

DIVERSITY OF INSECT PRODUCTS ON THE GLOBAL MARKET:

A REALITY WHOSE HALAL STATUS MUST BE UNRAVELLED!



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To achieve UN's Sustainable Development Goals by 2030, edible insects and their products (both in recognisable and unrecognisable forms) have attracted global attention in the commercial sector, scientific research and public media. Some insect products are already approved ingredients and applied in many foods plus beverages. Their global market increases by day because online suppliers are currently available. Despite all these on-going developments, it is gullible to expect everyone to support insect consumption. These insects' Halal status is a centre of controversy from different Halal certifying bodies across the globe!

Edible insects are gaining global demand. Currently, four edible insects are certified for use by the European Union as novel food, as many others are being evaluated for inclusion on the approved list. Approved insect products reach wider markets in a short period because online suppliers are now available. The only edible insect whose halal (lawful and permissible) status is clear is locust, as there is clear-cut Islamic evidence for its consumption. However, there exists marked differences in the opinions of Islamic jurists from different Sunni schools of Islamic law regarding other types of edible insects, because the Quran plus Hadiths were silent on other edible insects particularly those which are not acceptable in the Arabian culture. The basic reasons why edible insects are resented is due to their impurities and perceived harmfulness. **With an unbiased perspective, this article seeks to answer the question whether other edible insects except locusts, which are not acceptable in the Arabian culture yet a delicacy in other muslim cultures elsewhere, processed safely/hygienically, and with proven health plus environmental benefits, should also be deemed haram (prohibited).** As the edible insect industry gains

popularity, this article is intended to spark joint discussions among Muslim researchers, food technologists, nutritionists, halal certification bodies, academia, industry players, policy makers, and other stake holders that will yield a conclusive unified stand on the halal status of many edible insects.

Insect consumption has been a dietary practice in several communities from all continents since ancient times and became a popular food from 2013 after the UN's FAO envisaged insects as a viable solution for food insecurity/hunger vulnerability amidst the rising human population and limited agricultural land. **By 2023, the global edible insect market was valued at US\$1.2 billion, and insect consumption has now grown into an acceptable food culture in approximately 113 countries globally.** In line with Sustainable Development Goals, insects can be used as a more sustainable human food than animal-sourced proteins as they meet several nutritional demands, in addition to emitting fewer greenhouse gases (eco-friendly), require little resources for their production (land and water), can be produced in large quantities using very cheap agricultural waste materials, and have shorter reproduction cycles compared to many meat-based products from animals. Nutritional and environmental-related benefits are the most emphasized advantages fronted by promoters of insect consumption; recent research indicates that the protein content of several edible insects is comparable with that from chicken, milk, beef, fish, lamb, and eggs. Additionally, some researched insects have been found with lower cholesterol concentrations. In today's world, insect products are steadily forming a significant portion of processed foods globally and have attracted attention of several researchers plus industrialists. The heightened interest in nutraceuticals has led to biotechnology developments that aid the formulation of novel functional food from nutrient-dense edible insects, e.g. good quality edible oil with a lower cholesterol content than animal-sourced cooking oil. Edible insects offer a rich supply of antioxidants, and their chitin finds several applications in both the food and pharmaceutical industries.

Currently, **European Commission has already approved 4 edible insects to be used as novel food ingredients** (migratory locusts, house crickets, yellow mealworm, grain mould beetle) and the approved number of insects is expected to continue rising. Several government organisations and NGOs are campaigning for insect consumption in regions grappling with food scarcity. Food insect farms/enterprises have been set up in different countries e.g., Kenya, South Africa, Thailand, China, Mexico, California, Canada, Cambodia, Laos People's Democratic Republic, India,

Democratic Republic of Congo, etc. The market value for the edible insect business is beyond \$20 million. Traders around the world are finding this a booming business and are willing to invest in it. Lately, edible insect customers find it easy ordering for insects and their products online from suppliers like Crunchy Critters, EatGrub, EntoVida, Meat Maniac, ecoEat, etc, and other similar establishments are likely to increase in the near future. Global leaders like Amazon are also involved in this promising and lucrative insect business.



