

## Concept of Halal Food and Biotechnology

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**Abstract:** Almost every Muslim either fully practicing Islam or not is seriously concerned about what he or she eats. Muslims observe the divine laws in every aspect of life. There is a complete code of dietary laws present in the Holy Quran for the followers of Islam. Some basic principles are described as all foods are permitted except those mentioned clearly in the Holy Quran. The most recent advancements of biotechnology in field of food industry like status of GMO's, use of genes, enzymes, food additives or enhancer in food in Islam deduced by the *Ijma* or *Qiyas*. These if obtained from plant origin would be considered as Halal. If obtained from animals then Islamic Shari'ah put some restrictions about the animal that it should be permitted by Supreme law giver, and should be fit, clean and wholesome for health. The world has become global supermarket with the presence of improved communication and transportation system. Islam is the world second largest religion and more than 1.2 billion Muslims consume Halal products. The need of Halal food increases with the increase of Muslim population globally. The Halal foods should be mentioned clearly by labeling the hidden food ingredients, for example enzymes. The Muslim scholars need to infer opinions with the advancement of biotechnology.

**Key words:** Food enhancer, gelatine, GMO's, Halal, Haram, mashbooh

### INTRODUCTION

The origin of Muslim's dietary law commands. For the Muslims a whole code of life is completed as a religion "Islam". In Islam a strong emphasis is placed on cleanliness both spiritually and especially on dietary laws. For a food or drink to be approved for consumption as Halal it must be confirmed by Islamic law (*Shari'ah*) revealed in Quran and in tradition of last Prophet.

**Halal:** Halal is an Arabic word which means permitted, allowed, lawful, approved and legal. This Quranic term used to describe the permitted things as "Halal". Opposite of Halal is Haram (forbidden or prohibited). There is a clear boundary between Halal and haram. While the things with no clear status is termed as "*Mashbooh*" (doubtful). The basic principles are revealed by Almighty and explained by tradition of Prophet (*Hadith*). Other sources of Jurisprudence used to determine the permissibility of food not explained in Quran and Hadith are *Ijtihad* to solve the problem either by (1) *Ijma*, consensus of opinion or (2) *Qiyas*, analogical reasoning or by combination of both. Some major terms used in dietary law are described below;

Halal means permissible and lawful while Haram means prohibited. It is exactly opposite of Halal. *Mashbooh* is something questionable or doubtful, either due to the differences in scholars' opinions or the presence of undetermined ingredients in a food product. *Najis* is something not clean, (Halal thing may become *Najis* when contaminated) and *Makrooh* is a term generally associated with someone's dislike for a food product or, while not clearly haram, is considered dislikeable by some Muslims.

Dietary laws given to Muslims in scripture are also described in Christianity and in religion of other book holders (*Ahlul-Kitab*). Reason for Muslims to observe these dietary laws are to follow the Divine Commandments: *The Glorious Quran* [Arabic text and English rendering by Pickthall (1994)].

"O ye who believe! Eat of the good things wherewith WE have provided you and render thanks to ALLAH if it is He whom you worship" (Quran 2: 172).

Followers of Islam are emphasis to eat what is Halal-un-Tayyaban meaning 'allowed, permitted and wholesome'.

“O mankind! Eat of that which is lawful and wholesome on earth.....” (Quran 2:168)

**Principle for Halal food:** In general, every food is allowed for Muslims except what is prohibited either by the Holy Quran or by the Hadith. These rules of Shari’ah (Islamic law) bring freedom of choice for people to eat and drink anything they like as long as it is not haram (prohibited).

“He hath forbidden you only carrion, and blood, and swine flesh, and that which hath been immolated to (the name of) any other than Allah...” (Quran 2:173)

“Forbidden unto you (for food) are carrion and blood and swine flesh, and that which hath been dedicated unto any other than Allah, and the strangled, and the dead through beating, and the dead through falling from a height, and that which hath been killed by (the goring of) horns, and the devoured of wild beasts saving that which ye make lawful (by the death-stroke) and that which hath been immolated unto idols. And (forbidden is it) that ye swear by the divining arrows. This is an abomination...” (Quran 5: 3)

Alcohol and other intoxicants are also prohibited as:

“O ye who believe! Strong drink and games of chance, and idols and divining arrows are only an infamy of Satan’s handiwork. Leave it aside in order that ye may succeed” (Quran 5: 90)

Blood, pork, and the meat of dead animals or those immolated to other than God are strongly prohibited. It is also ordered that Halal animals should be slaughtered while uttering the name of Allah at the time of slaughter.

