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## FATWA DEBATE ON PORCINE DERIVATIVES IN VACCINE FROM THE CONCEPT OF PHYSICAL AND CHEMICAL TRANSFORMATION (ISTIHALAH) IN ISLAMIC JURISPRUDENCE AND SCIENCE

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### Abstract

Medical field is one of the key areas in viewing the interconnection between religion and science, both modern and traditional. Religion and science are unanimous in ensuring the good health of humans. However, there are differences in approaches used in interpreting the meaning of 'good' in health care between religion and science, as well as the methods of achieving that objective. Among the issues related to the modern medicine is to which extent that the vaccine used is halal. The use of derivatives from haram sources during vaccine preparation becomes a polemic in the field of Islamic bioethics. There is a clash in methodology when scholars explain the halal status of the modern medicines used, especially those derived from haram substances. Among the concepts that caused the difference in fatwa regarding the use of such medicine is istihalah concept. Differences of previous scholars' acceptance that are associated to istihalah became the fundamental of fatwa difference in this era. Therefore, this paper will discuss issues in the use of haram substance derivatives in the production of vaccines. Next, istihalah concept is analysed based on opinion from past and present scholars, as well as the correlation of istihalah in vaccines production.

**Keywords:** Fatwa, Vaccine, Istihalah, Porcine, Halal.

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### ISLAM & VACCINE

According to Padela et al. (2013), modernity, globalization and sophistication in technological breakthroughs have challenged the religious system to re-evaluate the existing traditional doctrine and code of ethics to produce a practical guide to modern society. Marcus (1995) explains, the role of religious Scholars are very important in explaining the guidelines of medical ethics; either to the patient or to the medical professional. The guidelines describes how the Scholars can present modern approaches in explaining the principles contained in religion.

Islam provides general guidelines to the followers regarding medication and medical treatment. Islam insists that individuals who are sick to try finding a cure, but only halal medicines are allowed. This is based on the hadith from the Prophet Muhammad, "If you are sick, you should seek treatment. However, do not be treated with haram stuffs." Narrated by Abu Daud (n.d.: 4/7, hadith 3874). Abu Hurairah reported: "Prophet Muhammad forbids treatments with khabith (haram or tainted) medication." Narrated by Abu Daud (n.d.: 4/6, hadith 3870), al-Tirmizi and Ibn Majah.

Vaccination is an effective immunization method for the preventive treatment represented by modern medicine. Preventive treatment through immunization is in line with the life saving objective in according to Islamic law. However, immunization through vaccination method involves how the vaccines are obtained. Although the use of vaccines is considered as one of the effective methods for immunization, the vaccine produced must be halal vaccine. According to British Pharmacopoeia, vaccines for human use are the preparations containing substances that are able to induce specific and active

immunity in humans against a viral agent or toxin or antigen derived thereof (Abdul Halim Ihsan, 2013: 68).

However, there are issues; the vaccine is produced by the mixture of substances from unclean derivatives, particularly derivatives from pigs. According to the majority of Islamic jurist, any component of pigs is unclean and haram for human consumption. Pork proscription in verse 145 of surah al-An'am means it includes an overall prohibition of pig component. Allah SWT said: "Say (O Muhammad): "I don't find in what has been revealed to me, anything prohibited for an man to eat except if it is a carcass, or oozing blood, or pork, - for it is full of filth. Or anything that is wrongly done (fasiq), that is the animals are slaughtered in the name of other than Allah.' Then whoever is compelled (consuming it out of emergency), while he was not intending and not transgressing, then Allah is All-forgiving, merciful." (Surah al-An'am, 6:145). Based on the verse above, if a pig component had to be used in 'darurah' situations (emergency), only then it is allowed to be consumed (Ibn Hazm, 2001; Ibn Juzai, 1998; Ibn Nujaym, n.d.; al-Kasani, 2000; al-Qalyubi & 'Umyrah, 1997; Hammad, 2004). However, there are non-popular opinion stating that the forbidden by Allah is just eating pork. While for other uses besides pork, are not included in the proscription. Therefore, uses of other than pork is conditionally allowable such as pigs' tanned hide is clean, pigs' hair can be used. Among the scholars who share the same opinion are Daud al-Zohiri (al-Rahibani, 1994) and Ibn 'Asyur (1984).

Among the critical substances used in vaccines production are gelatin and trypsin. Gelatin is an extracted protein to be used as a stabilizer in vaccine (Abdul Halim Ihsan, 2013). According to the gelatin manufacturer in Europe, 80% of gelatines in the market are manufactured from pig hide extract, 15% of cow dung extract

inside the intestines, and 5% from the pigs' bones, cattle, other livestock and fish (Mohammad Aizat, et al., 2012). Meanwhile trypsin is a type of proteolysis enzyme produced from pig pancreas for hydrolyzing esters and amides from the protein network. Trypsin can also be produced from the pancreas of cows and other mammals (Abdul Halim Ihsan, 2013).

