

THE CONCEPT OF TAḤAWWUL AS A DETERMINANT FOR RULING OF HALAL FOR FOOD AND BEVERAGES PRODUCED THROUGH FERMENTATION PROCESS

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Abstract	<p><i>Taḥawwul is a concept of transformation of determining the halal and haram status of a product produced through fermentation. There are several foods and beverages product produced through fermentation process. During fermentation process many products are produce and its status ruling of this product are different at every fermentatation stage. The objectives of this study were to identify and evaluate the taḥawwul concept as halal determination of the product produced by fermentation process. An explicit taḥawwul-based approach through taḥawwul ibtidā', taḥawwul al-wustā, taḥawwul al-akhīr and taḥawwul shubhah has been the basis for the halal determination of a fermentation product. To determine the effectiveness of this concept, the study was conducted by applying two samples of traditionally produced palm vinegar originated from Bestari Jaya Selangor and Penaga Pulau Pinang based on the residue of alcohol and acetic acid in the final product detected by Gas Chromatography. The results of this study found that palm vinegar from Bestari Jaya Selangor was categorized as fasīd vinegar (haram) because it was still in the taḥawwul fasīd level that the ethanol content of this vinegar exceeded the JAKIM's permissible level of 1.93% v / v while palm vinegar Penaga Pulau Pinang is categorized as ṣaḥīḥ vinegar (halal) vinegar as it has entered taḥawwul ṣaḥīḥ level as the ethanol content in this vinegar is only 0.17% v / v. Therefore, the concept of taḥawwul is very relevant as a concept to determine the ruling of products produced through fermentation process especially vinegar products.</i></p> <p>Keywords: <i>Taḥawwul, Halal, Haram, Vinegar, Sahih.</i></p>
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INTRODUCTION

The term *taḥawwul* has been used in many disciplines not only in certain fields as it can be used in many fields especially in the food industry. Together with the technology advancement and globalisation in the food industry, there are various products produced through the fermentation process. These products exist in the global market regardless of their halal status. Some of these products belong to halal foods while other products' halal status is still doubtful.

This is due to the fact that there are products in the global and local markets that are doubtful because it contains alcohol (Jamaludin, 2015) and even some of the products that are considered halal by consumers such as vinegar products are still high in alcohol if they have not been through a proper *taḥawwul* process. The alcohol exists because the product is produced through the fermentation process where every product produced through the fermentation process contains alcohol in small or large quantities (Nor Musfirah, 2011).

Fruits such as grapes, apples, raisins and wheat and other fruits that contain carbohydrates can produce alcohol when fermented (Abdel Naser et al., 2000). Lack of discussion on *taḥawwul* in the topics of food and beverages will burden the entrepreneurs involved in the food industry and make it difficult for consumers to ensure the halal status of product that is produced through the fermentation process. In this regard, the discussion of the standard as determining the halal status of the products produced through the fermentation process is an important requirement in determining the halal status of the product.

SCOPE AND METHODOLOGY

This paper will discuss the concept of *taḥawwul* as a determinant of ruling of the product produced through fermentation process. The data is obtained from various reference materials consisting of reference books, *turath*, journals, interviews and materials obtained from electronic media. The discussion of the concept of *taḥawwul* is also discussed in various fields of knowledge especially in food production through fermentation.

To complete the study, the concept was applied to two local vinegar products that were produced through the traditional fermentation process. To understand the relevance of this concept as a halal and haram determinant of a product produced through the fermentation process, this study combines library and laboratory research approaches, incorporating the *fiqh* approach to determine the ruling and science as reinforcement to the concept of the application applied to obtain accurate results.

DEFINITION OF TAḤAWWUL

There are several meanings of *taḥawwul* in the Arabic language and among them, *al-tanaqul* or *al-intiqāl* which means phase, transfer and move in which the changes of ruling (*ḥukm*) from one ruling to another with clear reason analogy (al-Tahānawī, 1996), *taḥawwul* also mean *al-inṣirāf* which means to turn as stated in *Muʿjam al-Wasīṭ and Mukhtār al-Ṣiḥāḥ*:

التحول لغة: التنقل من موضع إلى موضع أو من حال إلى حال وعن الشيء انصرف عنه إلى غيره

“*Al-Taḥawwul* in language is moving from one topic to another, or moving from one state to another or turning something to something else” (Ibrāhīm Anīs et al., 2004; al-Rāzī, 1986).