“Eat of that over which the name of Allah hath been mentioned, if ye are believers in His revelations” (Quran 6: 118)

“And eat not of that whereon Allah’s name hath not been mentioned, for lo! It is abomination. Lo! The devils do inspire their minions to dispute with you. But if ye obey them, ye will be in truth idolaters” (Quran 6: 121).

From Quranic verses, interpretation of the verses by Hadith, and inferences of these by Muslim scholars some laws are deduced according to which all pure and clean food is permitted except the dead animal, blood (flowing or coagulated), swine and all its by-products, animal slaughtered without pronouncing name of Allah or pronounced the name other than Allah (this may include the Halal things contaminated with Haram), carnivores

animals, birds with sharp claws, and intoxicants of all types including alcohol and drugs.

Halal dietary laws deal more generally with four issues, permitted and prohibited animals, slaughtering methods, prohibition of blood and intoxicants.

## PERMITTED AND PROHIBITED ANIMALS

Meat of domesticated animals with split hoof is allowed like goat, camel, sheep, cattle, and buffaloes. Also chicken, ducks, turkey, pigeon, and sparrows and like birds are allowed. While meat of swine, boars, and carnivorous animals like lion, tiger, dog, cats and prey birds (eagle, falcon, and osprey) is prohibited.

Sea food also has controversial status. Some groups believe only fish with scale is halal; while other certain groups believe all species live in water all the time are Halal. Consequently, Lobsters, crabs, prawns, are although halal but may be *makrooh* by some hence not consumed. Animals that live both on land and water like crocodile, seals, and frogs are not consumed.

Status of insects is not clearly defined except locust which is mentioned as halal. Insects, in general, both helpful for human like ant, honeybee, or harmful and dirty creatures like flies, and lice are also prohibited as food. Eggs and milk from permitted animals are also allowed.

**Slaughtering methods:** In case of permitted animals a term *Dhabh* is used for sole purpose to make it fit for consumption. The word *dhabh* in Arabic means ‘to slaughter’. Islamic Shari’ah put some conditions must be fulfilled for *dhabh* to meet the requirements to be a Halal. In general, the animal must be of Halal specie, and must be slaughtered by a sane Muslim, who pronounces Allah’s name while slaughtering (invocation), cut the neck (jugular vein) with sharp knife and allow the rapid and full drain of blood results in quickest death of animal.

Generally, cutting three of four passages, (jugular vein, trachea and esophagus, and carotid arteries) of an animal is included in *zabiha* method. Advancements in the methods, uses of machinery, pronouncing the name of God to whole slaughter house or individual, stunning, electrical shocks are also issues for Muslim scholars to infer the opinion.

**Blood prohibition:** According to the Holy Quran pours forth blood is prohibited either of Halal or haram animal. Although blood is not consumed and sold in any market but the products made by blood are available. Like blood sausages and blood albumin are haram for Muslims.

**Intoxicants and alcohol prohibition:** Consumption of alcohol is prohibited clearly in the Holy Quran. The Arabic term for alcohol is ‘*khamr*’ means that which is fermented including everything which affects the consciences of someone including all wine, whiskey,

beer, brandy, drugs and liquors etc. According to some Muslim groups, alcohol is allowed in case only when end product has the amount of it less than 0.1%. However, if wine is converted to vinegar it will be Halal as long as no wine remains in it. So it becomes clear that if an unlawful food item changes state, then the original ruling also changes. [Change of State-Istihala (Al-Quaderi, 2001)]. It is still controversial issue for debates of Muslim jurists.

**Science behind prohibition:** The prohibited things mentioned above are purely and strictly Islamic guidance. Although the permission and prohibition is enough to observe by Muslims as divine orders but justification of the facts revealed 14 centuries before are also confirmed by scientists based on their scientific knowledge as follows:

- Dead animals are unfit for human health because of decaying process which leads formation of some chemicals. (Awan, 1988).
- Blood flood out of body contain intoxicants, bacteria and some metabolic products.
- Swine act as a carrier of diseases for humans. (Hussaini and Sakr, 1983).
- Intoxicants are harmful as effecting nervous system and resulting in the loss of senses. (Al-Qaradawi, 1984).

### BIOTECHNOLOGY AND HALAL FOOD

There is a wide role of biotechnology in food industry as it is a source of synthetic materials, and innovations. The current issues are the status of genetically modified organism (GMO) or vegetables and plants, use of food additives, enzymes, emulsifiers, hormones are of main subject of concern for Muslims. The Muslim consumers should be particular and sensitive to the products they use for the Halal or haram issue. The recent advancements and impact of these advancements upon status of divine dietary law is very important.

