

CULTURED MEAT: AN APPRAISAL FROM THE FIQH AND SUFI VIEWS OF MUSLIM SCHOLARS

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ABSTRACT

Meat comprises of important nutrients for the human body. As the global population increases, so has the demand for meat. A new idea was conceived to invent cultured meat produced from the outer part of the animal's body in the 1930s. However, the idea of cultured meat invention was only realized in 2013 by a Dutch scientist who invented burger-shaped cultured beef. This invention did not exist at the time of the Prophet, his Companions and the *tābi'īn* and it has become a polemic among the Muslim community regarding its halal status. The existence of cultured meat in the today's society requires a clear *fiqh* explanation and procedure because it is one of the new discoveries in the food industry. This study is significant to provide a good understanding and new knowledge to the Muslim society. A clear *fiqh* approach will provide guidelines to the society in considering it as a staple or alternative diet. Otherwise, they may avoid consuming cultured meat product as a precaution from haram and uncertainty (*shubhah*). This study employs qualitative descriptive research by analyzing some previous studies as secondary sources that have been recorded elsewhere, processed, printed and disseminated to the public. The results found that cultured meat is a new discovery in Malaysia. Although the original law for this cultured meat is halal, if it does not meet the shariah principles and criteria, it is considered haram. This paper highlights the halal status of cultured meat from *fiqh* and sufism in terms of the transformative form of God's creation. Based on the primary sources of *fiqh* and sufism, the status of cultured meat is considered halal provided if the shortage of meat affects the needs of the population, it causes no harm in terms of consumption and benefits the general public. Further research is necessary to verify that it is also *tayyiban* and fulfils the *maqasid* with regard to Islamic nutrition and the effects of consumption to consumers.

Keywords: *Cultured meat, alteration of God's creation, halal, haram.*

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Introduction

Meat is one of the favourite and the most widely eaten in the world. According to Kamus Dewan (2002), meat is an option of food that people consume and it is a main part of the body of an animal between the skin and the bones. Meat has been presumably the first source of animal protein for human nutrition in daily food (Paulsen *et al.*, 2017) and is considered as one of the main sources of energy for the body that contains of fats, minerals, vitamins and some important nutrients and it well accepted by the majority of society (Celada *et al.*, 2016). Meat plays an important role in the development of human life and affects the economic growth of a country. The average per capita consumption of meat globally is increasing year by year with an increase of 5 million metric tons in every 10 years (Godfray *et al.*, 2018).

Over the past 50 years, the various types of meat consumption in food increased globally from 23.1 kg (1961) to 42.20 kg per person until year of 2011 (Sans and Combris, 2015). It increased to 26 kg per year in 2000 and is expected to increase up to 37kg per year in 2030 (Heinz and Hautzinger, 2007). An analysis made by Sanjay Mahato (2019), which stated that the consumption of meat-based food will continue to increase by 10-11 kg between 30-40 years ahead. Overall, the global demand for meat and dairy products is expected to grow by 73 % and 58 %, respectively, in the period 2010-2050 (FAO, 2011). The United Nations Department of Economic and Social Affairs (2019) estimated that the world's population is to grow by 10 billion in 2050 and 11 billion in 2100. The growth of the world population will directly lead to the increase in the demand for meat.

Laboratory Cultured Meat

History of Cultured Meat

The concept of producing cultured meat, also known as in vitro meat, has been discussed since the 1930s, as noted by Fredick Edwin Smith, author of "The World in 2030 A.D." In 1932, Winston Churchill predicted the possibility of synthetic meat production without conventional animal husbandry, produced outside the animal's body (Reese, 2018). The idea of generating new life outside the animal body was later demonstrated by Alexis Carel, who successfully isolated (embryonic) heart cells from chickens in a living state for an extended period from the chicken's body in 1937. Six years later, Rene Barjavel, a French science fiction author, envisioned in his novel "Ravage" the use of in vitro meat in food restaurants as a future consumer product (Bhat *et al.*, 2014).

The idea and prediction of this cultured meat did not hold up for about five decades due to various factors, including technological advances and insufficient costs. In 1996, the idea of expanding this cultured meat received a new boost when Sealea and Rudnicki discovered in 2000 that stem cells isolated directly from skeletal muscle were capable of regrowing the muscle. In the early 1950s, Dutch scientist Willem Van Eelen suffered from famine during the World War, which inspired him to investigate cultured meat as a food source (II). (Spectre, 2011). Later, in 1999, the theory and concept of culturing meat was successfully patented internationally before the concept of stem cell and in vitro cell culture emerged in the food industry (Schneider, 2012). In 1998, Benjaminson was awarded a \$61,639.00 grant from the National Aeronautics and Space Administration (NASA) and successfully produced an alternative food source for astronauts by culturing goldfish (*Carassius Auratus*) muscle tissue in Petri dishes over a period of 3 to 5 years (NASA, 1998). To test the degree of suitability and safety, the cultured meat was cooked with olive oil and spices and then tested by the panels. The panels concluded that this cultured meat was safe and could be used as an alternative food (Benjaminson *et al.*, 2002).