According to *fuqahāʾ*, *taḥawwul* means a change from one form to another form which can bring effect (*āthar*) on the status of a particular ruling (Wizārāh al-Awqāf wa Shuʿūn al-Islāmiyyah, 1986). In other words, *taḥawwul* also means a change of substance to something else (al-Rāzī, 1986) which includes the physical exchange and its nature (al-Zuḥaylī, 1997) as change unclean (*najs*) materials becomes pure (*tāhir*), such as turning blood into milk or turning *khamr* into vinegar.

According to Dewan Bahasa dan Pustaka (1997), *taḥawwul* may be defined as “chemical decomposition” which can be interpreted as a chemical reaction where molecular identity decomposes to a fraction of atoms or smaller molecules. It is also known as the decomposition of substances and it can also be interpreted as a convert, transmute, transformation or change (Baʿlabakī, 1995), whether the appearance changes (Steel, 2005) or the character of a form is changing or converting into something else (Hornby, 2000).

In terms of science, *taḥawwul* can be understood as a transformation process commonly referred to by the term complete transformation that involves the compound and the physical change of a substance into other substances, such as changes in physical substances and glucose properties compounds produced from fruit to *khamr* and then become vinegar through the fermentation process (Ḥammad, 2003).

Taḥawwul Ṣaḥīḥ in Determining Product Ṣaḥīḥ

The word *ṣaḥīḥ* is a common word used to show something is good, acceptable, clear, true, healthy and prosperous and it is also often used to indicate agreement on a word or deed. According to Ibrāhīm Anīs (2004) in *Muʿjam al-Wasīṭ*, Ibn Manẓūr (1996) in *Lisān al-Arab* and

Abū Shuhbah (1983) in *Al-Wasīṭ fī Ulūm Mustalaḥ al-Ḥadīth*, the word *ṣaḥīḥ* comes from *صَحِيحٌ* means, “healthy and not ill, it can also mean uninterrupted, free from any disgrace or defect and is also healthy from any illnesses” (Ibrāhīm Anīs et al., 2004; Ibn Manẓūr, 1996; Abū Shuhbah, 1983).

Ṣaḥīḥ also means complete (al-'Ijī, 1824), perfect and not broken (al-Ḥalabī, 2008). The concept of *taḥawwul ṣaḥīḥ* (perfect transformation) in the process of fermentation product means a period stipulation that allows the product to mature until the product is halal and safe to be used. Thus, the concept of change which is considered *ṣaḥīḥ* and perfect (*tām*) in the process of preparation of product is the change that occurs from the source of natural ingredients such as fruit into *khamr* then transformed into vinegar through the process of double fermentation continuously.

Taḥawwul is divided into three parts which is *taḥawwul ṣaḥīḥ*, *taḥawwul fasīd* and *taḥawwul shubḥah*. Each of the *taḥawwul* process has different features. The differences between the three types of *taḥawwul* can be seen in chart 1 below.