There are two schools of thoughts that explain the legal status of halal vaccines containing pig component. First stated the product including vaccines, when there are unclean components in its production, then the product is haram for human consumption, but should there be in a 'darurah' situation, then it is allowed. While for the second school of thought, despite the presence of unclean component in the product, but when the unclean had changed in substance, then it is halal to consume as istihalah and istihlak processes already took place.

Example of fatwa from the first school of thought is the Fatwa Committee *Muzakarah* of the National Council for Islamic Religious Affairs Malaysia convened for the 81st time in the Senate Meeting Room of Universiti Sains Islam Malaysia (USIM) on March 31, 2008 discussing the issue in the use of the Biothrax Vaccine And Rotateq Vaccines Using Elements From Pigs In Its Production Process and has agreed to decide the following:

- a) "After listening to briefings and explanations and examining the evidence, arguments and views expressed, *Muzakarah* agreed to decide that for the time being, the use of the BioThrax™ and RotaTeq vaccines containing pork element in the process of production is not conditionally allowed. Any drugs that use the resources that are prohibited for Muslims to eat and touch or any unclean elements exist in its production process is haram to be used by Muslims except in emergency situation.
- b) *Muzakarah* also decided that the use of BioThrax™ and RotaTeq vaccines are not allowed because:
  - i. Current situation is considered not an emergency situation;
  - ii. There are alternatives to the substance or drug instead of using pigs derivatives in the processing of both vaccines; and
  - iii. No solid supporting data to prove that people in this country desperately need both vaccines.

Therefore, *Muzakarah* views that the halal certificates for both vaccines should not be granted."

While a sample of fatwa from the second school of thought is the result of the European Council of Fatwa and Research, at the 11<sup>th</sup> Conference of the Islamic Center, in Stockholm, Sweden, on 1-7 July, 2003 which claimed that the Polio Vaccine using trypsin substances; enzyme derived from pigs, as one of its components, is halal for use even if trypsin is a haram substance, but istihlak has taken place due to its small amount of content, while others halal substances are more dominant. Istihalah also took place, where trypsin is no longer considered as part of a pig.

The same stance was also expressed in the 8<sup>th</sup> Medical Fiqh Seminar Resolution organized by the Islamic Organization for Medical Sciences Kuwait organized in Kuwait on 22-24 May 1995:

"8. "Transformation", i.e. the process that causes an object to change into another, totally different in properties and characters, turns the unclean, or what is deemed to be unclean, into a clean object, and therefore turns prohibited things into things permissible by the Shariah. On this account the following is concluded:

- a. Gelatine made of unclean animal's bones, hide and tendons is clean and permissible for consumption.

- b. Soap produced by treating and transforming pig fat or fat obtained from a dead animal turns into a clean compound by the process of transformation and therefore using this soap is permissible.
- c. Cheese processed with rennet, obtained from animals which are dead but are permissible to eat, is clean and eating it is permissible.
- d. Ointments, creams and cosmetics which contain pig fat are all unclean. Their use is impermissible in Shariah except when transformation (of the material into one of totally different properties) is ensured." (IOMS, 1995)

Furthermore in the 9<sup>th</sup> Medical Fiqh Seminar, the standpoint against istihalah and istihlak as the changing processes of unclean into clean become more clearly explained. In the 9<sup>th</sup> Resolution Medical Fiqh Seminar organized by the Islamic Organization for Medical Sciences Kuwait in Casablanca, Morocco on 14-17 June 1997:

#### "1. Transformation and Additives in Food and Medicine

The Seminar endorsed all the recommendations made at the 8th Seminar under Section II, on impermissible and defiled foods and medicines.

Furthermore, the Seminar discussed the medical and Fiqh aspects of this issue and concluded that additives in foods and medicines that originate from defiled or forbidden substances may be made permissible by two methods:

#### A. "Transformation"

The Seminar made reference to Recommendation 11(8) made at the 8th Fiqh-Medical Seminar with respect to transformation.

Transformation, from the Fiqh point of view, is defined as "changing the nature of the defiled or forbidden substance to produce a different substance in name, properties and characteristics." In common scientific terms, this refers to all new compounds produced by chemical reaction, such as the manufacture of soap from oils and fats, or the decomposition of substances such as fats and oils into various compounds such as fatty acids and glycerol. Chemical reactions result from deliberate technical and scientific processes as well as due to invisible processes, as the Islamic Fiqh experts had pointed out, such as acetification, tanning and burning. This leads to the following conclusions:

1. Additive compounds extracted from prohibited animals or defiled substances which are "transformed" as given above, may be considered as clean and permissible for consumption or as medicine.
2. Chemical components extracted from prohibited or defiled substances, such as blood or sewer water that have not undergone a chemical transformation, according to the terms given above, are not permitted for consumption or for use as medicine. This includes the following:

All foodstuffs containing blood as the primary ingredient, such as blood sausages, black pudding, hamburgers, baby foods, pastries, soups and sauces. As for blood plasma, a cheap egg-white substitute usually used in pastries, pies, soups, sausages, hamburgers, cakes, biscuits, puddings, bread, dairy products, and baby foods and medicines, and may in some cases be added to flour, the Seminar decided, however, that it has different properties and characteristics from blood and would, therefore, not be subject to the same ruling. Some participants, however, did not agree with this view.