In 2013, Dutch scientist Mark Post succeeded in growing a beef burger in his laboratory at Maastricht University in the Netherlands. He used stem cells from the thighs of live cattle to produce the cultured meat. The cultured meat was then cooked at Riverside Studios in London and tested by two sensory scientists, Josh Schonwald and Hanni Ruetzler (Post, 2014; Kelland, 2013). It was found that the colour of the cultured meat was reminiscent of chicken and not real beef. Therefore, he added a little beet juice and saffron to the cultured meat to approximate the colour of real beef. As for the taste, the panel found that the taste of the cultured meat was very similar to the taste of real conventional beef (Zaraska, 2013).

Although this cultured meat is developing well, this knowledge is common only among scientists and academics, so the issue of producing meat produced outside the animal body by culturing tissues or animal stem cells is now intensively discussed only in the community.

Sources of Cultured Meat

Normally, meat is produced from a combination of tissues, muscles, fatty blood vessels, and various other elements derived from embryonic cells after fertilization of the sperm between male and female animals (Bailey *et al.*, 2001). Conventionally, meat is usually obtained from animals that are kept for a certain period of time before slaughter to obtain the meat. This conventional process is considered impractical because it takes a lot of time and does not meet the needs and demands of society. Therefore, a new discovery has been made to solve the shortage of meat caused by the increase in population and the development of today's technology. Scientists have produced cultured meat in a short period of time by using existing, readily available animal stocks with the help of stem cells derived from embryonic or adult cells.

Stem cells derived from these embryos can be obtained from embryos that have not yet been implanted in the uterus, whereas stem cells derived from adult cells are obtained from the body tissues of animals (Edelmen, 2005). In development, the source of cells that can be used as stem cells can be obtained from the following sources: Satellite Cells, Adipose-derived Stem Cells (ADSCs), Embryonic Stem Cells = ES Cells, Induced Pluripotent Stem Cells, a mixture of cells and stem cells from other flesh components (Bhat and Bhat, 2011).

Factors of the Existence of Sources of Cultured Meat in the Market

There are several main factors that condition the presence of cultured meat in society, namely the growing human population, increasing demand for meat, ensuring the safety of cultured meat, environmental pollution, reduction in the cost of animal husbandry, increased awareness of animal welfare including processing, transportation and health care (Hamdan and Ramli, 2019).

Increasing human population and demand

According to the United Nations Department of Economic and Social Affairs, the world population will reach a peak of nearly 11 billion people by the end of this century, with a growth rate of about 83 million people, or 1.1% annually. The world population is aging and growing at a slower rate, but growth is still expected to increase globally from 1 billion in 1800 to 7.9 billion in 2020 (World Population, 2020), expanding to 8.6 billion in 2030, 9.8 billion in 2050, and 11.2 billion in 2100 (United Nations, 2017).

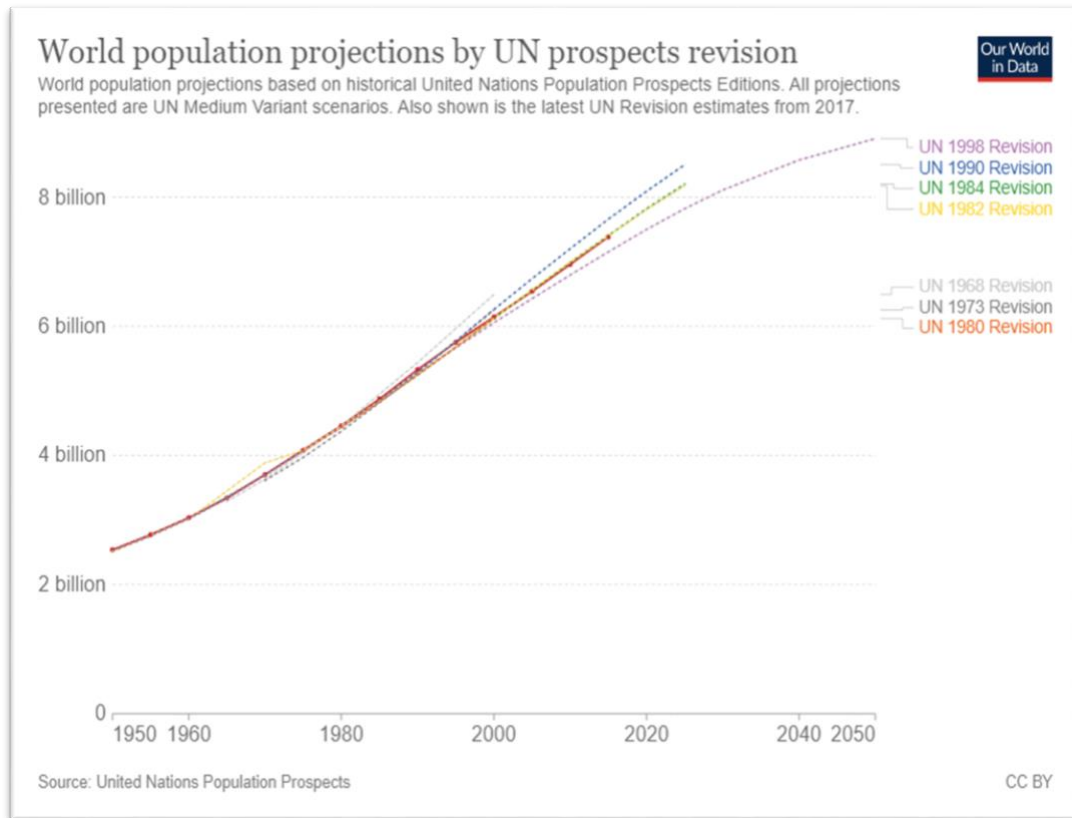


Figure 1: World population projections based on historical United Nations Prospect Editions (United Nation, 2017).