Muslims' acceptability of edible insects depends firmly on religious rules which form the founding principles for halal food certification bodies. However, **halal certification bodies do not have a consolidated position on the Islamic permissibility of almost all insects (except locusts).** Controversies exist among the 4 Sunni schools of Islamic law and among different halal certification bodies globally. The books of Fiqh (Islamic jurisprudence) also present **completely opposite opinions on the subject. This unconsolidated position has affected both the halal certification bodies plus Muslim intellectuals globally.** Muslims are enjoined to eat halal, nutritious, plus hygienic foods, while exercising appreciation plus moderation in their dietary practices. Globally, there is a steadily increasing awareness among Muslims to preserve their religious principles in regard to Halal food production, and an increased requirement for halal

foods in conformity with their religious obligations. The increasing muslim population around the globe annually translates into high purchasing power and because of their dedicated campaign for wholesome plus credible food products, the halal food market is now positioned among the most influential plus profitable markets in the business world. Halal certification bodies therefore need to have a consolidated strong position regarding edible insect consumption. **A given food qualifies as halal or haram on basis of five sources: the Quran, Hadiths, Ijma' (consensus of Islamic jurists), Qiyas (deduction by analogy), and basing on different schools of Islamic thought or madzhab of the Sunni traditions.** Important to note, the Halal logo is not merely a symbol of religious permissibility and slaughtering procedures/guidelines, but is also an indication of clean, wholesome, trusted, and hygienic food products sought for by both Muslims and non-Muslims.

Islam emphatically implores mankind on responsible and ethical custodianship of the natural resources on earth plus environmental conservation. Islamic eating habits encompass a balanced coordination of religious beliefs, health consciousness, plus social responsibility. It is therefore an unfair analysis for Muslim researchers and scientists to under-look the several advantages of insect consumption (i) without thorough plus convincing scholarly proof, or (ii) basing on only one or a few sources of evidence, without putting the opinions of other Islamic sources of evidence into consideration. It is also important to note that, (i) since the ancient time, Islamic food practices have kept diversifying in tandem with the diverse cultural heritage of Muslim communities distributed in different geographical regions of the world (ii) **in Islamic theology, debates on Mushbooh (doubtable) issues are ruled by the strength of arguments raised, not by the number of people supporting a particular line of thought.** The Qur'an is displeased with people who condemn food or any other provision which has been proven to be *Tayyib* (acceptable, good, wholesome, nourishing) without solid convincing proof, and calls them strayers from the right path i.e. transgressors. *'O you who believe! Do not make unlawful the tayyibat (all that is good as regards foods, things, deeds, beliefs, persons) which Allah has made lawful to you, and do not transgress. Verily, Allah does not like the transgressors. And eat of the things that are Halalan-Tayyiban (lawful and good) which Allah has provided for you, and fear Allah in whom you believe'* (Surah Ma'idah, verses 87-88). It is thus false to prohibit what is Halal and Tayyib or represent Halal as Haram, and vice versa. Any food forbiddance must be justified with verified supporting proof that renders it (prohibited food) - not to be halal and tayyib. Islamic dietary practices are

based on the general rule which states that: *'All foods are considered halal until proven with valid evidence to be haram'*. The basic reasons why edible insects are resented by Muslims is due to their impurities and perceived harmfulness. Therefore, as long as the insect in question meets the Islamic dietary law principles and can be processed safely, insect consumption and mass rearing stands as a viable, sustainable, cheap and an environmentally-friendly practice which harmonizes with Islamic values of moderation, health consciousness, stewardship of natural resources, sustainability, and social responsibility.

Does the Arabian Culture Support Insect Eating? Yes: Before the advent of Islam in Arabia, Arabs were already eating, enjoying and considering **locusts (an edible insect) as a favorite food**, and even after the advent of Islam to Arabia, locust consumption was additionally approved halal. There is a total of about 14 hadiths detailing the halalness/permissibility of locust consumption. Some of these evidences can be found in (i) Ibn Majah, Chapters on Hunting, Hadith No.3218 (ii) Chapters on Hunting, Hadith No. 3220 (iii) Sahih Bukhari, Volume 7, Book 67, Number 403. Till now, eating locusts is not only a long-established dietary practice but also a lucrative business in Saudi Arabia, Libya, Yemen, plus some other countries in the Arabian Peninsula. Present literature indicates that a sack of live locusts costs around US\$40.0 per kg, more expensive than meat!

