



Fiqh Istihalah: Integration of Science and Islamic Law

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Abstract

Modern developments in information technology have helped the expansion of knowledge, and shaped various aspects of contemporary life, including art, architecture, engineering, agriculture and the food industry. This paper discusses the role of modern technology in the food industry, with emphasis on the activities of enhancing, redesigning and upgrading the quality of the food. It analyses the use of technology in determining the permissibility of certain foods in compliance with the Islamic concept of *halal*; and it examines the concept of *fiqh istihalah* and its applications in the food industry, focusing on issues relating to the use of alcohol and gelatine ingredients in food products.

Keywords: *Fiqh, Istihalah*, Science, Integration, Gelatine, Alcohol

Abstrak

Perkembangan moden dalam teknologi informasi telah membantu pengembangan ilmu dan membentuk gaya hidup masyarakat semasa dalam pelbagai aspek seperti kesenian, seni bina, kejuruteraan, pertanian dan industri makanan. Kertas ini ditulis untuk menonjolkan peranan teknologi moden dalam industri makanan dan kegiatan meningkatkan, mereka bentuk semula dan menambah baik kualiti makanan. Kertas ini juga menganalisis penggunaan teknologi bagi menentukan keizinan makanan tertentu yang menepati konsep makanan halal dalam Islam. Usaha juga dilakukan untuk menggariskan konsep *fiqh istihalah* dan aplikasinya dalam industri makanan. Namun, kertas ini memberi tumpuan kepada isu yang berkaitan dengan alkohol dan bahan gelatin dalam industri makanan.

Kata kunci: *Fiqh, Istihalah*, Sains, Penyatuan, Gelatin, Alkohol

Introduction

Rapid development in food technology resulted in the emergence of various new food products and food ingredients in the market; this technology enables players of the food industry to produce, and probably reproduce food from different ingredients. However, religious communities, including Muslims, have raised some ethical concerns about some food production activities, which are not in line with their religious values. For instant, Muslims rejected those foods which were derived from pork and its derivatives, carrion, blood, wine and others. The reason is, the consumptions of these items are prohibited by the *shari'ah* of Islam, and thus any food derived from these items is not permissible (*haram*); examples of

especially in cooking, chocolate, ice cream, biscuits and other products. Furthermore, alcohol by-products such as vinegar and marmite have been popularly consumed by consumers, including Muslims without assuring the source of origin of the products (Mian & Chaudry 2004). Meanwhile, gelatine is widely used as an ingredient to improve the quality of food products. Generally, most of Muslim jurists agreed that gelatine derived from slaughtered and permitted animals is permissible (*halal*). However, there is disagreement among the Muslim jurists on the permissibility of the gelatine derived from pork and carrion. Some of them agreed that gelatine extracted from the prohibited sources is not permissible (*haram*), while others are of the opinion that gelatine from non-permissible (*haram*) sources is *halal* because it has undergone *istihalah* process (Nazih 2004).

In their discussion about the process of transforming certain items or products from one form to another, Muslim jurists tend to use terms like *istihalah* (transformation) or *inqilab* (changes), (Wahbah 1997). *Istihalah* is an Arabic word which is derived from the root word (ح و ل) that means change (Ibn Manzur 1990; Wehr 1974); it is synonymous with the word (انقلب) or *ichanges* (انقلب) and transformation (تغير) (al-

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such ingredients are gelatine and the use of alcohol in food products.

Alcohol is mainly used as a food carrier in food products. Its has been used as flavour enhancer,

Razi 1997), thus *istihalah* literally means transformation and conversion (Wahbah 1997). According to Qal'ahji in *Mu'jam Lughah al-Fuqaha'*, *istihalah* of a substance from one form to another without the possibility of return to the original forms (Qal'ahji 1996). This viewpoint is in line with Sa'di Abu Jayyib's opinion where *istihalah* is said to hold when a substance has undergone complete changes (Abu Jayyib 1988). For example, the seeds grow and changes to a tree or a transformation of filth becomes a dust (Al-'Ayid n.d.).

Conceptually, Muslim jurists provided various definitions of the term *istihalah*; however, the common ground of these definitions is 'transformation of one material into another' (Muhammad 1996). Wahbah (1997) also defined *istihalah* as conversion of the composition and properties such as the conversion of filthy (*najs*) materials into pure (*al-tahir*) materials. Nazih (2004) adds that *istihalah*, in this perspective, is basically a transformation of filthy (*haram*) materials into another material; such changes include physical appearance and properties such as name, odor, taste, colour and nature. Therefore, *istihalah* can be defined as a complete transformation of a product, physically and chemically (Aizat & Radzi 2009).