As the world population increases, the growing population has a direct impact on the increasing demand for food, especially meat and other meat-containing foods. Although there are differences in ideology, culture, economic situation, and national position, each person in the world consumed about 75 pounds of meat as food per year (Gould and Friedman, 2016) and the consumption will continue to increase year by year. Below is the meat consumption data for each country for each year.

Meat consumption in various foods is expected to double globally by 2050, at about 73%, in line with the increase in the world's population. If this demand is not satisfied, it will lead to other problems in human life, such as protein shortage and rising prices, and also affect the smooth chain of enterprises and consumers. To prevent this situation, scientists have tried to produce plant-based meat alternatives such as vegetables (Choudry, 2016; Post, 2012) to meet consumer demand with a similar taste and texture to domestic meat produced from various protein sources such as soybeans and wheat (Grigg, 1995). In addition, insects such as grasshoppers (Paul *et al.*, 2016) and synthetic meat produced by in vitro techniques have also been grown from animal cells (Bryant, 2020). Some scientists refer to this alternative as analogue meat, which refers to fake meat products or synthetic meat that is not made exclusively from red meat as a substitute (Ismail *et al.*, 2020).

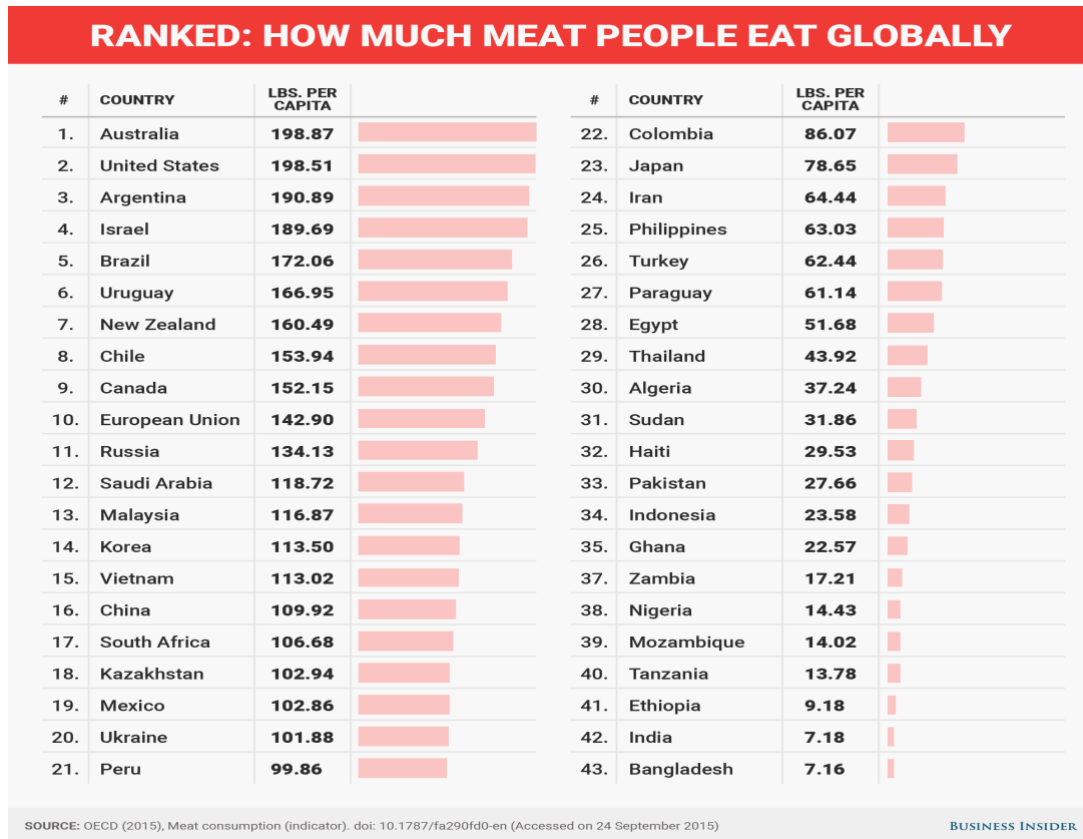


Figure 2: The top meat-eating countries (Gould and Friedman, 2016).

Ensuring the Safety of Cultured Meat: Singapore Context

In the context of Singapore, the Singapore Food Agency is the agency responsible for regulating food manufacturing establishments. In a joint initiative, the Singapore Food Agency (SFA), A* STAR and NTU are working together to improve food safety in Singapore in areas such as cultured meat. The discussions between regulators, scientists and food technology companies led by these teams are key to finding solutions that are attractive to global food suppliers while meeting the stringent requirements of consumers and regulators.

Ensuring food safety is critical and fundamental. Culturing meat is no different from any other food manufacturing or production process. Appropriate systems must be in place to ensure Good Manufacturing Practice (GMP) and implementation of Hazards Analysis Critical Control (HACCP) systems, or other equivalent food safety management systems to mitigate the risk of contamination. Producers of cultured meat must apply the concept of food safety by design throughout the manufacturing process. They must adhere to standard and strict food production hygiene practices to ensure that final products are safe for consumption.