**Genetic modifications (Use of gene):** Reconfiguration of genetic material of an organism (may be plants, vegetables or animals) by taking gene from specie and inserting it into another distinct specie which are not evolutionary related, results in organism called Genetically Modified Organism (GMO). Genetically modified foods are beneficial as productive yield is increased, added nutritional values, as well as environmental benefits.

The status of the process of genetic modification is controversial. According to some Muslim scholars and jurisprudence the process of altering some physical traits

or nature created by Almighty is sin as it is mentioned in Quran clearly.

“...assuredly I will incite them and they will cut the ears of cattle; and assuredly I will incite them and they will alter Allah’s creation.” And he who takes Satan for a friend beside Allah has certainly suffered a manifest loss.” (Quran 4:119)

So according to this verse the alteration is not permitted as God is Supreme Power and Creator and no one can or would interfere with His power. Here two thoughts arise:

- Either alteration is just for alteration purposes (No purpose except beauty like in cosmetics or face surgery)
- Or alteration is for some useful purpose (For welfare of humankind) but it does not harm nature or other creatures

Genetic modifications are permitted by some group of thoughts as these things are not mentioned clearly in the Holy Quran or Hadith (Traditions of Prophet Muhammad) because these are recent advancements. By the *Qiyas* and *Ijma* with some limitations it is allowed. In case of improvement of nutritional values of plants for welfare of human it is necessary to observe some Islamic virtual and laws by Muslims to consume these products.

Genetic modifications that especially is an issue of concern can be categorized as:

- From animals to plants and vice versa
- From insects to plants
- From animals to animals

**From animals to plants:** The most controversial applications of biotechnology involve the use of animals and the transfer of genes from animals to plants. Recent advancements in food industry lead scientists to engineer crops with genes having more nutritional values. This transformation will be considered Halal as long as the source animal is Halal. In case where the source animal is not Halal there is a controversial debate among Muslim scholars. For example, pork is clearly announced as Haram in Islam. So taking any gene from pork is forbidden although the end product changes and transferred gene is decoded according to host cell but as it is clearly Haram so any part, by-product, gene or any substance taken from it will be Haram. As mentioned by a jurist:

“Whatever is conducive to the “prohibited” is in itself prohibited. If something is prohibited, anything leading to it is also prohibited.” (Al-Qaradawi, 1984) and some groups believe in

“If an unlawful food item changes state, then the original ruling also changes”  
[Change of State-Istihala (Al-Quaderi, 2001)].

For example swine DNA in soy make it Haram for Muslims. The oil or any material extracted and made from that engineered soy either will be Haram or *Mashbooh* so Muslim consumers should avoid it.

Some advancement like pig cytochrome P450 gene's three kinds are introduced into the rice plant "Nihonbare", and transformants were produced. The rice plant transformed with pig CYP2C49 showed resistance to herbicides (National Institute of Agro biological Sciences, Japan, 2002-07-01). Obviously these rice become haram for Muslims.

On the other hand, when no substituent is present gene of Halal animal can be transformed. This can be taken as Halal and used as the product changes and when grown into soil by some chemical changes the status of gene also changes. But this should be practice only under strict and needy conditions.

**From insects to plants:** One of major application of biotechnology in food is use of microbial “genes or products” in food. In advance Biotechnology plants and vegetables are made herbicide resistant and insect resistant to improve their yield.

The product of gene in this case will be considered as Halal as:

- Status of insects is not clearly defined
- No intoxicants or harmful agent would produce in plant

So, if plant serves better as before for mankind with a resistant power to pests and herbs, there is no religious issue. Some criticism arises due to risk for health, wild life, and for other animals also. Because plants engineered for the production of specific toxin against herbs or microorganisms may also target the animals that eat them. These may lead production of new viruses (Phillips, 1994).

By cross pollination or natural phenomenon other herbs can be more resistant then before.

In case, when the plants producing toxins also harm human then the plants will be prohibited as this not fulfill the criteria of ‘good and wholesome’, which is recommended for Muslims.

Genes for some natural toxins such as protease inhibitors in legumes, cyanogens in cassava and lima beans, goitro genes in canola species, and pressor amines in bananas and plantains, may be turned on and lead to an increase in levels of these toxins which can pose a hazard to the consumers of these crops.

**From animals to animals:** Some recent advances in this field also include the transfer of gene from animals to animals either for addition of nutritional values or express or suppress some specific gene in them.