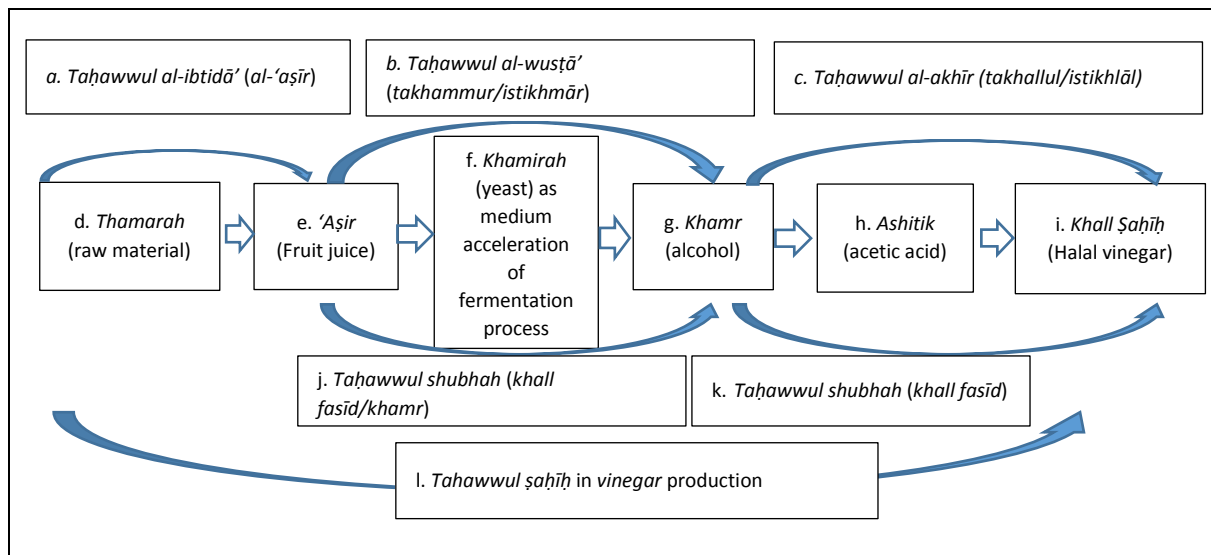


Figure 1

Based on figure 1 above, vinegar as fermentation product is produced through multiple and continuous process starting from *taḥawwul al-ibtidā' (al-'aṣīr)* which is the change of fruit into juice at the first stage then *taḥawwul wuṣṭā' (takhammur/istikhmār)* which is transformation from juice to *khamr* in the second process and ending in *taḥawwul akhīr (takhallul/istikhlāl)* which is the change from *khamr* to vinegar.

In the first fermentation process of the fruit changing into juice, there were no implication of ruling because it only changes from the solid-shaped fruit to liquid, while after it changes to *khamr*, then the new rule can be categorized as *shubḥah* because it contains *khamr* even in a small amount and haram because it has turned into *khamr* as a whole. Similarly, changes from *khamr* to vinegar there is significant of change due to the implication of *shubḥah* because it contains *khamr* even in small quantity and halal as it has turned into vinegar completely.

Therefore, vinegar that is considered as *ḥalālan ṭayyiban* is vinegar that does not belong to *khall shubḥah (shubḥah vinegar)* and *khall fasīd (haram vinegar)*. To ensure that the vinegar does not belong to *shubḥah* vinegar and *fasīd* vinegar, it must go through the process of *taḥawwul ṣaḥīḥ* so that the *khamr* residue in the final fermentation process disappears or leaves traces of ethanol in a very small quantity.

The Concept of *Taḥawwul* in Different Disciplines

Taḥawwul is not a new term in *sharī'ah*, as scholars have discussed *taḥawwul* in various fields such as philosophy of *taṣawwuf* until there is a term called *takhallī* which means it is purified from despicable traits (Bashier, 2004), then it becomes *taḥallī* which is self-fulfillment with admirable qualities (Ibn 'Arabī, 2006) up until *maqām tajallī* (al-Ṭayyib, 2014) by exposing all the *ḥijāb* and obstacles from *bashariah* (humanity) (El-Syafa, 2018).

Taḥawwul has been discussed by scholars in the process of human formation as a very unique and beautiful being of Allah the almighty in terms of appearance and structure, (al-Baghāwī, 1991) more than any other being (Shaykh Zādah, 1991). However, before it was created as a perfect and beautiful creation, there were several stages of changes that it had to go through and each of these forms of change involving time, circumstances and even different forms, which were explained in detail in the Qur'an surah al-Mukminun (23): 12–14 (Aḥmad Faraj, 1993). The process of human creation takes a long time. According to the hadith of the Prophet Muhammad SAW, every 40 days from the first day of pregnancy, there will be changes from *nuṭfah* (sperm) then *alaqah* (leech-like clot) and then *mudghah* (chewed lump) and then given *rūḥ* in the first four months or 120 days until it becomes fetus (al-Zagūl, 2012).

Taḥawwul is also discussed in the formation of animals such as insects in the process of metamorphosis (Shaurub, 2013). The processes involved in this metamorphosis process are divided into three parts: ametabolous, hemimetabolous and holometabolous (Holley, 2017; Goodman, 2009; Gillot, 2005). To make it clear, each change that occurs during the metamorphosis process creates a new physical one until the end of the metamorphosis is complete (Shaurub, 2013). The changes occurring from eggs, larvae, pupae, and imago (Wanninger, 2015; Gillot, 2005) to insects is considered as *taḥawwul*.

The term *taḥawwul* is also used in politics and in this field, it is often referred to as "Transition or transformation", which is the transfer or transition from one state and place to another state and another place (Merriam-Webster, 1984) that there are terms such as *al-taḥawwul al-siyāsī* and *al-taḥawwul al-dimaqrāṭī* (Barakat, 2000) which is a gradual process of democratization in which people change their institutions and political orientation through various political processes and procedures that are rooted in a stable democratic system (Hasan, 2017; Muḥammad Munīb, 2008).