In Singapore, companies that intend to produce cultured meat must conduct and submit safety assessments to cover potential food safety risks. Test parameters include factors such as the toxicity and allergenicity of the meat itself, as well as the components used in the culture media and the safety of the manufacturing process. Expected dietary exposure from consumption of foods containing cultured meat should also be evaluated, even if the product is not yet on the market. Companies must label product packaging with qualifying terms such as “cultured”, “farmed,” or “cell-based” to make clear the type of food being sold.

In Singapore, Eat Just is the only company that has approved lab-grown chicken as an ingredient. The product has a high protein content and broad amino acid composition, does not contain antibiotics, and has very low microbiological content, such as salmonella and E. coli. Eat Just has passed all the rigorous

testing required by the Singapore Food Agency and received recognition for food safety requirements for novel foods, as well as demonstrated a consistent manufacturing process for the cell-grown chicken. During the safety and quality inspections, the product was also found to meet poultry meat standards.

They are not yet on the regular market, but only used in a restaurant 1880. The cost of a chicken nugget is 50 dollars. To become the powerhouse of cultured meat, the cost must be reconsidered. This will also affect the manufacturing process. Purchasing power will be an issue. Eat Just is looking at this factor to secure the market for protein alternatives in Singapore.

Environmental Pollution

The production of meat with good quality and guaranteed safety requires a lot of time and processes in rearing, feeding, preservation, cutting, delivery and preparation (Petriani *et al.*, 2020). The whole process of meat production has several negative impacts on the environment, such as high water consumption, soil degradation, and greenhouse gas (GHG) emissions from livestock production, including carbon dioxide, methane, and nitrogen oxide. Industrial GHG emissions have increased 16.4 percent since 1996 and skyrocketed to 44 percent (250.51 million tonnes) from livestock in 2015. This could accelerate the impact of greenhouse gases from livestock waste such as methane, which is 86 times more harmful than CO₂, on global temperature. Under these conditions, livestock accounted for 18% of all greenhouse gases, compared to 13% of industrial impacts (Shindell *et al.*, 2009).

Other negative impacts include solid waste and waste from animal agriculture, which can pollute the air, soil, and groundwater, as the abundance of animal waste affects the health level of the community and wildlife.

The production of meat also requires large areas as space for animals and plants. Many livestock require large amounts of feed such as corn, soybeans, and other grains (Weiss and Leip, 2013). The Food and Agriculture Organization of the United Nations (FAO) (2011) stated that about 30% of the world's land area is used for meat production. In this case, a solution to land scarcity must be found through the production of cultured meat. It can also prevent pollution and save space and land.

To keep livestock healthy and clean, animals also require a large amount of water. This water is used not only for drinking, but also for other purposes such as watering fodder plants, cleaning animal shelters, and keeping the animals hygienic. According to Hoekstra and Chapagain (2007), water demand is higher in livestock production than in agriculture, as 13,812 gallons of water are needed to produce one pound of cooked beef, while only 908 gallons are needed to produce one pound of cooked beans. May (2012) mentioned that it takes 50,000 to 100,000 gallons of water to produce 1 kg of meat. The use of land, water, energy, and time is associated with the production of conventional meat, which only produces a certain amount of meat and may not be able to meet the demand of the world's population. Therefore, a new alternative such as meat production in the laboratory without excessive use of energy, water and land and safe from any pollution should be considered.

Increase an awareness of animal welfare

As the world's population grows and the demand for meat increases, there has been an increased awareness of farm animal welfare in terms of food, space, and hygiene. Animal welfare requires careful care and treatment in terms of physical and psychological well-being to increase productivity, health and meat quality. The ideal life for farm animals is free-range before they are slaughtered. However, with the increasing demand for meat, free-range is no longer the first choice for most farmers because this method requires a larger area and open pastures (Bracke, 2009).

Most farmers care more about commercial profit than animal welfare. They usually opt for factory farming, where the animals are kept in cramped quarters with no room to move around, or even stand or flap their wings. The animals are forced to wallow in their own faeces and urine, have no access to outside air or sunlight, and are even brutalised by being injected with hormones and antibiotics to speed

up the growth process and prepare them for marketing. As a result, these animals are potentially exposed to various viruses and bacteria through faeces and urine in their environment. This situation can affect the physical and psychological condition of the animals. Physically, the animals are prevented from performing natural behaviours such as walking, stretching their limbs, dust bathing, and other natural behaviours. Psychologically, animals in factory farms feel frustrated, bored, and suffer, leading them to self-harm (Hetts *et al.*, 2008).

The cruelty of the livestock industry is part of the cruel reality and new alternatives have been invented by scientists to produce the meat without the long process of raising livestock. This idea is also accepted by animal rights activists because it could avoid any persecution (Bhat *et al.*, 2015), and it is even healthier than conventional meat because through this process, scientists could adjust the level of nutrients, proteins, and nutrition that humans need to be free from diseases such as diabetes, cancer, and heart problems (Larsson and Wolk, 2006). In addition, the ratio of saturated and unsaturated fats can be controlled during the breeding process by manipulating the composition of materials and fats used as breeding medium, such as omega-3 (Wyers, 2019).