#### B. Consumption or Assimilation

This refers to the blending of a small amount of a prohibited or defiled substance with a dominant clean and permissible one

resulting in the obliteration of the prohibited or defiled substance altogether. This would be the case if the properties of the dominant substance, such as taste, colour and smell overwhelm the weaker substance which is completely assimilated into the dominant one, as in the following examples:

1. Additives containing very small amounts of alcohol which are used in foods or medicines, such as colourings, preservatives, emulsifiers and anti-acids.
2. Lecithin and cholesterol, extracted from defiled non-transformed substances may be used in food and medicine in very small quantities, having been assimilated into a dominant clean and permissible mixture.
3. Enzymes obtained from pigs, such as pepsin and most digestive yeasts, used in negligible (infinitesimal) quantities in food and medicine." (IOMS, 1997)

#### ISLAMIC JURISTIC ADAPTATION IN ISTIHALAH

Based on the fatwa regarding vaccine that was previously mentioned, the resulting differences are based on their acceptance towards the istihalah concept as a transformation process of the unclean substance to permissible substance.

The use of istihalah term as a fiqh technical terminology was only recently used by the current scholars. However, this term was used in fiqh turath *kitab*, namely in a discussion concerning unclean in the Taharah and At'imah wa Ashribah chapters (Zulkifli, 2012). Among the terms used in fiqh turath *kitab* that are related to the unclean's purification process through istihalah are such as *istihlah*, *inqilab*, *intiqaal al-'ayn*, and *taghyir al-'ayn*.

Istihalah is a natural process that gives a transformation effect of legal status due to the change of substance. If haram substance and unclean that has changed in chemical structure and physical characteristics, so it has turned to other materials that have a different name and properties. Its legal status is halal and clean based on 'each of thing is originally clean and halal' methodology (Hammad, 2004: 18). Istihalah literally means a change of a substance to another substance (al-Ashqar, 2001; al-Khatib, 2003; Hammad, 2004; al-Zuhaili, 2006; al-Ghananim, 2008).

Istihalah based on fiqh means the change of one substance to another substance such as a transformation of a substance from unclean to clean substance (Ibn 'Abidin, 1992; al-Zuhaili, 2006). Qal'ahji added an istihalah parameter in its definition 'without any possibility to return to its original shape (Qal'ahji, 1996: 39). Istihalah by English terms refers to 'transformation'.

Therefore istihalah according to fiqh term refers to a complete transformation of a substance from unclean element into clean, either via physical or its chemical chain, or both. Transformation of the unclean to clean physically means disappearance of unclean properties in the product such as changing of the color, taste and smell similar to a tanned animal hide (except for dog's skin, pig and those originated from these two sources). Example of change in chemical chain is the wine alteration into vinegar, which is physically unchanged as it is still in liquid form, except for the ethanol has turned into acid (Fayyumi, 1985; Hammad, 2004; al-Zuhaili, 2006; Mohamad Aizat et al., 2012).

Istihalah from the scientific view can be classified as three parts, the transformation of physical appearance, chemical substances, and both physical and chemical. Physical transformation includes odor, taste and color. While chemical transformation is the changes of chemical substances in materials. The transformation of physical and chemical of one substance involves the complete changes and produce a new materials. For example, in Islamic law noted that the complete transformation can be described as

the blood of roe does transform into nourish essence. It also includes the transformation of animal's faeces into ashes through burning process.

In explaining the istihalah concept as a transformation process of the unclean substance to clean substance, some juristic adaptation were concluded based on the analysis on fiqh turath and current write up:

#### 1) Istihalah is a Natural Process that Gives the Legal Status Transformation Effect Due to Substance Changes

Istihalah process is a natural process and scholars agreed that based on istihalah Occurred, the substance changes affecting the legal status changes. Istihalah that are unanimously accepted by scholars is substance istihalah as specified in *nas* (dictum).

##### a) Istihalah Process in Animal's Milk

Allah SWT said: That is to say: "And indeed, for you in grazing livestock is a lesson. We give you a drink from what is in their bellies, between excretions and blood; (i.e.) pure milk, palatable to those who drink it." (Quran, Surah al-Nahl, verse 66)

The scholars agreed that istihalah occurred in the milk production process in the livestock's bellies. Although the food excretion and blood if it comes out of an animal, it becomes the unclean, but the substance transformation process has occurred from food excretion and blood into milk and that milk is a halal substance if it is produced from halal animals (al-Nawawi, 1995). Ibn Hajar al-'Asqalani (2003:10/710) explained, "Milk is a mixture of food excretion and blood, then transformed (istihalah), then milk it out of the animal in a state of clean."