Today, *taḥawwul* is used in economics and finance that there are various terms such as *al-bunūk al-Islāmiyyah* and *al-maṣrafiyyah al-Islāmiyyah* (al-Nashmī, 2015). This transformation enables all types of prohibited business transactions to become *mubāḥ* in accordance with Islamic *sharī'ah* law (Hammad, 2015). With the emergence of these terms in economic and financial terms, a variety of conventional international trade financing instruments such as Warranty, Credit Letters, Export Credit Receipts and Refunds (ECR) can be accepted by Islamic banking after the process of transformation in accordance with *sharī'ah* requirements. The modification is to include a contractual element that highlights the *mu'āmalah* contracts such as *murābaḥah*, *bay' al-dayn*, *wakālah* and *kafālah* (Ahmad Khilmy et al., 2017; Ahmad Khilmy et al., 2014).

However, the term *taḥawwul* is not discussed in the topics of food or beverages that are fundamental to human life as the *fuqahā'* discusses more on the concept of *istiḥālah* more than *taḥawwul* in their books. Thus, the discussion of *taḥawwul* as a concept of determining halal and haram in food products especially in vinegar products that is still doubtful will be discussed in this paper.

Taḥawwul in the Production of Products Made through Fermentation Processes

Taḥawwul has a close relationship with fermentation. The term fermentation originates from the Latin word "*fermentum*" which gives the meaning "*to ferment*" (Mishra et al., 2017). Therefore, the food produced through fermentation process will undergo a change from the original to the new form which does not allow it to go back to its original form. Food and beverages produced through fermentation are among the earliest products used in human life (Marco, 2017). This fermentation technique is not only used for preserving food but it also provides an attractive aroma, soft food texture and unique taste from one product to another

(Nowak and Kuligowski, 2017) by retaining the original ingredient used (Hugenholtz, 2013). Through this fermentation process, the raw materials that are perishable and non-durable can be utilized to become a high quality product (Ray and Joshi, 2014). Foods produced through the fermentation process contain high levels of nutrients that are beneficial for improving health (Makwana and Liver, 2019; Jeyaram et al., 2009) and preventing the risk of various harmful diseases (Kwak and Jukes, 2001; Kim et al., 2011). Therefore, fermentation has become a global trending method today all over the world in food production, not only in developing countries but also in many developed countries.

Generally, fermentation process in food production is divided into two main parts which are solid-state fermentation and submerged fermentation (Min Yong, 1992). Solid-state fermentation requires the use of aerobic microorganisms while submerged fermentation requires anaerobic processes (Mishra et al., 2017). There are a variety of food products that are produced through fermentation (Dirar, 1992; Dirar, 1993), and some of the products which were produced through solid-state fermentation are *tempeh*, *Oncom* and *Miso* while products that were produced through submerged fermentation are wine, *toddy*, *beer*, *buza* and vinegar (Glenn and Rogers, 2005).

All of these products undergo the process of changing their shape, appearance, color, taste, smell, texture and content after the fermentation process. The changes that occur from the original form until the fermentation process ends is part of *tahawwul*, which is a change from one form to another that does not allow the products to revert to their original form. Although the entire product produced through the fermentation process has been transformed into another form, not all of them are classified as *halālan ṭayyiban* products. *Halālan ṭayyiban* products are products that are clean, pure and free from the elements of impurity and uncleanness. It is also clean from any elements that can be detrimental to human health and from anything that can damage the mind.

***Tahawwul* as an Instrument for Determining the Status Ruling of Fermentation Products**

There are various fermentation products that has undergone the *tahawwul* process, which includes *nabīdh*, *koumiss*, *buza*, wine, *toddy*, beer and various other alcoholic drinks. However, these products are considered as *haram* products because they contain high amounts of alcohol and every product that is produced through fermentation processes that still contain high alcohol content are *haram* (Riaz & Chaudry, 2004). *Koumiss* is a popular beverage among *mamlūk* and it belongs to the category of alcoholic beverages as it contains high alcohol content of 4% -5% (Lewicka, 2011). Other products that are part of the alcoholic beverages are *buza* which is a popular alcoholic beverage in Egypt and several other places such as Africa, Asia and Russia. *Buza* is categorized as a *haram* beverage as it has 3.8% of alcohol and can even reach 7% (Armanios and Ergene, 2018).