Status of Cultured Meat from the Perspective of Islam

Cultured meat is a new issue that did not exist at the time of the Prophet, the Companions, the *al-tābi'īn* and the *tābi 'al-tābi'īn*, nor in the next generation after them. The absence of this issue at that time has made it difficult for the present generation to recognise the halal status when this issue arises. The existence of new products such as cultured meat in the time of the *mutaqaddimmīn* (classical scholars) requires *istinbāt* (clear legal conclusions) from *ittifaq* (agreed legal sources) as well as the *ijtihād* of the scholars.

The Law of Cultured Meat According to the Quran and Mufasssīrīn

Basically, meat is mentioned in the Quran as a delicate food. There are 12 words of لحم (*lahm*) mentioned in al-Quran; these words refer to the meaning of meat in several suras in al-Baqarah (2:173), al-Baqarah (2:259), al-Māidah (5: 3), al-An'ām (6:145), al-Naḥl (16:14), al-Naḥl (16:115), al-Ḥajj (22: 37), al-Mu'minūn (23: 14), Fāṭir (35:12), al-Hujurāt (49:12), al-Thūr (5:12), and al-Wāqī'ah (56:21). Based on these words, there are a total of 12 words لحم (*lahm*) mentioned in Al-Quran that generally refer to normal meat production that is produced by a conventional process, even if it is done in different contexts.

The mufasssīrīn such as Ibn kathīr, al-Ṭabarī, and al-Rāzī had their point of view in *tafsīr* book especially in sūrah al-Baqarah (2:173), al-Māidah (5: 3), al-An'ām (6:145), and al-Naḥl (16:115), in which لحم (*lahmun*) is explained in each of the words referring to the prohibition of eating pork, either farmed or wild (al-Ṭabarī, 1994), and its bones, fats, and related forms (Ibn Kathīr, 2000), because it is illegal and dirty (al-Rāzī, 1981). While in al-Baqarah (2:259), it is proved that Almighty God can resurrect the dead in a normal form even if they are only the bones and envelop them with flesh in a short time.

In al-Naḥl (16:14) and Fāṭir (35:12), reference is made to fresh fish coming from both the salty sea and the fresh water, while in al-Ḥajj (22: 37) *taqwa* and honesty in performing *udhiyyah* (sacrifice) are emphasized, with Allah Almighty accepting the meat and blood of sacrificial animals only if the performers are honest. While al-Mu'minūn (23: 14) explained the process of creation of man which started with sperm and expanded to *al-'alaq* (adhering in the woman's womb) in a few weeks, then became a form of flesh, changed into bones and wrapped with flesh until the *ruh* (spirit) was blown into a complete form of man.

Moreover, al-Hujurāt (49:12) has pronounced the prohibition of *ghībah* (gossip) that Allah imposes on those who practise *ghībah* in their lives, equating these people with eating the flesh of their own relatives

and considering it a filthy act. In al-Ṭhūr (5:12), the life of the believers in Paradise was portrayed, where they lived happily, and Allah bestowed them with fruits and meat of their choice. Among the delicious meat they ate in Paradise was a bird al-Wāqi'ah (56:21).

Although these surahs refer to the meaning of meat, it is generally understood to mean animal flesh obtained through natural processes. Therefore, the Qur'an does not mention the word cultured meat either implicitly or explicitly.

Since cultured meat is a new invention in the food industry that did not exist at the time of the prophets and their companions, the law that applies to cultured meat is the same as the law of changing God's creation, because it is not produced by natural processes that have been practiced by farmers for centuries. In other words, this process has changed the habit of producing meat through conventional processes to cultural techniques that require human effort.

In general, it is forbidden to change Allah's creation, as Allah states in Surah al-Nisa (4: 119):

Translation: "And I will truly lead them astray and will raise up empty dreams of them and will send them (cut off the ears of livestock), then they actually cut them off, and I will tell them (to change God's creation), then they really changed it. Whoever makes Satan become a protector besides Allah, then, in fact, he suffers a real loss." (al-Nisa' 4: 119).

The Law of Cultured Meat According to the al-Ḥadīth

Just as al-Qur'an does not mention the status of cultured meat, so does the hadith. Something that did not exist at the time of the Prophet and his Companions and also the *tabi'in* is considered a new thing, and the new thing that is not produced by *tābi'ī* (naturally) is considered a change in the creation of Allah and is forbidden. This is explained in the ḥadīth as follows:

Translation: "The Prophet (p.b.u.h.) said, "Allah has cursed the lady who artificially lengthens (her or someone else's) hair and the one who gets her hair lengthened and the One who tattoos (herself or someone else) and the one who gets herself tattooed" (Al-Bukhārī, Ḥadīth 5933).

In another Ḥadīth, the Prophet said:

Translation: "Abdullah cursed those women who practiced tattooing and those who removed hair from their faces and those who created spaces between their teeth artificially to look beautiful, such ladies as changed what Allah has created. Um Ya'qub said, "What is that?" `Abdullah said, "Why should I not curse those who were cursed by Allah's Messenger (p.b.u.h.) and are referred to in Allah's Book?" She said to him "By Allah, I have read the whole Qur'an, but I have not found such a thing. `Abdullah said, "By Allah, if you had read it (carefully) you would have found it. (Allah says:) 'And what the Apostle gives you take it and what he forbids you abstain (from it).'" (59.7) (Al-Bukhārī, Ḥadīth 5939).

