



Majlis Ugama Islam Singapura
(Islamic Religious Council of Singapore)

From Lab to Table:

Novel Food from an
Islamic Perspective



Office
OF THE
MUFTI

From Lab to Table: Novel Food from an Islamic Perspective

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Editor:

Office of the Mufti

Contributors:

Muhammad Nurdarwis bin Anuar

Office of the Mufti

Singapore Food Agency

Halal Development

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03 INTRODUCTION

The Fatwa Committee of Singapore previously issued two religious edicts (fatwa) regarding the consumption of novel food, namely alternative proteins derived from plants and insects, as well as cultivated meat. These fatwas were issued in response to inquiries from the Muis Halal Development and the Singapore Food Agency (SFA) regarding the consumption of alternative proteins and cultivated meat.

The Fatwa Committee's guidance emphasises that the production and consumption of these novel food are a recent addition to our daily lives. As Muslims, we must carefully consider their acceptability, and make our choices in accordance with Islamic teachings. If prepared under appropriate conditions, they may be deemed permissible (halal) for production and consumption.

This booklet provides guidelines on the necessary

conditions for novel food including alternative proteins and cultured meat, to be considered halal, covering not only the requirements for raw materials, but also the conditions for preparation.

For consumers who are considering incorporating novel food into their diet, this booklet assures them of the safety and permissibility of these foods from an Islamic perspective.

As it stands, the discourse surrounding the pros and cons of novel food, notably cultivated meat, is both relevant and intricate. As Muslims, it is crucial for us to engage in thorough research, conducting our own due diligence to form well-informed conclusions about its compatibility with our lives.





04

**KEY
CONSIDERATIONS
OF NOVEL FOOD**

Novel Food, including cultivated meat, refers to food and food ingredients that have not been traditionally consumed and therefore do not have a documented history of safe consumption. As technology and consumer trends evolve, novel foods have emerged as innovative alternatives to conventional meat sources.

There are two key factors that requires careful consideration when addressing novel food from a religious perspective in Singapore - (i) the global push for environmental sustainability, and (ii) food safety which aligns with the religious principle of avoiding harm. Therefore, the purpose of this section is to shed light on these two factors in the Singaporean context.

A. Global Push for Environmental Sustainability

Globally, there has been an increasing push for environmental sustainability. Climate change has made this an imperative and each of us have a role to play as global citizens.

The concept of environmental sustainability reflects the fundamental Islamic principle of stewardship (*Maqṣid al-Istikhlāf*) over the Earth. By embracing sustainable practices and mindful consumption, we not only ensure the responsible management of our natural resources but also fulfil our moral obligation as stewards entrusted with the care of the planet.

Novel foods, which can be produced through more environmentally sustainable means compared to traditional agriculture and aquaculture, offer a practical option for contributing to the mission of caring for the planet.



B. Singapore's Novel Food Regulatory Framework

The SFA is the regulatory agency responsible for developing food standards and regulations related to food placed on the market in Singapore. In 2019, SFA introduced the novel food regulatory framework,¹ which requires companies to seek pre-market approval of novel food.

Under the novel food regulatory framework, companies producing novel food are required to conduct and submit safety assessments of their products for SFA's review. SFA reviews these safety assessments to ascertain that potential food safety issues have been addressed before the products are allowed for sale.

Additionally, producers of novel food are to comply with the relevant prevailing regulations, such as chemical, microbiological and labelling requirements specified under the Singapore Food Regulations, just like any other food sold in Singapore.

This helps to protect consumers. To ensure that the safety assessments are rigorously reviewed, SFA conducts its reviews with the support and scientific advice of a Novel Food Safety Expert Working Group that comprises of experts spanning a diverse range of specialities, including, food science, food toxicology, bioinformatics, nutrition, epidemiology, public health, genetics, microbiology, and pharmacology.

It is crucial to highlight that the regulatory framework for novel food in Singapore prioritises the safety of consuming such products. This aligns with the fundamental religious principle of "لا ضرر ولا ضرار," which emphasises the avoidance of harm, as well as the promotion of public welfare.



