, 2017). It is vital to be cognisant that the Muslim community perceives alcohol as *haram* (impermissible); at which point, the change of "hotdogs" and "A&W root beer" to "sausage /frankfurter" and "A&W sarsaparilla" respectively was deemed a

necessary effort (Bernama, 2017; Greg, 2016). Similarly, in 2009, JAKIM suggested to the manufacturers of *bak kut teh* (which means Pork Bone Tea soup) to change their name if they wanted to obtain a halal certificate, even if there is no pork in the listed ingredients (TheStar, 2009). The halal certification process does not solely depend on the ingredients used but on many other conditions that need to be met, including the product name.

The name change required by JAKIM was on the basis of the consideration between *maslahah* (benefit) and *mafsadah* (harm) and prioritising *maslahah ammah* (public interest) over *maslahah khassah* (personal interest). Therefore, based on this precedent, JAKIM prioritises public interest in maintaining the Muslim community's perception of non-halal foods' unlawful status by disapproving halal certification of products having misleading names. Approval of halal certification for products with misleading names may contribute to confusion among the Muslim community. The European Commission (EU) also discusses the importance of a product name on whether cultured meat can be defined as meat and carry 'meat' in their product's name because food labelling should be clear, precise and easily understandable (Bryant, 2020; European Commission, 2016).

The application of *sadd al-dharai's* (blocking the means to evil) to close the path that can lead to harm and greater damage can also be used to evaluate the issue of "Plant-Based Pork Substitute Burger". There are two types of 'paths' to harm or evil; the first type is a harmful path by itself. For example, drinking wine can lead to being drunk. Drinking wine itself is *haram*. The second type of path is permissible in its normal condition, but it can turn into prohibition if it might lead to harm or evil. For example, giving presents to friends is permissible in normal conditions, but it may be prohibited if the friend is elected as a decision-maker. This prohibition is to ensure that the present would not be categorised as a form of bribery known as a conflict of interest. In addition, if a certifying body certifies products that may encourage people to consider pork as a food source, the certifier may seem like promoting or supporting wrong. On the other hand, by not certifying the product, the certifier is promoting good. This action matches Allah's command in the Quran, Chapter 5 (sura *al-Ma'idah*), verse 2: "And cooperate in righteousness and piety, but do not cooperate in sin and aggression" (Quran 5:2). Halal certification cannot be issued to the product due to the potential harm and greater damage that may result, such as it might lead the Muslim consumer to try the real ones after tasting the pork plant-based meat. All these Islamic concepts are applied to ensure that the Muslim

community understands and is aware that pork is forbidden to Muslims. Not all halal foods may receive halal certification; refer to the visualisation as shown in Figure 1.

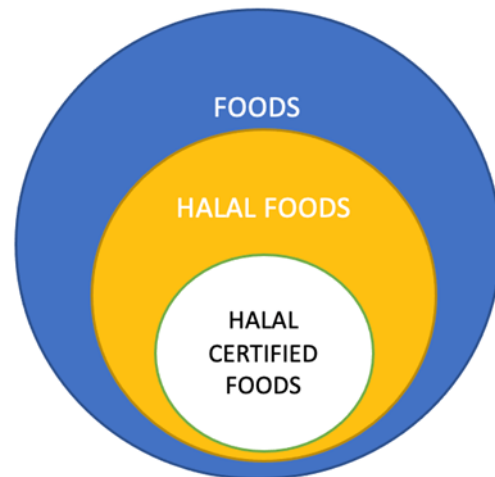


Figure 1. Set and subset of foods, halal foods and halal certified foods.

Another concern may arise if the company that produces these "Plant-based Pork Substitute Burgers" change their name to "Meat Burgers" only, but the taste, colour, texture and smell are similar to pork burgers. Will this product then be halal and lawful? If it is halal, will it be halal-certified by any halal certification body? These questions are challenging, and the circumstances require in-depth and comprehensive *ijtihad* from Muslim scholars. Comprehensive research can be done by having integrated analyses from food specialists, scientists and Muslim jurists in determining the halal authenticity and halal certification of the plant-based pork meat. The second concern is, can the Shariah compliance hotel and airline serve non-Muslim guests with pork plant-based meat as one of the dishes? Is it allowed because that dish is not *haram* itself? Is it will affect the halal certification that awarded to them? This concern also needs to be discussed by JAKIM as one of the prominent leaders in the halal industry. By referring to the previous Halal Standard, the awarded halal certification may affected due to the 'non-halal' name of the product.

4. Conclusion

From this review, it can be initially concluded that plant-based pork substitutes should not be certified halal based on Islamic teachings as discussed above and requirements from halal certification bodies, in particular, JAKIM. On the other hand, the rapid development of science and technology has made it essential for Islamic scholars to increase their understanding and knowledge so that *fatwas* and legal resolutions are given in accordance with the actual issue, with full respect for their knowledge in Islamic studies.

Scholars say *al-hukm 'ala shai' far' 'an tasawwurihi* which means “the determination of the Islamic law of a particular matter or issue is part of the understanding of that matter or issue”. Understanding a product or procedure during the *ijtihad* process will affect the accuracy of *fatwas* and legal resolutions. The product of alternative proteins, either plant-based or cell-based, will be exported to Muslim countries and consumed by Muslim consumers. Islamic scholars must answer the questions raised about the production of alternative proteins to guide Muslims and food companies manufacturing them.

Conflict of interest

The authors declare no conflict of interest.

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