This hadith mentions that it is haram to alter one's natural appearance unnecessarily. Tattooing (*al-washm*), removing one's teeth (*al-washr*), creating gaps between one's teeth (*al-tafalluj*), shaving one's eyebrows (*al-nams*), and the like is haram in Islam. Allah also forbids lengthening hair and tattooing for the sake of cosmetics. (Al-Bukhārī, Ḥadīth 5481).

This hadith shows the prohibition for a woman to lengthen her hair as well as tattoo her body. These actions are classified as a great sin and so is the lifestyle of the Jews because they alter the nature of creation.

Ḥumaid bin Abdurrahmān had heard that Muawiyah bin Abu Sufyan stood on the pulpit during Hajj and took a strand of his guard's hair and said that Prophet Muhammad (p.b.u.h.) had previously forbidden the act of extending women's hair (Al-Bukhārī, Ḥadīth 3281; Muslim, Hadith 2127) and (Muslim, Hadith 2126).

From the above source of Islamic law, it is clear that the al-Quran and the al-Hadith do not mention the legal status of cultured meat because this product did not exist in the past. It is an innovation that exists in this new era. Basically, it is considered an alteration of creation that is against the sunnah of meat production. Although there is no clear *instinbāt* law in either source, the above hadiths refer more to humans and cosmetic phenomena, but not to food.

Based on the above hadiths, Allah forbids the action that is against the norm of nature. However, the case of cultured meat, one of the products that are produced without natural processes, is different. This product is considered to be an alteration of God's creation. Therefore, in order to know the status of its *ḥukm*, the view of Islamic jurisprudence is required, which describes the human understanding and practice of sharia.

The Changing Form of God's Creation according to Fiqh Perspective

There are various forms of change in God's creation by man. Some of these changes are permanent while others are temporary. Some of the permanent changes are permissible and some are prohibited, likewise with the temporary changes, some of them are permissible while others are unlawful. Permissible permanent changes include changes that replace missing limbs, such as dental implants, implantable contact lenses (ICL), and heart implants. They also include treatments to facilitate speech, vision, and breathing. This is explained in the hadith of 'Arjafah bin As'ad:

Translation: "My nose has been cut off on the day of the Battle of Kulab in the days of Jahiliyyah. So, I took (replaces) with silver. Then (some time) my nose began to rot. So, the Prophet of Allah ordered me to replace my nose with gold. (Al-Tirmīdhī. *Bāb mā jā'a fī shadd al-asnān bi al-zahab*. 1996).

Al-Tirmizi had mentioned in the hadith of Arjafah bin As'ad that he was severely wounded in the battle of al-Kulab at the time of Jāhiliyyah. The Companion replaced his wounded nose with a silver one until the nose was rotten. The Prophet (p.b.u.h.) then ordered the Companion to reconstruct the nose with gold.

Basically, the use of gold is prohibited especially for humans, then it is allowed for treatment purposes, based on what happened to 'Arjafah Bin As'ad. Al-Qaradawi said, "If a person has a defect that causes pain, whether real or emotional, then it is permitted to treat him. As long as he does so in order to get rid of the pain that disturbs him and affects his life. Indeed, "Allah wants to make your life easier, not more difficult"." (al-Baqarah:185)."

The forbidden permanent alteration is an alteration that is done for beautification purposes and not for treatment purposes, such as painting tattoos, stretching teeth, and performing cosmetic surgery or changing male genitalia into female and vice versa. The permissible temporary change is a change that is allowed according to the rules of Shariah, which must not harm the body and affect the *aqidah*. This matter agrees with one of the hadiths in the *qaidah al-fiqhiyyah*, namely *lā ḍarar wa lā ḍirār*, which has the meaning of harmlessness or against it. It also agrees with the branches of the method of the *qā'idah al-fiqhiyyah* in *al-Aṣlu fī al-Asyā al-Nāfi'ah al-Ibāḥah* which explains that something that is beneficial is considered permissible while something that causes harm is haram, as it is also mentioned in the *qā'idah fiqhiyyah*, viz. i.e., *al-aṣlu fī al-asyā al-ḍarrah al-tahrīm*.

In this case, all changes that are made temporarily and do not harm one's health and faith are permitted, such as wearing henna and eyeliner. Prohibited temporary changes, on the other hand, are changes that are impermissible according to the rules of the Shari'ah, such as lengthening the hair and shaving the eyebrows.

Muslim Scholars' Discussion on the Legal Status of Cultured Meat

The two main sources (al-Quran and Hadith) do not clearly mention the ruling of cultured meat, considering it as a new product in the food industry and also as an alteration of God's creation created by human innovation and produced against the nature of the animal. Any act that alters God's creation is absolutely forbidden and any product produced by this process is automatically impermissible. However, Muslim scholars differ on the definition of altering Allah's creation. These disagreements can be summarized into four categories:

The first opinion is held by the *mufasssirīn* scholars of al-Shanqīṭī (2005) and al-Ṭabarī, (2006). They argued that the meaning of alteration in Allah's creation in Surah al-Nisa (4: 119) and the above hadith is to alter the religion of Allah SWT. This opinion is supported by al-Rāzī, (1997) in his book Tafsīr al-Fakhr al-Rāzī. He stated that the meaning of the words “*falā yughayyirunna khalqillāh*” in al-Nisa (4: 119) and “*lā tabdīla li khalqillāh*” in al-Rūm (30: 30) is that there can be no worship of creatures (*makhlūk*) to other creatures (Al- Rāzī, 1981). In other words, do not commit shirk towards Allah (Abū Ḥayyān, 1993) by making the creatures on this earth gods, such as worshipping statues and idols or worshipping the moon and the sun (Ibn Taymiyah, 2005). Al-Tabari also explained that the purpose of changing God's creation is to commit immorality and violate His command. Any act that violates the Shari'ah is considered immoral and changes its His creation (al-Ṭabarī, 2006) spiritually or metaphysically, which is part of *ma'nawi* change (*al-taghyīr ma'nawī*). This act is also considered committing shirk when changing the nature of the original faith, beliefs from Islam to Judaism or Christianity (al-Athqalānī, 2001) or in physical forms, which belong to physical changes (*al-madī*), such as cutting the ears of livestock, tattooing, lengthening 'hair, shaving eyebrows, and pulling teeth apart (al-Jawziyyah, 2006).

The second opinion is *al-khisa* (castration) as advocated by Mujahid, Qatadah and Ikrimah. Castration is the removal or inactivation of a human's testicles. Castration of humans is haram according to ijma' because this act is contrary to Shari'ah and the nature of humans, who long for children and family. Castration of animals, on the other hand, is permitted in order to increase the meat and fat of the animal (Qaraḍāwī, 2006).

The third opinion is the opinion of the *mufasssirīn* and Islamic jurisprudence on *al-washm* (tattooing), as presented by Ibn 'Atiyyah (2001) in al-Muharrar al-Wajiz fi tafsir al-Kitab al-'Ajiz and al-Suyuti in al-Durr al-Manthūr fi al-Tafsīr bī al-Ma'thūr, which was transmitted by Ibn Mas'ud and al-Hasan (al-Ṭabarī, 2006). The majority of Muslim scholars agreed that altering God's creation, such as tattooing, is forbidden because it causes unnecessary pain during the process.

The purpose of changing the fourth creation of Allah is to change the *sunnatullah* and jurisprudence which is the absolute right of Allah SWT such as legalizing haram or vice versa (al-Qaraḍāwī, 1980). Therefore, the last opinion has been held by the Muslim scholars about changing the *sunnatullah*, which states that no one has the right to change the absolute right of Allah (Ibn Abī Ḥātim, 1997), like legalizing haram or vice versa. Islam has limited the power to legalize the haram and halal regardless of their religious or worldly position, which is reserved only for Allah. (al-Qaraḍāwī, 1980).

Analysis of Cultured Meat from Perspective of Fiqh

Cultured meat is one of the most famous innovations in the food industry, without going through a natural process. It is produced from the external part of the animal body using a culture process by extracting it from an animal tissue or stem cell (Bhat *et al.*, 2014) and placing it in a medium containing appropriate nutrients and energy to expand and grow as meat (Hamdan and Ramli, 2015). This product needs a special declaration and legislation whether it is halal or not. Therefore, deciding on the law is not an easy process as it is contemporary issues that have never been specifically discussed by the classical ulama scholars.

In particular, the rulings of cultured meat were not yet mentioned by the *fuqaha*, as it did not exist in their time. Therefore, this cultured meat can be considered as an alteration of the natural creation of Allah. Basically, Allah has forbidden changing the form of His creation. However, there are things that are allowed to be changed, especially in medicines and other things that are not against the law, in order to save people's lives. In this case, it is considered *mubah*, and the fact is based on the *qā'idah al-fiqhiyyah* as follows (al-Şanhājī:2001; al-Zarkashī: 1992):

الأَصْلُ فِي الْمَنَافِعِ الْحِلُّ وَفِي الْمَضَارِّ التَّحْرِيمُ

Translation: All beneficial can be executed accordingly but all harmfulness is haram.

If cultured meat production is beneficial to the community as a whole, such as improving the food chain and global stock, it can be considered permissible and acceptable, but if it harms people, it automatically becomes haram, as stated in the *qā'idah fiqhiyyah* (al-Şanhājī:2001; al-Zarkashī: 1992).

Laboratory Cultured Meat from Perspective of Sufism

Asceticism (*zuhd*) is the root of Sufism. It is a renunciation of a world-centered life to a preference for the otherworld-centered life. As ascetics, Sufis strive to attain God's satisfaction and come close to Allah in view of the hereafter, rather than satisfying their worldly desires in a worldly life. They are called "people of their Lord" (*rabbaniyun*). Unlike Hindu, Buddhist, and Christian ascetics, Muslim ascetics do not practice celibacy or lead monastic lives. They live a life of balance, a life of harmony between this world and the next. In general, asceticism is consistent with the teachings of Islam. It is a practice of the Prophet Muhammad (p.b.u.h.) himself as well as his companions, including the four rightly guided caliphs, *Ahl al-suffah*, Abu Dharr (d. 32/657), Abu 'l-Darda' (d. 32/652), his wife Umm al-Darda', Salman al-Farisi (d. 35/655), Hudhayfah b. al-Yaman (d. 37/657) and 'Imran b. al-Husayn al-Khuza'i (d. 53/672 or 54/673). Such spiritual practices would continue and still until now preserve in a Sufi lifestyle (al-Qushayri 2007; Al-Attas 1963; Fattah 1993; Knysh, 2000; 2017).