##### b) Wine Into Vinegar Istihalah

The scholars agreed that if *khamar* (wine) has changed in substance (istihalah) by itself and becomes vinegar, the vinegar is halal for use (al-Kasani, 2000; al-Qurtubi, 1993; al-Dusuqi, 1996; al-Syirazi, 1996; al-Nawawi, 1995; Ibn Hajar al-'Asqalani, 2003; al-Buhuti, 1997; Ibn Taimiyah, 1398H; Ibn Qayyim al-Jauziyah, 2002; Ibn Rusyd, 1989; al-Khatib, 2003; al-Ghananim, 2008). Arguments:

- i. Aisyah reported, Prophet Muhammad saidﷺ, "The best side dish to be eaten with bread is vinegar." True hadith recorded by Imam Muslim (1998). *Wajh dilalah* of this hadith, is the praise of Prophet Muhammad towards vinegar in that hadith is general in nature; whether vinegar derived from *khamar* (wine) or from others (al-Ghananim, 2008).
- ii. Umar bin al-Khattab said, "Let no man drink vinegar from spoiled wine, until Allah really has transformed that wine into vinegar. Until the condition that the wine really turns into vinegar, hence that vinegar is halal. A Muslim is not at fault if he has bought vinegar from *ahlil kitab* as long as he is not aware that the *ahlil kitab* has intentionally changed the wine into vinegar." Recorded by al-Bayhaqi (1999).

The chemical reaction of transformation of wine to vinegar is through the alcohol dehydrogenase and aldehyde dehydrogenase. Initially, alcohol is dehydrogenated to form acetaldehyde and two hydrogen ions and two electrons are released. In the second step, two hydrogen ions bind with oxygen to form water that hydrates acetaldehyde to form aldehyde. During step three, aldehyde dehydrogenase converts acetaldehyde to acetic acid and releases 2 hydrogen ions and 2 electrons. (San Chiang Tan, 2005). Figure 1 shows the chemical reaction of vinegar.

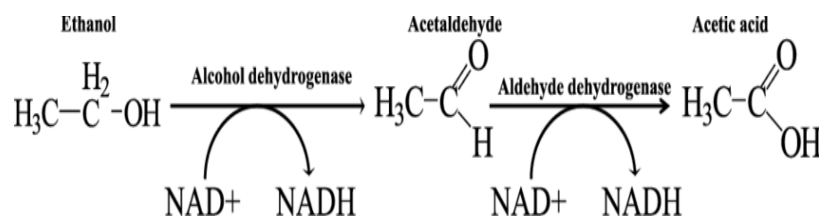


Figure 1: Chemical Reaction of Vinegar

## 2) Istihalah for Antelope Blood Into Perfume (Musk)

Abu Sa'id al-Khudri reported, Rasulullah ﷺ said, "Musk is the best perfume." True hadith recorded by Imam al-Tirmizi (2000: 3/308, hadis no. 991), Abu Daud (1997: 3/618, hadis no. 2274), al-Nasa'i, and Ibn Hibban. The scholars agreed to accept istihalah on musk. Al-Nawawi (1995) explained, musk is blood that has transformed its substance (istihal) into perfume.

M.N Shrestha (1998), explained that the musk is obtained from male deer that have the musk gland situated beneath the skin of the abdomen between the reproductive organ and umbilicus of males. It opens to the exterior through an orifice that lies anterior to the urethra. The synthesis of musk is probably regulated by androgens from the testes, as castrated males produce a negligible amount. (Macartney, 1983). Musk takes 30 days or more to mature in the sac where it changes from being creamy white and pasty with no remarkable scent into a powerfully scented, granular, dark red-brown substances (Shrestha, 1983).

## 3) Istihalah of the Unclean Hide with Tanning

Abdullah bin 'Abbas reported, "Maimunah's assistant was given a goat as a gift, and then the goat died. At that time the Prophet was passing by and said, 'Don't you want to take the hide of that dead goat, then you cleanse and take advantage of it?' They said, 'It is dead.' Then the Prophet explained, "Only the carcass is haram to be eaten." True hadith recorded by Imam Muslim (1998: 1/276, hadith no. 363), Abu Daud, al-Nasa'i and Ibn Majah.

The scholars also agreed to accept the istihalah process that is a transformation of unclean carcass' hide into clean leather for use, through the tanning process. Ibn Hazm explained, "Each of Allah's creation on this earth is originated from one embryo, of which difference is only referring to 'ardh and each individual's behavior. With different properties exist in this world, it therefore triggered differences in name, as how Allah fix the order. The names are understandable among people according to their language. Grapes is grapes and different from raisins. Raisins are not grapes. Grape juice is neither grapes nor alcohol. Alcohol is not a fruit juice. Vinegar is also not a wine. Order for each name is established by Allah SWT." (2001:1/161)

## 4) Can Istihalah be Analogized?

The scholars agreed to accept istihalah process that was described in the Qur'an and Sunnah such as food excretion and blood turned into milk, wine turns into vinegar, blood of antelope into musk, and hide of dead animal becomes clean with tanning. However, the scholars have different opinion, whether all kinds of istihalah are analogous to these four material.