Istihalah includes three aspects of transformation such as, the transformation of physical characteristics; *second*, the transformation of chemical substances, and *thirdly*, the transformation of both physical and chemical changes (Aizat & Radzi 2009). Physical transformation includes odour, taste and colour, whilst chemical transformation is the change of chemical substances in the product (Wahbah 1997). In the case of transformation of both physical and chemical characteristics, a substance undergoes complete changes and transformed into a new material (Nazih 2004). Common examples of physical transformations are animal skins, except dogs and pigs, which are being transformed into hides through the tanning process (Fayyumi 1985). An example of chemical transformation is the change of wine to vinegar through a fermentation process (Wahbah 1997). In the latter example, both wine and vinegar are still in liquid forms, but they are different in terms of chemical properties.ⁱ

Fiqh is an Arabic word, which literally means deep understanding, full comprehension and gaining knowledge of the religion in general (Ibn Manzur 1990). Ibn Khaldun describes *fiqh* as 'knowledge of

the divine rules which pertains to the actions of individuals (*af'alul al-ibad*), who are expected to respect the demand of the divine law, including the required (*wajib*), forbidden (*haram*), recommended (*mandub*), disapproved (*makruh*) or merely permitted (*mubah*)' (Levy 1957). With more specific terms, *fiqh* is understood as: 'knowledge of practical rulings extracted from detailed evidence of the *shari'ah*' (*al-'Ilmu bi Ahkam al-Shari'iyah al-'Amaliyyah min Adillataha al-Tafsiliyyah*) (Abu Zahra 1958). Moreover, *fiqh* in Islam includes *al-Ibadah* (worship), *al-Muamalat* (dealing & transaction), *al-Munakahat* (marriage), *al-Mawarith* (inheritance), *fiqh al-At'imah* (foods) and so on (Syarbini 1994).

Therefore, this paper aims to elucidate *fiqh Istihalah*,ⁱⁱ and present it as an alternative verification method, through which the permissibility (*halal*) of the food, or otherwise, is determined. In this paper, *fiqh Istihalah* is the concept of understanding the process of physical and chemical transformation or conversion of materials which affect the *halal and haram* status of a product.

Structure of Istihalah

In the process of transforming food products in the concept of *istihalah*, as shown in Figure 1, transformation includes three main elements, namely the raw materials, the conversion agents and finished products. The process of combining occurred as a result of the interaction between raw materials and conversion agent, naturally or artificially. The finished product after having undergone the conversion process will be different, physically and chemically from the original material.

Gelatine

Gelatine is a protein which is derived from partially hydrolyzed collagen obtained mainly from skin and bones of vertebrates (Karim and Rajeev 2008). Collagen consists of tertiary, secondary and primary structure. Partially hydrolyzed collagen could mean the cleavage of tertiary and secondary structures into smaller molecules. Meanwhile, primary structure of gelatin consists of amino acid (Figure 2) which is the smallest molecule found in gelatin. According to Schrieber & Gareis (2007), the composition of collagen encompasses all 20 amino acids. Glycine, proline and hydroxyproline are the largest numbers of amino acid that exist in gelatine.