Opinions of Islamic jurists are different concerning the halalness of other edible insects. This difference emanated from the fact that all the hadiths on the halalness of edible insects centered on only locusts, leaving other insects unpronounced. The Hanafi school regard all insects as haram (prohibited), including any food containing insect products or extracts. They base their contention on a Quran verse (Surah A'raf, verse 157) that forbids eating of harmful and unpleasant things. They consider insects to be filthy, harmful or infectious, and are strongly convinced that a sane human being would be disgusted with them. The Shafi'i and Hanbali schools consider all insects, apart from locust, as nasty, and therefore haram. **The Maliki school decrees that all insects are halal as long as they are culturally acceptable and not damaging to health.** They base their opinion on some Quran verses such as Al-Ma'idah, verse 93 that allows consumption of everything on earth except what has been clearly condemned by Shariah or health-damaging. **Basing on absence of explicit proof that condemns consumption of all insects, any edible insect which has been proven to nourish the body, not dangerous or infectious, and pleasant to a people is considered halal.** The Maliki school however recommends that edible insects must not be eaten

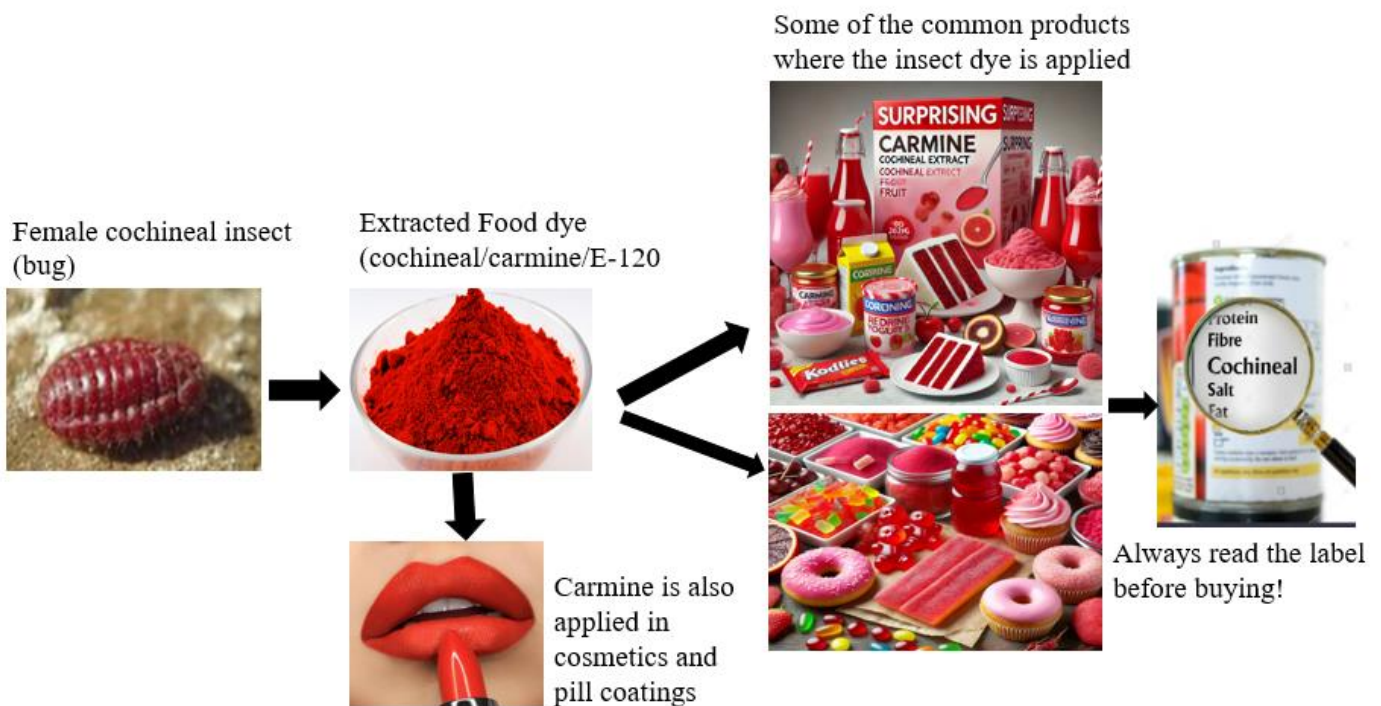
while still alive; they have to be killed first for example, through roasting, plucking off the head or any other acceptable way, and Allah's name (Bismillah) must be invoked onto the insect while causing it to die. Summarily, **the grounds of disagreements and varied arguments on insect consumption among scholars of all the 4 Sunni schools, is rooted on whether insects are considered disgusting/filthy or tayyib (nourishing, acceptable by people, hygienic, wholesome).** Whereas many scholars insisted that insects are filthy, Malik school considers them as non-filthy except those insects which are injurious or infectious to humans, and are not culturally acceptable. Muslims are taught in the Holy Quran: *'They ask thee what is made lawful for them, say; 'All good things have been made lawful for you,..and pronounce thereon the name of Allah. And fear Allah, surely Allah is quick in reckoning'* (Surah al-Ma'idah: 4). In relation to edible insects, present research indicates they are evidently nutritionally good. **No school of all the 4 Sunni schools gives a candid, explicit or straightforward Quran verse or hadith narration prohibiting insect eating.** Therefore, the decree on the haramness of insects other than locust would be centered on legal reasoning, deductions, and inferences which allows further research. It is also important to note that **in such situations where divergently opposing opinions occur, the right opinion is decided depending on the strength of its arguments, and not by how many people agree with such opinion;** qualitative approach precedes quantitative approach in Islamic jurisprudence.