1 Singapore Food Agency (n.d.), "Novel Food", <https://www.sfa.gov.sg/food-information/novel-food/novel-food>



07

**RELIGIOUS
POSITIONS
ON
NOVEL FOOD**

Overarching Islamic Principles on Food

Islamic dietary laws, commonly referred to as "halal" (permissible) and "haram" (forbidden), dictate what is permissible and what is forbidden for Muslims to consume. These laws are derived from the Qur'an and the Hadith (sayings and actions of the Prophet Muhammad).

There are some key Islamic principles related to food. Halal food and drinks are permissible for Muslims to consume. These include food such as fruits, vegetables, grains, and specific types of meat and seafood that meet certain criteria. It is worth noting that the default and overarching religious principle governing matters related to food is that all food is considered permissible, except when there is a specific prohibition against it. This principle is based on the verse 145 of Surah al-An 'am:

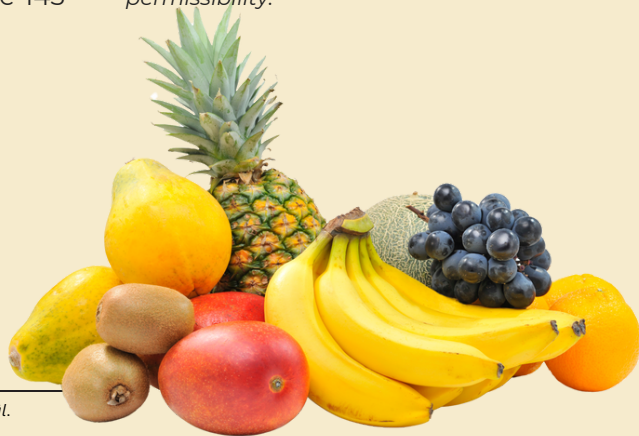
قُلْ لَّا أَجِدُ فِي مَا أُوحِيَ إِلَيَّ مُحَرَّمًا عَلَىٰ طَاعِمٍ يَطْعَمُهُ إِلَّا أَنْ يَكُونَ مَيْتَةً أَوْ دَمًا مَّسْفُوحًا أَوْ لَحْمَ خِنزِيرٍ فَإِنَّهُ رِجْسٌ أَوْ فِسْقًا أُهِلَّ لِغَيْرِ اللَّهِ بِهِ فَمَنْ اضْطُرَّ غَيْرَ بَاغٍ وَلَا عَادٍ فَإِنَّ رَبَّكَ غَفُورٌ رَحِيمٌ

Which means: "Say, O Prophet, 'I do not find in what has been revealed to me anything forbidden to eat except carrion, running blood, swine—which is impure—or a sinful offering in the name of any other than Allah. But if someone is compelled by necessity—neither driven by desire nor exceeding immediate need—then surely your Lord is All-Forgiving, Most Merciful.'"

Based on this verse, scholars have formulated a legal maxim that states:²

الأصل في المنافع الإباحة

Which means: "The default ruling for things that are beneficial is permissibility."



2 Al-Isnawī, *Nihāyat al-Sūl Sharḥ Minhāj Al-Wuṣūl*. (Beirut: Dār al-Kutub al-'Ilmiyyah, 1999), 360.

In other words, the prohibited food and drinks are restricted to certain items explicitly listed in religious texts. These include pork and its derivatives, alcohol, and any food that contains harmful or impure substances or any religiously permissible livestock that are not slaughtered according to religious requirements.

While the term halal primarily refers to the permissibility to consume certain ingredients in Islamic dietary laws, it is important for Muslims to also consider whether ethical and humane practices have been implemented by the food producers when choosing their halal food. The Qur'an encourages Muslims to embody the qualities of mercy and compassion (*rahmah*) in all aspects of their lives, including the treatment of animals. Muslims are responsible for providing proper care, such as food, water, and shelter, to the animals under their charge. Neglecting or mistreating animals is considered a sin. The Islamic position on novel food such as alternative protein and cultivated meat can be evaluated based on the core principles of Islamic ethics and jurisprudence.

While there may not be specific references to “novel food” in classical Islamic texts, the permissibility of consuming such food can be considered within the broader framework of Islamic principles related to food consumption and environmental stewardship.