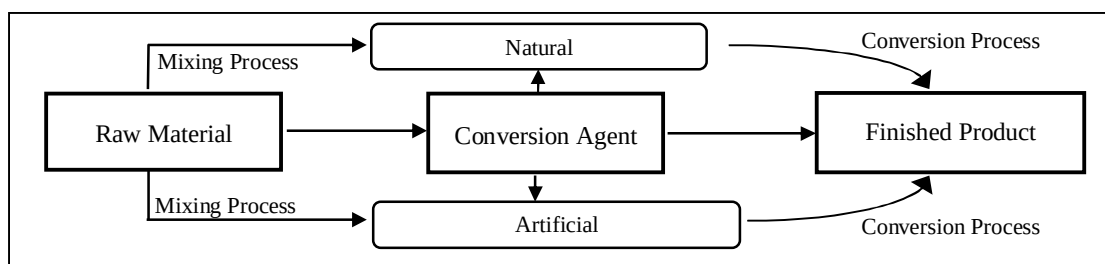


Figure 1: Iploc and R2

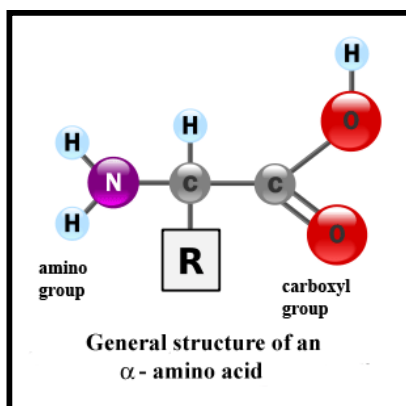


Figure 2: General structure of amino acid

Gelatine is a very important ingredient as value-added properties in food products. It is widely used as a texture stabilizer, foaming agent, emulsifying agent, thickener and others. Gelatine can be found in various food products such as ice-cream, yogurt, jelly, puddings, beverages and meat products. Table 2 shows the usage of gelatine in various products. The wide usage of gelatine in food products led to loss of confidence and continuous controversy among Muslim consumers because of its questionable sources. The Gelatine Manufacturers in Europe (2011) declared that the main source of edible gelatine is extracted from pigskin (80%), cattle hide split (15%) and the remaining 5% comes from pig and cattle bones, poultry and fish.

Alcohol

Alcohol is obtained from fermentation of fruits or grains with the existence of yeast, sugar or starch. It is colourless, flammable and has been broadly accepted as one of the most popular beverages all over the world. It is also used in other products in its pure or denatured form as a solvent in drugs, perfumes, and explosives, cleaning solution, bakery products and cooking.

Alcohol is classified according to the relationship between the carbon atoms in it. The most commonly used primary alcohols are methanol and ethanol (Figure 3) with ethane backbone. The simplest secondary alcohol is iso-propanol, while butanol is a simple tertiary alcohol

Table 1: Application of gelatine in consumer products

No.	Products	Gelatine Application
1.	Food Products - Fruit gummies, marshmallow, candy bar filling and jelly. - Cheese, yogurt, cultured milk, ice-cream and sandwich spread.	- Chewiness and gumminess, foaming agent and water holding capacity. - Emulsifier, foaming and stabilizing agent, and texture stabilizer.
2.	Drugs and Pharmaceuticals - Hard capsules and soft capsules.	- Capsules rebuilding.
3.	Cosmetics - Skin care products, cosmetics surgery and hair care products.	- Increase flexibility and smoothness. - Decrease wrinkles.
4.	Detergent and Cleaning agent	- Surfactant.

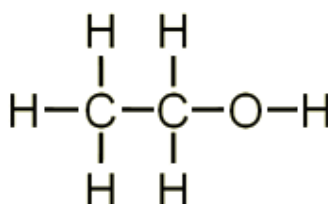


Figure 3: Chemical structure of ethanol

Production of ethanol needs to undergo the fermentation process (Figure 4). During fermentation, yeast breaks sugar down into ethanol and carbon dioxide. The process is without air, and once completed; the carbon dioxide gas bubbles out into the air, leaving ethanol and water behind.

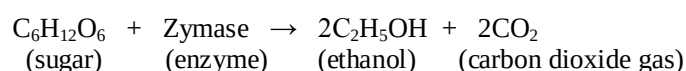


Figure 4: Ethanol fermentation process

Various sources of sugar are used in these processes, resulting in different forms of alcohol. The sugar from crushed grapes is used to make wine; malted barley is used to make beer; sugar cane or molasses makes rum; grain, potatoes, beets, molasses, and a variety of other plants are used to make vodka. Below is a list of several types of alcoholic beverages and their alcohol contents. See the following table 1.

Alcohol consumption in large doses can cause acute respiratory failure or death and in chronic cases have a lot of medical repercussions. In normal consumption, about 20 percent of alcohol is absorbed by the stomach and 80 percent by the small intestine. The alcohol then enters the bloodstream and dissolves in the blood. Eventually, the blood circulates the alcohol throughout the body, leading to intoxication.

Application of Istihalah in Gelatine and Alcohol Products

In the food production chain today, gelatine are extracted from pigskin, cattle bones and hides. Therefore, clearly gelatine can be derived from both permissible (*halal*) and non-permissible (*haram*) sources. Gelatine or collagen are processed along with other ingredients, mixed together and made to undergo various processing methods, including extreme heat treatment, enzymatic reaction, pasteurization and others. These extreme conditions can physically and/or chemically modify the matrix structure of collagen, in order to produce good gelatine.