The Qur'an markedly urges mankind to eat what is halal (Islamically permissible) and tayyib (good, spiritually wholesome, acceptable, and hygienic). The word 'tayyib' is subjective as it puts into consideration individual perspectives towards an object in question i.e. what may be 'tayyib' in the view of someone may not be 'tayyib' in the view of another. This is evidenced in several Quran verses where 'tayyib' appears and connotes individual taste plus self-willingness (such as in Surah Nisa, verses 2-4). In the dietary language, a tayyib food is one which can nourish the body, suits the taste in accordance with the cultural norms, and is safe for the body plus Islamic spiritual health. Therefore, any insect that is confirmed nutritious, safe for human health and culturally acceptable has satisfied the qualities of a tayyib food. Halalan-Tayyiban is thus not based solely on religious grounds but also embodies other aspects such as food quality, its safety, and wholesomeness, encompassing the rearing methods and feeds/substrates, harvesting, processing, labelling, and marketing. Scholars who advocate for insect consumption argue that many edible insects satisfy these criteria. Existence of credible scientific proof which confirms that some edible

insects have nutritional and medicinal value, plus a favorite food for several races globally since ancient times, counters the argument which regards all insects '*disgusting which no normal people would like to consume*'. Where there is lack of clear-cut proof prohibiting insect eating, we may not avoid the opinion that locust, as an edible insect, is considered halal because of its acceptance in the Arabian tradition, and that some Islamic jurists treated other insects which are not a delicacy of the Arabs as filthy, on the basis that they are viewed as disgusting in the Arabian tradition.

Important to note, Islam does not have special/privileged classes; it is for all races, creeds, and genders. **Therefore, acceptance or rejection of most edible insects is mainly a question of culture.** In Islamic law, subjective views of the Islamic jurists regarding food are mainly inclined on their traditions, and such views are likely to change throughout time. Therefore, where prohibition of foods by Islamic jurists is based on traditions, such prohibition may not apply to all Muslims with customary/cultural differences which appreciate such food. This is proved through a narrative from Sahih Bukhari (Volume 7, Book 65, Number 312), where Khalid bin Walid narrated: '*A roasted mastigure (a kind of wild lizard) was brought to the prophet (PBUH). When he (PBUH) stretched his hand towards it to eat it, they said to him; 'It is a mastigure.'* So, he withdrew his hand. Khalid asked; '*Is it unlawful to eat?*' the Prophet (PBUH) replied; '*No, but it is not found in the land of my people and that is why I do not like eating it.*' So, Khalid started eating (it) while the prophet was looking at him'. Although both the Prophet (PBUH) and Khalid were from Makkah, the Prophet was not willing to eat something foreign but did not forbid Khalid who found it palatable from eating it; he (PBUH) instead empowered Khalid to take his own decision in this regard. We may also deduce that the Prophet (PBUH)'s refusal due to his personal preference did not guarantee it haram for others. Therefore, the opinion that all edible insects are disgusting is merely a subjective sentiment because there are Muslims whose culture accepts eating of some insects and do not regard them disgusting. Some Islamic scholars emphasize that insects were not absolutely labelled as prohibited in Islamic scriptures and thus, they may be regarded permissible (halal) for consumption. This is supported by the hadith in which Prophet Muhammad (PBUH) said; '***The halal is that which Allah has made halal in His book and the haram is that which He has forbidden, and that concerning which He is silent, He has permitted as a favor to you***'.