Religious Position on Alternative Proteins

According to a fatwa issued by the Fatwa Committee of Singapore on 19 January 2023, the production of alternative proteins is a necessity (*al-hājah*) in today's world. While there may currently be an abundance of food sources, investing in alternative protein sources now may help society better prepare for a more sustainable food future.

Alternative protein sources, such as plant-based proteins or lab-grown meat, often require fewer resources like land, water, and energy as compared to traditional animal agriculture. This can help mitigate the environmental impact of food production.

On that basis, the Fatwa Committee opines that the production of alternative proteins can also contribute to the preservation of life, environment, and human well-being.

A. Religious Positions on Alternative Protein Sources: (i) Plant-based, and (ii) Insect-based

As a general rule, all types of plants are halal to eat, except plants that are harmful to humans.³ From that, we can extrapolate that all types of plant-based alternative proteins are halal and permissible to be eaten according to the *Shari'ah*, as long as they are not harmful for human consumption.

Similarly, the fatwa concludes that food products derived from insects are **generally permissible unless the insects are harmful or there is a specific ruling that clearly prohibits them**. According to the Shafi'i school of thought, insects are viewed as unclean (*mustakhabath*) and should not be eaten. However, the Fatwa Committee took into consideration alternative scholarly discussions on the issue.



3 Al-Syarawānī, Hāshiyah 'alā Tuḥfah al-Muhtāj, (Egypt: al-Maktabah al-Tijāriyyah al-Kubrā) 9:388.

For example, Ibn ‘Ashūr defines the term “khabā’ith” as:⁴

وَالْخَبِيثُ: مَا أَضْرَّ، أَوْ كَانَ وَخِيمَ الْعَاقِبَةِ،
أَوْ كَانَ مُسْتَقْدَرًا لَا يَقْبَلُهُ الْعُقَلَاءُ،
كَالنَّجَاسَةِ

Which means: “*Khabīth*” refers to anything that is widely acknowledged as harmful or universally considered impure, such as filth, or that has negative consequences.”

Based on this discussion, the Fatwa Committee considered the opinion of Ibn ‘Ashūr, as it demonstrates the inclusivity of Islam in accommodating different cultures around the world. The study also refers to the fatwa issued by MUIS in 2009, which allows the use of a colour extract from a type of insect known as cochineal. Dar Ifta’ Misriyyah, an Egyptian Islamic advisory institution, has also issued a similar opinion.⁵

The Fatwa Committee of Singapore has ruled that protein produced from insects is halal.

This is because the production process is similar to the *istihālah* method, which involves a chemical transformation that alters the composition and properties of a substance. When a substance no longer retains its original characteristics due to this process, its use is permissible, provided the final product does not contain any harmful elements.

B. Religious Position on Cultivated Meat

The Fatwa Committee considered two main principles when determining the religious position on cultivated meat. These principles are: (a) consideration of the *Maqāṣid al-Shari‘ah* (Objectives of the Shariah), such as the preservation of human life, and by extension the environment; and (b) that the Shariah assumes that unless proven otherwise, the default ruling of beneficial things is that it is permissible.⁶

4 Ibn ‘Ashūr, *Al-Tahrīr wa al-Tanwīr*. (Tunis: al-Dār al-Tūnisiyyah, 1984), 9:135.

5 Please refer to: Ali Gomaa, “The Use of Food Colouring Extracted From the Shell of an Insect”, accessed October 11, 2023, <https://www.dar-alifta.org/ar/fatawa/11964/مستخرج-من-قشرة-حشرة-استخدام-لون-في-الطعام-يستخرج-من-قشرة-حشرة>.

6 As the legal maxim stipulated, “*The default ruling for things that are beneficial is permissibility*”. Please refer to: Al-Isnawī, *Nihāyat al-Sūl Sharḥ Minhāj Al-Wuṣūl*, 360.