The transfer of gene may be because of:

- Increase livestock, high yield of milk and meat etc., or
- To treat some specific disorder.

As long as gene transfer is for sole purpose of treatment of specific disorder such animals will be Halal because natural process is regained by treating with same normal gene.

To increase the yield of milk, its all derivatives will be treated as Halal until they are contaminated with Haram thing.

Like bovine growth hormone enhances milk production in cows.

Pigs can also be treated with a hormone called recombinant porcine somatotropin (rPST), a growth hormone that increases meat production in pigs, and reduces the amount of fat thereby producing low-fat pork (Uzogara, 2000).

More generally, the gene modification is allowed when the purpose is to serve humankind. The genetically modified product either animal or food vegetable will be Halal if genes taken from Halal source and are not harmful for human health. The product would not be considered as Halal if taken from Halal source and becomes intoxicant after modification.

Some critics regarding health, environment, ecological system also evolve because of the fear that gene transformation may not transferred to the target cell successfully, resulting in the unexpected behavior of cell like activation of some nearby gene which is inactive, production of unnecessary chemicals thereby making the resulting plant toxic, infertile, or unsuitable for consumption.

**Gene products (Enzymes):** One of useful, but least-understood, use of enzymes is in the food industry. The enzymes, act as catalysts, are proteins and the end product of gene. Food industry has taken advantage of the catalytic properties of enzymes as they can increase yield in less time and cost, and improve taste, affect color, and texture and give clarity to the finished product. Today, enzymes are used for many purposes including baking, fruit and vegetable processing, cheese making, beverages and food ingredient production.

Enzymes can be taken from animals, plants and microorganism also. They can be Halal or haram depending upon the source. If the source is Halal then they are considered as Halal as long as animal is slaughter

according to Islamic Shari'ah, if not then enzyme will be *mashbooh* (doubtful). For example pepsin/proteases and catalyses are extracted from cattle/pig's stomach and bovine liver respectively (Mathewson, 1998.).

The enzymes taken from plants or microorganisms are Halal for consumption like papain is an enzyme extracted from papaya and amylase taken from barley. Cheese and whey produced by using animal enzymes are haram if the source is haram animals. Chymosin is an enzyme used for coagulation, lipase is used for ripening, and lactase is used to improve digestibility of cheese (Chaudry, 2002).

Some enzymes are naturally present and extracted directly either from plants or animals, while some are biologically engineered. A common method for production is submerged fermentation.

Synthetic enzymes would be considered Halal only when ingredients and chemicals used for extraction are Halal and processing methods not violate the basic principles of Halal.

Labeling of enzymes is also an issue of concern. Some enzymes become inactive in final product like in juices. Status of these enzymes is termed as *Mashbooh*. While some remain active in final products like in bakery products (Mannie, 2000).

**Animal feed:** There has been a controversy surrounding the current issue of animal feed containing animal by products and its extracts including protein supplements made by swine.

Some Muslim Scholars believe in concept that the animal feed made by the haram animal's part lead the Halal animal that eat it towards the category of unclean for dhabh and thus to avoid.

On the other hand, some believe that the animal that lives in filth and survive by eating filth all the time meet the condition of unfit for the Muslim consumption. An Arabic term *jalalah* is used for the animal that lives in heap of filth and eats it every time. Muhammad forbade the meat and milk of that animal for consumption (Khan, 1991).

Some animals or birds eat sometime a part of filth so this would be an exceptional case and term *jalalah* will not implemented to those animals.

Muslims are much sensitive about the issue that the animal feed must be from plant origin or from Halal source otherwise. Saudi Arabia banned products from Europe on the suspicion that the animals were given feed containing prohibited animal parts (Al-Zobaidy, 2002).

**Food ingredients:** One of recent advancements in the field of food science is the use of different chemicals, food additives, flavoring agents, and emulsifier in food to improve the quality and taste. Plants and their derived

ingredients are Halal as long as not contaminated with haram or not intoxicants. Ingredients taken from Halal animal slaughtered by Halal method are considered as Halal.

## CONCLUSION

Halal is the dietary laws for Muslims. Being Islam is second largest religion of the world Halal products and International halal food trade increased to worth approximately \$150 billions (Egan, 2002).

Now-a-days with increase in the population demand for Halal food also increases putting a responsibility upon the government, Jurisprudents, and companies to ensure the product for certification of Halal. Hence, the food industry needs to understand the requirements for producing products for Muslim markets. It also needs to understand the import requirements of countries with Muslim populations, which cover religious as well as safety aspects of imported food.

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