Table 2: Several types of alcoholic beverages and their alcohol contents

Types of Alcoholic Beverages		
Beverages	Type	Alcohol Content (%)
Brandy	Fruit juices	40 – 50
Whisky	Cereal grains	40 – 55
Rum	Molasses/sugarcane	40 – 55
Wines	Grapes/other fruits	10 - 22
Beer	Cereals	4 - 8
Arrack	Paddy/wheat	50-60
Toddy	Flowers of coconut and palm tree	5-10

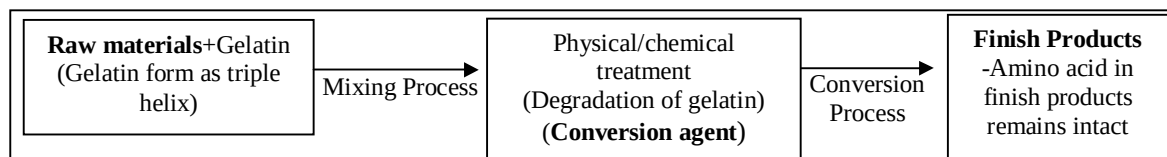


Figure 5 : Conversion process of gelatine

In the application of *istihalah*, raw materials are mixed with other substances to produce another new material (Figure 1). The transformation of raw materials into other products could happen physically (by observation) or chemically. Basically, the physical appearance of raw materials (pigskin, cattle bones and hides) has been transformed into gelatine. In the process of producing gelatine, the raw materials were mixed with other substances for its complete transformation.

However, it is proven that the chemical composition

heat treatment or alcohol or acid and alkali or heavy metals) could only disrupt the tertiary and secondary structure of protein and do not break the peptide bonds with amino acids (Figure 2). Furthermore, Hoque *et al.* (2009) suggested that excessive heating could degrade the gelatine; meanwhile lower heat treatment could only influence the stretching and unfolding of gelatine strands. In Figure 5: Conversion process of gelatine this regards, the amino acid molecules in gelatine are not affected by extreme physical or chemical treatments

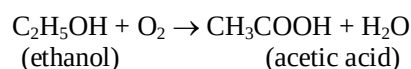


Figure 6: Fermentation process of ethanol to acetic acid

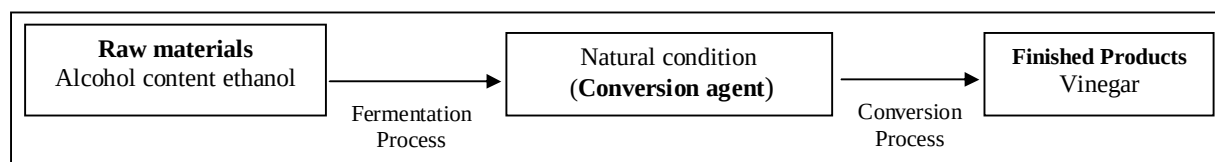


Figure 7: Conversion process of vinegar

of gelatine remained unchanged. It is suggested that the amino acid in food products still remained intact and did not undergo any chemical transformation, although the production process involved the extreme conditions. Denaturation of protein (which involves

Determination of *halal* and *haram* status of food products that contain alcohol depends on the source of the alcohol added (or naturally occurred). In food and beverages products, ethanol occurred naturally in fermentation process. According to Fatwa Committee

National Council of Islamic Religious Affairs Malaysia, natural occurrences of ethanol in food products are acceptable, if ethanol contents are less than 1% in beverages, and whilst it is 0.5% for flavoring or coloring substances for the purpose of stabilization (e-fatwa).

As mentioned earlier, fermentation process occurred in the presence of sugar and specific enzyme to produce ethanol and carbon dioxide gas. Ethanol produced from fermentation could be intoxicant and are not allowed for Muslims. When the fermentation continued in the presence of oxygen, the intoxicating alcohol then changes to acetic acid or vinegar. Refer to Figure 6.

In this process, ethanol has completely changed to acetic acid/vinegar. The complete change from alcohol to vinegar, chemically and physically (changes of color, odor and taste) describes that *istihalah* can be applied in this circumstance (Figure 7).

Hence, it is suggested that gelatin only transforms physically, not chemically. Because of this reason, *istihalah* method in gelatin cannot be fully applied. Most Muslim scholars suggested that the application of *istihalah* can only be applied when the complete transformation (physical and chemical wise) occurred during the process (Aizat & Radzi 2009). While, *istihalah* concept can be applied for vinegar because, the conversion of wine to vinegar undergoes complete changes physically (odor, color and taste) and chemically (chemical structure) (Ghananim 2008).

Conclusion

Fiqh istihalah addresses three different levels of conversion; such as transformation of physical, chemical or both chemical and physical. The matter of *istihalah* in gelatine issues is not applicable in Islam, because of the unchanging chemical composition even after severe process in food production line. However, complete conversion (physically and chemically) occurred in fermentation process of alcohol to vinegar. Nevertheless, the information on current matter, specifically in *halal and haram* status are still fewer. In depth, laboratory works on specific issues related to points of discussion are still needed in order to make effective clarifications. Finally, the concept of *Istihalah* is one of the relevant tools that can be applied in science and technology related issues in finding solution and dealing with *halal and haram* in food products for Muslim societies.