Al-Ghazali (450-505/1058-1111) mentions in his *Ihya'* the following advice of the Prophet on eating and drinking, especially on starvation and maximum satisfaction. It is considered a jihad of souls to fight against hunger and thirst, which is blessed by God.

Moreover, it is advised to consume moderately in life as a guarantee of entering the Kingdom of Heaven (al-Ghazali, n.d., trans. T. J. Winter, 1995).

As for eating, al-Ghazali also pointed out that Sufis not only eat foods that are permitted, but also estimate their quantity. Moreover, they would calculate the pace of eating and choose only those foods that give them the greatest satisfaction or push back cravings. To some extent, they would like to limit themselves to one day each day and night, and some would go without eating. They restrain themselves from eating and being overly satiated. Abu Sulayman al-Darani (d. 215/830), a Muslim ascetic of the 2nd–3rd/8th–9th centuries, stated that all that is necessary in life is a desire" Eating meat should not become a habit. by 'Ali b. Abi Talib (c. 600-661) it was once reported that regular consumption of meat

over a period of forty days leads to a hardened heart, while another Sufi pointed out that regular consumption of meat is a similar form of addiction to that of wine (al-Ghazali, n.d).

Moreover, Shihab al-Din Suhrawardi al-Maqtul (549-587/1153-1191), the founder of the school of enlightenment in Sufism, emphasizes that the final liberation from earthly light is conditioned by the dissolution of the body, i.e., through the practice of Sufism (ascetic practices) including 40-day retreats and abstention from meat (Fakhry, 2000). During the retreat, many Sufi *tariqats* prohibit the consumption of meat. According to ‘Abd al-Karim al-Jili (1365-1424), a Muslim Sufi saint and mystic, the advice of Ibn ‘Arabi (563-638/1165-1240), an Andalusian Muslim mystic, for a Sufi to avoid animal fat during the retreat is: “Animal fat strengthens animality, and its principles will dominate spiritual principles.” (Seidel, 2000).

The Qur’an and Sunnah as sources of Shari‘ah and their regulations in Fiqh approve of eating meat. Some Muslims even believe that eating halal meat is a “significant practice of Islamic identity” (Adams 2018). In general, Shari‘ah and Sufism must be together. Ahmad Sirhindi (971-1034/1564-1624), a Sufi reformer from the subcontinent, urged his Sufi friend to spread the knowledge of Shari‘ah and the rules of Fiqh in places where ignorance prevails and *bid‘at* prevails (Ansari 1986).

Overall, Sufism agrees with Shari‘ah regarding the halal status of cultured meat. Both views agree that the production of lab-cultivated meat with good intentions to solve the problem of meat shortage in the market or to increase the amount of protein is acceptable, provided it does not harm humans. However, eating this cultured meat, even if it is recognized as halal, is not fundamental in Sufism. The Sufis prefer starvation and fasting to the consumption of food and drink, especially meat or cultured meat.

Based on the above statements of Muslim scholars, altering Allah's creation with the wrong purpose and using the wrong medium is forbidden, such as associating Allah with other creatures (al-Ṣābūnī, 1981), *al-khisa* (castration), *al-washm* (tattooing), and legalizing something that is haram or not (al-Du‘aylaj, 2000). Moreover, altering Allah’s creation with good intentions and using a good medium is permissible. According to the analysis, the law for cultured meat or meat cultured in the laboratory can be formulated based on the following conditions:

1. Laboratory-cultured meat can be considered haram if the production causes harm to humans, such as mad cow disease or so-called Creutzfeldt-Jakob disease (CJD). Then, all activities related to processing, packaging, distribution, sale and consumption are also haram. This matter is in accordance with the fiqh "anything that leads to harm is forbidden" (*al-aṣl fī al-maḍar al-taḥrīm*).
2. Meat cultivated in the laboratory can be considered halal if the production with good intentions such as solving the problem of meat shortage in the market or increasing the protein content does not cause harm to humans. This matter is also in accordance with the fiqh method "Everything that leads to good is permissible" (*al-aṣl fī al-manāfi al-ibāḥah*).
3. Cultured meat is considered halal as long as the source of production complies with Sharia law, such as obtaining embryonic cells from proper slaughter in accordance with Sharia law, and consumption is not harmful to humans.
4. Cultured meat production is a blessing of Allah to mankind. Therefore, it should be well-intentioned and not compete or compare with the creations of Allah. Instead, it is a way to get closer to the Almighty.

The existence of a new product such as laboratory cultured meat is to solve the problem of meat production in society and is one of the blessings of Allah to mankind. As Allah says:

Translation: “And He has subjected to you whatever is in the heavens and whatever is on the earth - all from Him. Indeed, in that are signs for a people who give thought.” (al-Jāthiyah: 13).

Conclusion

The review showed that cultured meat is a new product produced by an unusual process without breeding and slaughtering processes. It is a new innovation in the food industry that did not exist at the time of the Prophet, the Companions and the Tabi'in. The status of lab-cultured meat is not found in the Qur'an and Sunnah, rather it is among the matter of modification of the creation of Allah. Islam has stated that the origin of a thing is permissible as long as it does not cause harm and violate the rules of Shari'ah. Therefore, laboratory-cultured meat can be categorized as halal if it is not harmful to humans and is intended to solve the problem of meat and protein deficiency. Although the production of lab-cultured meat is against nature, with the proper procedure and purpose, it is considered halal and one of God's gifts to mankind.

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