Relatedly, there exists two **contradicting opinions on the halalness of carmine, also called E-120 or cochineal, which is a red dye extracted from dried bodies of the female cochineal insect and applied in many food products** like juices, candies, soft drinks, energy drinks, desserts, frozen fish, meat, yoghurt, ice cream, jams, ketchup, etc. Halal certification bodies in different countries like Malaysia, Indonesia, Turkey, Singapore, Morocco, Algeria, Tunisia, China, America and Europe consider the use of cochineal coloring in food products halal and thus permit its usage in food products, in quantities not exceeding 0.003%. According to the Malaysian National Fatwa Committee and the Malaysian halal certification body- JAKIM, cochineal is a harmless insect and its carcass is sacred because this insect does not ooze blood upon death. Such halal certification and accreditation bodies expect food products that contain E120 colour additive to declare it by name ‘cochineal extract’ or ‘carmine’ on the label. On the other hand, countries e.g. Pakistan, Iran, Brunei, the Gulf States, and United Arab Emirates consider this dye non halal and don’t permit its usage in food products. Reasons for existence of varied views on the use of cochineal dyes in different countries include use of different fatwa elicitation methods by different countries.



Review of Halal compliance status of E120 (Carmine) --E120 – Carmine (Cochineal)

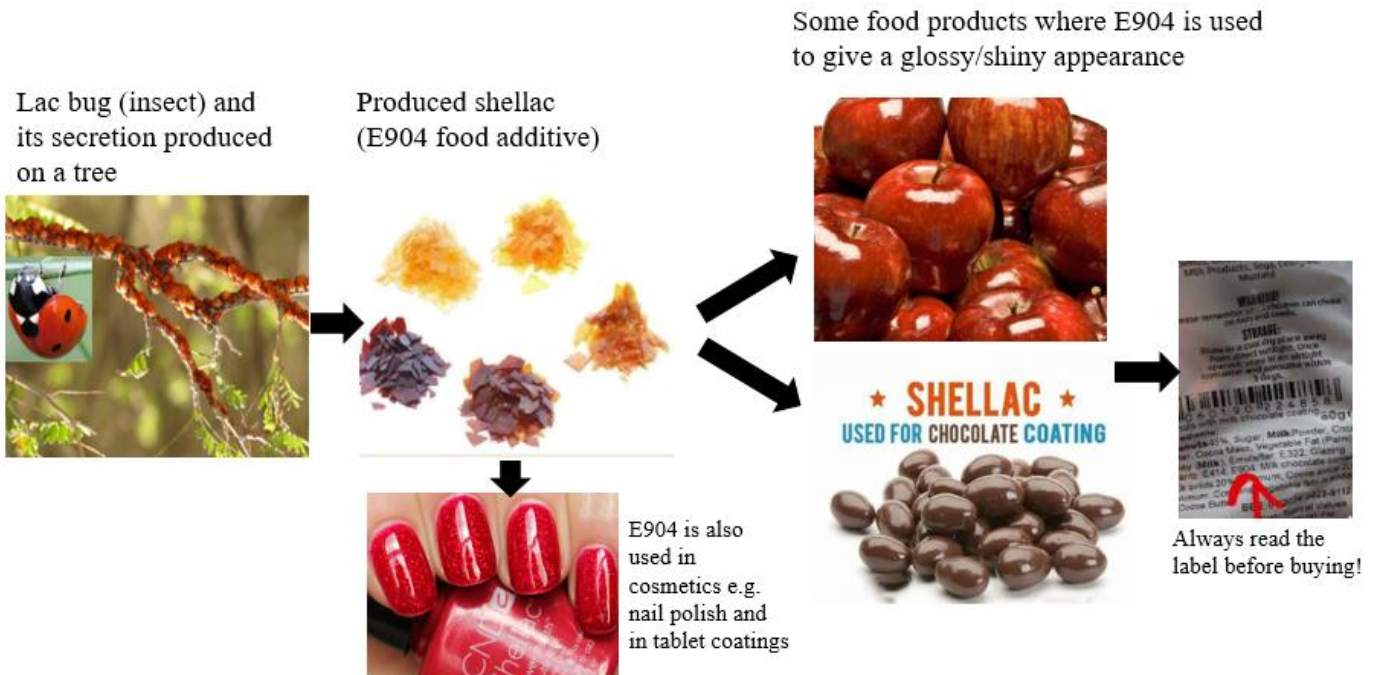
Source: Derived from the crushed bodies of cochineal insects (*Dactylopius coccus*).