In clarifying the issue, this paper work analyzes the issues discussed by the scholars regarding salt production base that was mixed with animal carcass, whether the collected salt is clean because istihalah has occurred, or the salt is *mutanajjis* and haram. There are two schools of thoughts from scholars in clarifying this issue:

- a) The first school of thought is in the opinion that the produced salt from a place that is mixed with the feces remain unclean and haram for consumption. This is the opinion of Imam Malik, al-Syafi'i, Ahmad's final opinion, and

Abu Yusuf (Ibn al-Humam, n.d.: 1/200; al-Gharnati, 1994: 1/162; Abu al-Husayn al-Syafi'i, 2000: 1/428; al-Nawawi, 1995: 2/529; Zakariya al-Ansari, n.d.: 1/51; Ibnu Hajar al-Haythami 1983: 1/306; al-Ramli, n.d.: 32; Ibn Qudamah, 1968: 1/53)

- b) The second school of thought is in the opinion that the produced salt from the production base that is mixed with unclean is clean as istihalah and istihlak have taken place. This is the opinion of Imam Abu Hanifah, Muhammad al-Syaibani, some Syafi'iyah scholars, and Hanabilah (Ibn al-Humam, n.d.: 1/200; al-Zayla'i, 1313H: 1/76; Ibn Nujaym, n.d.: 1/239; Ibn 'Abidin, 1992: 1/316; al-Nawawi, 1995: 2/529; Ibn Qudamah, 1968: 1/53; al-Najdi, 1397H: 1/350; al-'Uthaimin, 1428H: 1/31).

In conclusion, according to final opinion in the Maliki, Shafi'i, Hanbali, and Abu Yusuf school of thought, istihalah is not analogized to the other substances besides these four aforementioned substances. While the final opinion in Hanafi and opinion of some Maliki, Shafi'i, and Hanbali scholars, istihalah can be analogized. As long as the substance transformation occurs, hence the unclean substances that are transformed to other substances, the newly derived substance is clean.

## 5) Effects of Intent and Human Behaviour Towards the Istihalah Process and Legal Status Alteration

The scholars agreed that naturally occurred istihalah affects the determination of legal status. But they disagree over the istihalah impact towards the legal status transformation if the istihalah happens due to intentional human behavior. The basis of this concept refers to the khamar (wine) issue that would be intentionally converted into vinegar and with human intervention; whether the wine was mixed with something until it turns into vinegar, or the wine was relocated from a shady spot to a place exposed to sunlight, or left open the khamar container for fermentation to occur and turn the wine into vinegar (al-Khatib, 2003).

- a) The first opinion: Performing the istihalah process with the intention and to perform a particular intervention until substances alteration process took place, is prohibited and does not change the legal status. In the opinion of Umar bin al-Khattab, 'Uthman ibn al-'As, popular Maliki's opinion, Shafi, famous opinion in the Hanbali school of thought that are opinion of Ibn Taimiyah, Ibn al-Qayyim, as well as the opinion of Zohiri member of the al-hadith, the action of changing the wine into vinegar with intention and that behavior is not allowed and the vinegar is still haram for use (al-Dusuqi, 1996; al-Nawawi, 1995; Ibn Taimiyah, 1398H; Ibn Qayyim al-Jauziyyah, 2002; al-Qurtubi, 1993; Ibn Hajar al-'Asqalani, 2003; Ibn Kathir, 2000; al-Khatib, 2003; al-Ghananim, 2008).

- b) Second opinion: Performing istihalah process with the intention and performing a particular intervention until substance transformation process is allowed and changing the legal status. Based on opinion from Abu al-Darda', al-Thauri, al-Auza'i, al-Layth bin Sa'ad, the Hanafi, the opinion of Imam Malik, one opinion of Imam Ahmad, the opinion of al-Bukhari, Ibn Hajar, and al-Qurtubi; the act of changing the wine into vinegar with intention and intervention is justified and the vinegar is halal for use (al-Qurtubi, 1993; Ibn Hajar al-'Asqalani, 2003; al-Khatib, 2003; al-Ghananim, 2008).

c) Third opinion: Performing istihalah process with the intent and perform certain intervention until substance transformation process has taken place is *makruh* (not forbidden though improper) but legal status changed. This is the opinion of Maliki and one of many opinions of Imam Ahmad (al-Dusuqi, 1996; al-Khatib, 2003).

### 6) Istihalah and 'illah in Unclean Proscription

Furthermore, disagreements among the scholars associated with istihalah opinion is the extent to which changes in a substance that displaced the 'illah of proscription is the original root of the unclean. General methods outlined by the scholars said, "A law depends on the existence and absence of its 'illah" (al-Qurafi, 2001).