There are various studies highlighting the benefits of cultivated meat, and how it has the potential to contribute to the preservation of the environment.⁷ For example, a few cells obtained from an animal can produce 175 million pieces of burger patties. In comparison, producing a similar amount of meat through conventional farming would require around 440,000 heads of cattle.⁸ This cultivated meat production method offers a substantial reduction in greenhouse gas emissions, as well as reduce the use of energy, land, and water, which usually occurs extensively through conventional farming.

Based on these two religious' principles, the Fatwa Committee opines that the consumption of cultivated meat is permissible under the following conditions:

a. Cell sources must be taken from animals that are halal for consumption. As cells form the fundamental component in the production of cultivated meat, it is imperative that these cells are sourced only from animals that are halal for Muslims to consume according to the Shariah. This implies that cells obtained from animals such as pigs or those that are forbidden by the Shariah are not permissible.

b. Ensure that the entirety of the final product contains only halal ingredients. The Fatwa Committee requires that every ingredient that makes up the texture and composition of cultivated meat must be halal according to the Shariah. This includes (a) the stem cells harvested, (b) the medium for cell reproduction, and (c) any food additives used in the production process.

7 Bryant, Culture, Meat, and Cultured Meat, pg. 2, Stephens, et al., Bringing Cultured Meat to Market: Technical, Socio-Political, and Regulatory Challenges in Cellular Agriculture, pg. 155-166. Rorheim, Cultured Meat: An Ethical Alternative to Industrial Animal Farming, pg. 1-14.

8 World Energy Ventures, The Halal Cultured Meat Project, accessed January 7, 2024, <http://www.worldenergyventures.com/meat.html>.

Similarities And Differences Between Cultivated and Conventional Meat

Cultivated meat, also known as cultured or cell-based meat, is produced through *in vitro* cultivation of animal cells. Since cultivated meat does not involve slaughtering a live animal, it raises a unique question in terms of its halal status.

The Fatwa Committee conducted a thorough analysis of the similarities and differences between cultivated and conventional meat. While both types of meat share similarities in terms of origin, texture, and composition, the process of producing cultivated meat differs significantly from that of raising livestock.

Conventional meat comes from live animals raised on farms, while cultivated meat is produced by taking cells from animals and cultivating them in a laboratory environment. The entire meat production process (after the cells are extracted) does not involve any live animals.

Due to the differences between cultivated and conventional meat, not all rulings that apply to conventional meat can be directly applied to cultivated meat.

However, the similarities that exist between cultivated meat and conventional meat mean that there are several conditions that must be fulfilled to ensure that the cultivated meat is halal, i.e., the cell source must be taken from animals that are halal for consumption only, and ensuring that every element involved in producing the final product—be it the meat itself, materials, or media used in cultivation—adheres to halal standards according to the Shariah.

Sources of Cells in Cultivated Meat

As cells are a fundamental component in the production of cultivated meat, it is imperative that the cells are sourced only from animals that are considered halal for consumption, according to the Shariah.

This means that cells obtained from animals that are forbidden by the Shariah such as pigs or animals are strictly not allowed. This prohibition extends to all aspects, encompassing the (a) harvested stem cells, (b) cell reproduction medium, and (c) any additives employed throughout the production process.

Stem cells can be extracted as early as the embryonic phase. Embryonic stem cells (ESCs) extracted for the production of cultivated meat are cells formed as a result of fertilisation between male and female animal reproductive cells. For instance, cells taken from fertilised chicken egg embryos can be used for this purpose.

Some general principles that need to be considered in this issue are as follows:

a. The permissibility of consuming or utilizing any part of the embryo is contingent upon the mother animal being slaughtered according to Islamic rites, as the embryo is considered part of the animal. This is based on a hadith:

ذَكَاةُ الْجَنِينِ ذَكَاةُ أُمِّهِ

Which means: *“The slaughter of the foetus is by the slaughter of its mother.”* (Hadith narrated by Abu Daud)

b. If the embryo is taken from the egg of an animal (such as a chicken, duck, etc.), the jurists are of the opinion that it is permissible without the need for slaughter.

Under the current Singapore’s Halal Certification Framework, cells for cultivated meat will be extracted from animals that are permitted for consumption in Islam which have been slaughtered beforehand according to Islamic Law.