Usage: Commonly used as red food coloring in candies, beverages, dairy products, cosmetics, and pharmaceuticals.

Halal Status: Non-Halal (Haram or doubtful) according to the majority of scholars because:

1. Insects are generally not considered permissible for consumption except for locusts (as per Hadith).
2. The extraction process involves crushing the insect, which is seen as impure (Najis) by some scholars.
3. Some scholars consider Istihalah (chemical transformation), but in this case, the colorant retains its biological origin, making it problematic.

Similarly, shellac is another food additive produced by insects called lac bugs. This food additive is labelled as E904, and primarily used as a food glaze or coating such that foods have a glossy appearance or shiny finish. Common foods and beverages where this insect additive is applied include chocolates, candies and some fruits. In fresh fruits e.g. apples, E904 acts as a barrier which prevents moisture loss such that the product retains its freshness and flavor. **E904 is considered permissible (halal) by some scholars, as it is viewed in a similar light to honey, which is also a secretion from an insect and is permissible in Islam.** Whereas E904 has been deemed safe for use as a food additive by major food safety authorities, some individuals may experience allergic reactions. It is thus advisable to always check the ingredient list on food labels, whether the list contains 'shellac' or 'E904'.



Review of Halal compliance status of E904 – Shellac

Source: Obtained from the secretion of the lac insect (*Kerria lacca*), which is processed into a resin-like coating.

Usage: Used as a food glaze in Cosmetics, candies, chocolate, pills, and fruit coatings.

Halal Status: Controversial but generally considered Halal by many scholars because:

1. It is not derived from the insect's body but from its secretion.
2. The secretion is collected and purified, which some scholars view as similar to bee honey, which is Halal.
3. It undergoes significant processing, making it more of a natural resin than an insect derivative.
4. Some organizations, like JAKIM (Malaysia), MUIS (Singapore), and ESMA (UAE), consider purified shellac Halal, while others require certification.

In final remark, if a particular insect or insect extract has been used in a food, this must be declared on the food label under list of ingredients, for a consumer to make an informed decision. Regarding safety, Islam implores people to consume what is hygienic and safe for human health (Surah Baqarah, verse 196). Thus, prior to regarding an insect as tayyib, it must be clearly proven that the insect is safe for human health. Large scale use of insects as food necessitates research on processing methods, technological treatment, toxicological, microbial plus hygienic safety and

possible allergenic potential. Understanding the perspectives of Islamic scholars from all the 4 Sunni schools of thought, provision of explicit evidence that negates insect consumption, considerations of cultural acceptability of edible insects in some Islamic communities, nutritional plus health/medicinal advantages, environmental and sustainability benefits, are all crucial in fostering a constructive open dialogue on the integration of insect eating into Islamic dietary practices or in the issuance of a unified halal stand on edible insects. Insect consumption was a practice in different cultures even during Prophet Muhammad (PBUH)'s time, and thus should not be portrayed today as a barbaric food habit. Insect consumption is not explicitly forbidden in Islam; it is a gray zone between unequivocally halal and haram. Except locusts, there exists no consensus among the 4 Sunni schools on Islamic permissibility of other edible insects. Each edible insect which is proven to be nutritious, safe for human health, can be processed hygienically and culturally acceptable for a given people has satisfied the criteria for a tayyib food. However, insects are not to be eaten when still live; they should be killed first and Allah's praise (Bismillah) invoked on them before their death. Before declaring a particular edible insect as haram, cultural differences and other subjective opinions need be carefully considered. **For foods that are condemned by Islamic jurists basing on cultural reasons, such prohibition is not universally binding to all Muslims particularly those from diverse custom or culture that appreciate such food.**

The halal certification process is a meticulous system designed to ensure that products, services, and processes comply with Islamic principles and dietary laws. At the heart of this process lies the Fatwa Committee (Islamic Fiqh Committee), which plays a pivotal role in interpreting and applying Shariah principles to modern industrial and commercial practices. This committee is composed of Islamic scholars and experts in jurisprudence (Fiqh) who provide religious guidance and oversight throughout the certification process. In cases where there is ambiguity or disagreement about the halal status of a product or process, the Fatwa Committee provides authoritative rulings. Their involvement ensures that halal certification is not only scientifically and technically sound but also religiously authentic. Unfortunately, the books of Fiqh also present completely opposite opinions on Islamic permissibility of other insects (except locusts). This unconsolidated position has affected both the halal certification bodies plus Muslim intellectuals globally.