A comparative analysis was performed between wines into vinegar istihalah; agreed upon by scholars, and the substance mixed with pork; disputed by scholars.

#### a) Istihalah on alcohol

Drunk (*al-iskar*) is the 'illah of alcohol ban (al-Zuhaili, 1989; Zaidan, 1993). Abdullah bin Umar reported that the Prophet Muhammad said, "Every intoxicating drinks is *khamar*, and every *khamar* is *haram*" (Muslim, 1998). From the scientific explanation aspect, among the reasons that a person who consumes alcohol gets intoxicated is due to the percentage in content of ethyl alcohol or ethanol ( $C_2H_6O$ ) that is high in the alcohol (Hammad, 2004). Ethanol is compound of carbon, hydrogen and oxygen. When it comes to people liver, ethanol is oxidised and in the end, it becomes ethanoic acid, the same acid that found in vinegar. People who drink too much may damage their liver because they do not have enough liver alcohol dehydrogenase (LAD). (UNESCO). At the same time, ethanol as the main element that causes harm as experienced by alcoholics (National Institute on Alcohol Abuse and Alcoholism, 2013).

During fermentation, the ethanol content in fruit juice will increase over time. A high percentage of ethanol turns the juice into wine. If the wine is further fermented, the effect will alter the fermentation of ethanol ( $C_2H_6O$  /  $CH_3CH_2OH$ ) into acetic acid ( $C_2H_4O_2$  /  $CH_3CO_2H$ ) (Nakayama, 1959; Mohammad Aizat et al., 2012). Worldwide acetic acid is called vinegar, if obtained by oxidative fermentation of ethanol-containing solutions by acetic acid bacteria. Furthermore, Peter Raspo, Dušan Goranovič (n.d) explained, Vinegar is traditionally the product of acetic acid fermentation of dilute alcoholic solutions. At the present time it is produced microbiologically from natural alcoholic solutions

(10-15% by volume of ethyl alcohol) or by dilution of acetic acid. For most of human history, acetic acid was produced by fermentation of sugar to ethyl alcohol and its subsequent oxidation to acetic acid by microorganisms.

This shows that changes (istihalah) has completely occurred; in physical and chemical chain which is ethanol turns into acetic acid, then 'illah on wine proscription is gone because the substance that can cause intoxication has decomposed into acid (Mohammad Aizat et al., 2012).

#### b) Istihalah on Pork Derivatives

'Illah of pig proscription is the pig substance itself is unclean. Based on the analysis by scholars in verse 145 of surah al-'An'am, 'illah of pig proscription is 'rijs'. 'Rijs' means anything that is considered to be disgusting by the Shariah (Markaz Fatwa Islamweb, 2001). Therefore, for as long as any unclean elements that are considered to be disgusting by Shariah exists in any substance, then 'illah of its proscription still exists. The scholars discussed the issue on interference of the unclean with clean substance in pig *mutanajis* substance. If the unclean dropped in water, and the water content does not exceed two water tank (270 litres total, known as *kolah*), hence the water is considered *mutanajjis*. However, should the water is more than two *kolah* and it is not contaminated with any of the unclean elements such as taste, smell, or color, the water remains clean. The base property of clean for water that is mixed with the unclean is discussed by scholars as an istihalak terms.

The question is how far the influence of the unclean to the clean substance is. Are there any istihalah and istihlak. According to scientific studies, the pigs property on gelatin derived from pig pancreas still exists and it can be scientifically proven (Mohammad Aizat et al., 2012). In addition, Aizat et al., (2011) also explained, it is believed that the chemical composition of gelatin is remained unchanged. It is suggested that the amino acid in food products is still remained intact and did not undergo any chemical transformation although the production process involve extreme condition. Because of this factor, the halal and haram status determination in these issues should be referred to the sources of origin of extracted gelatin. Hoque et al. (2009) suggested that excessive heating could degrade the gelatin; meanwhile lower heat treatment could only influence the stretching and unfolding of gelatin strands. Thus, the amino acid molecules in gelatin are not affected by physical or chemical treatment (Figure 2).

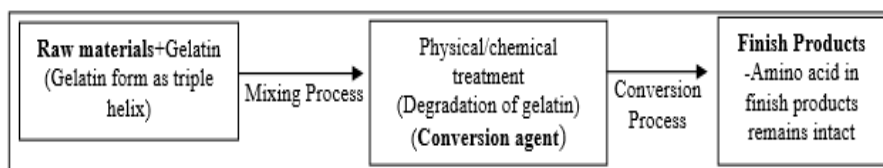


Figure 2: Conversion Process of Gelatin (Aizat et al., (2011)

Therefore, the scholars begs the question can the istihalah concept be accepted in issues involving derivatives of the unclean substance, especially pigs. Hence the issue arises, the occurred istihalah is an incomplete istihalah. The final product still carry the unclean substance, hence 'illah of its proscription still exists.