REFERENCES

Abu Jayyib, S. 1988, al-Qamus al-fiqhi: lughatan wa istilahan, Damsyik: Dar al-Fikr.
Aizat, M.J. & Radzi, C.W.J.W. M. 2009. Teori Istihalah menurut perspektif fiqh dan sains: aplikasi

terhadap beberapa penghasilan produk makanan. Jurnal Syariah. 17 (1), 169-193.
Al-'Ayd, A. et al. n.d. Mu'jam al-'Arabi al-Asasi, Tunis: al-Munazzamah al-'Arabiyah li al-Tarbiyyah wa al-Thaqafah wa al-'Ulum.
Al-Fayyumi 1985. al-Misbah al-Munir fi Gharib al-Syarh al-Kabir, Beirut: al-Maktabah al-'Ilmiyyah.
Al-Jurjani 2000. al-Ta'rifat, Beirut: Dar al-Nafa'is.
Al-Razi 1997. Mukhtar al-Sihhah, Beirut: Dar al-Fikr al-'Arabi.
Ghananim, Q. I. 2008. Al-Istihalah wa Ahkamuha fi al-Fiqh al-Islami, Jordan: Dar al-Nafais.
Hoque, M.S. et al. 2010. Effect of heat treatment of film-forming solution on the properties of film from cuttlefish (*sepia pharaonis*) skin gelatin. J. of Food Engineering. 96, 66-73.
Ibn Manzur 1990. Lisan al-'Arab, Beirut: Dar Sadir.
Ibn Taymiyyah 2005. Majmu'ah al-Fatawa Ibn al-Taymiyyah, Egypt: Dar al-Wafa', 3rd edition, vol. 21.
Jasser, A. 2010. Script-Based Rational Evidences, in: Jasser A., Maqasid al-Shariah as philosophy of Islamic law. Kuala Lumpur, Islamic Book Trust, pp. 107-135.
Karim, A.A. & Rajeev, B. 2008. Fish gelatin: properties, challenges, and prospects as an alternative to mammalian gelatins. Food Hydrocolloids. 23, (3), 563-576.
Majma' al-Lughah al-'Arabiyah 2004. al-Mu'jam al-Wasit, Egypt: Maktabah al-Syuruq al-Dauliyyah, vol. 4.
Mian, N.R. & Chaudry, M.M. 2004. Halal food production, London: CRC Press.
Nazih, H. 2004. al-Mawad al-Muharramah wa al-Najisah fi al-Ghiza' wa al-Dawa' bayna al-Nazariyyah wa al-Tatbiq, Syria: Dar al-Qalam.
Nurdeng, D. 2009. Lawful and unlawful foods in Islamic law focus on Islamic medical and ethical aspects. International Food Research Journal. 16, 469-478.
Nyazee, I.A.K. 2000. The Sources of Islamic law, in: Nyazee, I. A. K., Islamic Jurisprudence. Pakistan: The International Institute of Islamic Thought, pp. 144.
Qal'ahji, Muhammad Rawwas 1996. Mu'jam lughah al-fuqaha', Beirut: Dar al-Nafa'is.
Schreiber, R. & Gareis, H. 2007. The raw material 'Ossein', in: Schreiber R. and Gareis H., Gelatine Handbook-Theory and Industrial Practice. Weinham: Wiley-VCH, pp. 63-71.
Syarbini 1994. al-Iqna' fi Halli Alfaz Abi Syuja', Beirut: Dar al-Kutub al-'Ilmiyyah.
Wahbah, Z. 1997. al-Fiqh al-Islami wa Adillatuh, Syria: Dar al-Fikr, vol. 1.
Wehr, H. 1974. A dictionary written Arabic, (ed.) J. Milton Cowan. Beirut: Librairie Du Liban.

www.e-fatwa.gov.my, cited on 20th Oct. 2011.

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ⁱ In the Islamic *shari'ah*, vinegar is permitted, while wine is prohibited because of its intoxication effect.

ⁱⁱ Basically, the main sources of verification of *halal* and *haram* in food products are from the Qur'an, Sunnah (prophetic traditions), *Ijma'* (consensus of legal opinion) and *Qiyas* (analogy) (Nyazee 2000). While, secondary sources of these verifications include, *al-Maslahah* (public interest), *al-'Uruf* (custom), *al-Istihsan* (juridical preference), *Sad al-Dhari'ah* (blocking the means), *al-Istishab* (presumption of continuity) and others (Audah 2010). The paper consults the relevant sources of the Islamic *shari'ah*, as well as the available scientific data related to this subject. A comparative analysis of Muslim jurists on this subject would also be presented.