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CONCLUSION



Incorporating novel foods into our diets, especially those cultivated through environmentally sustainable methods, holds the potential to address critical global challenges. This approach harmonises with the fundamental Islamic principle of stewardship (*Maqṣid al-Istikhlāf*) over the Earth.

By embracing sustainable practices and mindful consumption, we not only ensure the responsible management of our natural resources but also fulfil our moral obligation as stewards entrusted with the care of the planet. This principle, deeply rooted in Islamic teachings, calls upon individuals and communities to act as custodians of the Earth, safeguarding its delicate balance and preserving its resources for future generations.

Furthermore, embracing novel foods from environmentally friendly sources aligns with religious principles, as articulated in this booklet. It underscores the permissibility of consuming novel foods namely (i) cultivated meat and (ii) alternative proteins, except in cases where a specific prohibition exists. These religious positions are intended to ensure the observance of halal dietary rules. Simultaneously, the Fatwa Committee continues to monitor contemporary needs, challenges, and developments, resting its guidance on the anticipated benefits from current technological advancements.



MUIS' FATWA ON CULTIVATED MEAT

F.A.Q



Why is it necessary for the fatwa to be issued on cultivated meat at this time, when there is no urgent need for Muslims to consume cultivated meat?

Following the approval by the Singapore Food Agency (SFA) of the sale of cultivated chicken meat in 2020, MUIS conducted a review on the permissibility of cultivated meat for Muslim consumption. The fatwa is issued following the review.

Considering the global impetus to find alternative, sustainable food solutions and the emergence of novel food, it is necessary to establish a clear religious position from the outset in order to facilitate any future plans for the halal certification of cultivated meat.

Ultimately, Muslim consumers should make an informed decision on the consumption of cultivated meat if it is halal-certified, based on their own dietary preferences.

What was the process involved in arriving at the fatwa on cultivated meat?

The Fatwa Committee, supported by the Office of the Mufti, conducted its own internal review of existing literature on novel food and cultivated meat, and consulted various stakeholders such as SFA, industry players, and scientists. The Fatwa Committee also visited a local manufacturing facility producing cultivated meat to have a first-hand view of how cultivated meat is produced.

As the novel food sector is still nascent and evolving, the Islamic scholarly position on it is still limited. The Fatwa Committee made its own assessment based on sound Islamic principles, as well as contextual considerations of Singapore's socio-religious realities.



Is MUIS encouraging Singaporean Muslims to consume halal cultivated meat?

The aim of halal certification is to provide greater assurance to Muslim consumers that a particular food product is halal to be consumed. Muslim consumers can then make their own informed choice whether or not to patronise any halal-certified eating establishment, or to consume any halal-certified food product.

Similarly, for cultivated meat, if it is halal-certified, Singaporean Muslims can choose whether to consume the meat or otherwise. Muslim consumers' acceptance of cultivated meat would also be dependent on other considerations like personal dietary preferences, taste, and cost. Individuals have the autonomy to decide what aligns with their preferences and lifestyle. It is important to note that our religion advises and encourages moderate consumption, as well as the adoption of balanced and mindful eating practices.

When is cultivated meat expected to be halal-certified in Singapore? Are there companies that are already seeking halal certification?

MUIS would need to develop guidelines on the halal certification of cultivated meat before any product can be halal-certified. This would involve consultations with various stakeholders, such as the SFA and industry players. The timeline would be dependent on the levels of complexity involved in certifying the products.

5

Can halal-certified cultivated meat be exported to other countries outside Singapore?

At present, any halal-certified cultivated meat produced in Singapore would be only for local sale and consumption. Export would only be possible if regulatory frameworks for cultivated meat are in place in those export markets. For example, the United States of America has also approved the domestic sale of cultivated meat.

Can you elaborate on the requirement for obtaining MUIS Halal Certification for cultivated meat production facilities in Singapore?

6

Companies applying for MUIS Halal Certification must have a facility producing cultivated meat products in Singapore. This is the same principle applied to conventional meat producing facilities. The halal status of imported raw materials and processing aids from overseas which are used locally must be substantiated with the appropriate halal supporting documentation, depending on the risk category, and not the country of origin.

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