However, the scholars who confirmed the occurrence of istihalah in which the final product is clean and not affected by the unclean substance at an early stage, because istihlak has occurred in the unclean substance. This fiqh adaptation refers to the issue of different scholars' opinion regarding the clean status

of salt produced from salt production base that is mixed with carcass.

Hence there are differences in acceptance among scholars whether istihalah of wine into vinegar, with istihalah of clean substance that is mixed with the unclean. It is referred to 'illah of proscription, whether it still exists at the end product, or is gone.

#### 7) Istihalah through Istihlak Process

Among the concepts discussed by scholars related to the transformation of the unclean substance to the clean is istihlak process. It is also a concept that has been discussed by earlier scholars in fiqh turath literature related to *mutanajjis* water and

quantity of two *kolah*. However, current scholars have developed the *istihlak* concept into justification of the halal or haram status of any product.

*Istihlak* means mixing of a substance with another substance that causes loss of properties and characteristics of the substance, until it is considered dissolved even though in fact it still exists (Hammad, 2004: 26). For example, in an end product, during its production process, there is a slight unclean mixed with other clean substance that is more dominant, although the unclean still exists in the product, but the property and characteristics of the unclean state is vanished due to domination of the properties and characteristics of the clean substance.

This concept is adapted from the hadith that explains about the characteristic of two *kolah* of water. 'Abd Allah bin 'Umar reported, "The Prophet was asked about the status of stagnant water that is being licked by reptiles and wild animals (i.e. whether the water is still clean). Then the Prophet said, "If the water exceeds two *kolah*, then it does not become unclean." True hadith recorded by Imam Abu Daud (1997: 1/17, hadith no. 63), al-Tirmizi, al-Nasa'i, Ibn Majah, and Ahmad. Imam al-Syafi'i, Ahmad, and Ishaq explained, "If the water exceeds two *kolah*, and then mixed with the unclean, hence it does not become unclean, as long as no change in its smell and taste." (al-Tirmizi, 2000: 1/97)

Based on the hadith by the Prophet Muhammad, he was asked about Buda'ah's well, which has been mixed with menstrual blood, dog carcass and other rubbish. Explained Prophet Muhammad, "The water is clean, it is not being defiled by anything." True hadith recorded by Imam Abu Daud (1997), Tirmizi (2000), al-Hakim (1990) and others. In another hadith, the Prophet Muhammad said, "If the water has exceeded two *kolah*, then it would not be unclean if mixed with the unclean." True hadith recorded by Imam Abu Daud (1997) and others.

In addition to hadith that is related to two *kolah*, the scholars also argue regarding *istihlak* with hadith that stated the Prophet Muhammad had mixed *nabidh* and clean water to be consumed. Ibn Amran report, one day the Prophet Muhammad was served with *nabidh* (a kind of intoxicating drink), then he took a smell, therefore his face creased due to excessive smell of the gas. Then he asked for water and next mixed the water into the *nabidh* and he drank it (al-Haithami, 2001: 5/66; al-Zuhaili, 2001: 151)

Ibn Taimiyah had adapted this *istihlak* concept in his justification of such a situation for conditionally-allowed *istihlah* on goods mixed with the unclean in it. He explained, "Indeed Allah forbids disgusting unclean such as blood, carcass, pork and the like. If the unclean dropped into water or others, and its substance has dissolved (*istahlakat*), and there is no more substances of blood, carcass, or pork origin, hence the water is clean. Similar to drops of wine mixed with a bunch of clean water, then dissolved the wine substance, hence it is not said that anyone who drink that water as drinking wine. Wine, if transformed (*istihala*) to vinegar by itself, then the scholars unanimously said that vinegar is clean." (1987: 1/252)

Al-Suyuti explains, "Exception from the method 'If combined halal and haram, then haram is more dominant' is a few details (among others) on *istihlak* of haram substance that has occurred or is about to occur... if liquid of the unclean is mixed with water and then lose its liquid form, then the water is clean and can be used." (1378H:107)

The scholars differed in accepting *istihlak* as an acceptance argument that change the status of *mutanajis* substance to clean and the difference is referred to the issue on salt production base which has some element of carcass.

## 8) Acceptance of Istihlah and Istihlak Due to Common Plight

Based on the Hanafiyah methodology, among the main factors they received and expanded the concept of *istihlah* and *istihlak* is due to common plight. Ibn Nujaym (w 970H) explains, "Fat of the unclean that are used in soap production is ruled as clean because that fat has transformed. Transformation of substance made something clean in the opinion of Muhammad and ruled as such due to common plight." (n.d.: 1/239)

Ibn 'Abidin (w 1252H) explained, the changing property of the unclean to clean is because of two factors, first: common plight and second: a complete substance transformation (*istihlah*) has occurred. He stated, "Be known, that 'illah of that legal status according to Muhammad is the change (*taghayyur*) and exchange (*inqilab*) of the fact and his verdict is as such due to common plight as previously stated. This legal status is not only specific to legal status of soap (that is mixed with fat of the unclean), but each substance that has changed and transformed in nature, of it there is a common plight." (1992: 1/316)

## APPLICATION OF TAKYIF FIQHI ISTIHALAH IN VACCINE PRODUCTION

Production of vaccines is a complex process and requires a substantial cost. Therefore, it is difficult to identify the actual content of the substance used in vaccine production. However, based on some references, it was stated that there are some possibilities that substances that are categorized as haram according to Islam being used in the production of vaccines, which include (International Medical Council on Vaccination, 2011:3; Gray, 2012: 291; Abdul Halim Ihsan, 2013:68-69):

- 1) Cells from aborted fetus, cancer cells of chick embryo and animal tissues.
- 2) Gelatin which is a protein extracted through hydrolysis of the skin or intermediary tissues of animals such as pigs or cows. Most of gelatin used as a stabilizer in vaccines are from pigs such as Rabies, Influenza, Japanese Encephalitis, MMR, Varicella, DTaP, Varicella Zoster vaccines.
- 3) Pus from scabies of diseased animals, feces and urine.
- 4) Stocks of virus or bacteria seeds that were cultured using enzymes from pigs.
- 5) Serum from horses, calves, pigs, rabbits and humans.
- 6) Antibiotics, bacteria, virus from monkeys, retro-viruses (viruses that have been contaminated in polio vaccine).

When these haram substances are used as ingredients of the vaccine, then among main issues discussed by present scholars, whether *istihlah* and *istihlak* process has already happened as such the vaccine could be considered clean and halal for use. To elaborate on this issue, this paper work will analyze the interrelation between vaccine ingredients and *istihlah* based on the discussed *takyif fiqhi*.

### 1) Vaccine is Haram and is Only Allowed During Emergency

There are opinions of current scholars who insist on the Syafi'iyah methodology stating, if the vaccine is produced from a mixture of haram substances, then it is haram. These opinion and methodology are the adherence in the Malaysian National Fatwa Committee Discussion, based on a fatwa issued in respect to vaccines. This opinion's correlations with the *istihlah* and *istihlak* concept are as follows:

- a) *Istihlah* and *istihlak* do not take place in the vaccine production process because the unclean is mixed with clean substance. It can not be analogized to cases such as wine into vinegar or food excretion and blood into milk because these two *istihlah* instances does not involve external haram substances. While in the production of vaccines, external haram substances were added to the clean substances.

- b) Mixing of haram substances in vaccines production is a deliberate intention of the manufacturer, hence although istihalah is likely to happen, but it is an istihalah that does not transform the unclean substance into clean substance.
- c) 'Ain (visibility) of the unclean can still be identified through laboratory experiments, then 'illah of proscription still exists because visibility of the unclean still exists. Therefore istihalah and istihlak that happen are still incomplete and does not transform haram property of the added unclean. In contrast to the wine that turns into vinegar, substances that are associated with 'illah of haram of wine which is ethanol turned into acid. Therefore istihalah has completely took place.

## 2) Vaccine is Halal

While school of thought that uses Hanafiyah methodology believes that although the vaccine is produced by a mixture of haram substances, but when istihalah and istihlak have already occurred, then the vaccine's status is clean and halal to use without emergency purposes proclaimed. Among the institutions that use this methodology are the European Council of Fatwa and Research and the Islamic Organization for Medical Sciences, Kuwait. This opinion relates to the concept of istihlak and istihalah:

- a) Haram substance that is added to when the vaccine has been through the istihalah process that changes the legal status from haram to halal because 'illah of the proscription ceased to exist. The final product is vaccine and have no more elements of unclean substances.
- b) Even if haram material is mixed with deliberate intention by the manufacturer of the vaccine, it does not affect the cleanliness of the final product because of istihalah had already happened.
- c) Although laboratory experiments may still identify unclean substance used to produce the vaccine, but the material has already undergone the process of istihlak. The property and characteristic of unclean substance is already lost and dominated by the properties and characteristics of the clean substance.

## CONCLUSION

The polemic on legal status of the vaccines' halal status is closely related to methodological differences related to scholars regarding istihalah. Mufti and Fatwa Institution that adhere to the Syafi'iyah methodology are ever so cautious in accepting the istihalah and istihlak concepts. Therefore fatwa and legal explanation involving unclean elements, particularly *mughallazah* unclean like pigs derivatives, all the related end products deemed haram because 'illah of unclean proscription still exists and istihalah and istihlak never happened.

While the Mufti and Fatwa Institution who adhere to the methodology Hanafiyah, they accept istihalah and istihlak process and stick to the final product. During which the final product is a material that is not in the unclean category, then it is back to the original ruling that the substance is possible and halal to use.

These methodological differences do not only involve a polemic in vaccine, but related to the establishment system of halal status of a product as well as the halal standard being applied by any country. Further studies regarding the need for istihalah and istihlak acceptance has to be done, especially in common plight elements relating to pork derivatives in the market. This refers to one of the elements which is in Hanafiyah methodologies that is acceptance of istihalah because of common plight.

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