Similarly, wine and *toddy* are categorized as *haram* drinks as they contain high levels of alcohol that can disrupt your mind and harm your health. The alcohol content found in the product ranges from 3% and can even reach 14% (McCarthy and Mulligan, 2006). In addition, *nabidh* which is part of the drink that the Prophet Muhammad SAW liked can also be categorized as *haram* if the fermentation period is more than 3 days (Armanios and Ergene, 2018), as the *nabidh* consumed on the third day contains 0.06% alcohol (Dzulkifli Mat Hashim, 2010) while the one consumed after 4 days of fermentation can be detrimental to health.

In Islam, all types of alcoholic beverages fall into the category of *khamr*, and each of them is *haram* even if the product contains small amounts of *khamr* or given a different name, it is still *haram*. Products that were originally *halal* then became *haram* because they contain harmful or alcohol substances that are classified as products that has gone through *tahawwul fasīd*, which is an imperfect process of change. A product produced through the fermentation process will be categorized as *halālan ṭayyiban* if the product has been through the process of *tahawwul ṣaḥīḥ* or perfect change. There are a number of fermented products that have been around for a long time but its *halal* status is still doubtful because they are still in the phase of *tahawwul fasīd* such as palm vinegar.

Palm vinegar is one of the most popular types of traditional vinegar among Malaysians and produced from nipah palm tree or *pokok nipah* in Malay language. Nipah palm tree is a kind of palm plantation found in swamp areas near the coast and tropical forests in Asian countries (Mulyadi et al., 2013). Generally, the process of fermentation in the manufacturing of nipah palm vinegar naturally takes a long time. Mohd Zaidi Mat Satar (2011) stated that the manufacturing of nipah palm vinegar needed between 3 weeks to 40 days of fermentation process, and this is also emphasized by Mr. Othman Md Isa, a traditional nipah palm vinegar entrepreneur from Kampung Tepi Laut, Pasir Gebu, Penaga, Pulau Pinang, Malaysia during an interview held on February 12, 2018.

According to him, this long fermentation process is important to produce high quality vinegar products. Vinegar produced through nipah palm water which was fermented for 40 days is believed to not only be used in cooking, but can also be used as a cure for diseases such as diabetes, hypertension, gout and kidney stones (Mohd Zaidi Mat Satar et al., 2011).

According to Muhammad Anas Othaman and his colleague (2014), the process of making nipah palm vinegar traditionally requires a long fermentation period of between 42-56 days, which was also affirmed by Nur Yuhasliza Abd Rashid and Shaiful Adzni Sharifuddin (2016), that the fermentation process to produce natural nipah palm vinegar between 30-90 days, and this is also emphasized by Mr. Othman Md Isa.

According to him, this long fermentation process is important to produce high quality vinegar products. The process of transformation of ethanol into acetic acid from acetic acid metabolism is an important feature that determines the quality of the final product. For the product to be sold as vinegar, the liquid produced from the fermentation process should contain at least 4% acetic acid (Nur Yuhasliza Abd Rashid and Shaiful Adzni Sharifuddin, 2016).

Basically, the resulting vinegar from nipah palm through the traditional process can be classified as halal vinegar because it is made up of natural sources that are clearly halal. However, the halal status of this nipah palm vinegar is doubtful because of some factors such as it is produced while it is still in the *tahawwul fasid* process, then the vinegar is categorized as *fasid* vinegar (haram vinegar). It is produced separately or produced through single fermentation (half fermentation) which is produced from the *tuak (khamr)* that has formed during the *takhammur* process.

In this study, the researcher chooses two traditional nipah palm vinegar produced from two different places namely *Pak Man Warisan Tradisi Cuka Nipah* (nipah palm vinegar) obtained from the nipah palm vinegar factory in Kampung Tepi Laut, Pasir Gebu, Penaga, Pulau Pinang Malaysia, and non-branded palm vinegar sold by the roadside in Bestari Jaya, Selangor, Malaysia.

Based on the above explanation, the concept of *tahawwul* is a fundamental concept of law making for products produced through the fermentation process. There are various types of products produced through fermentation processes such as wine, beer, toddy and many other types of alcoholic beverages. The *hukm* of these products are clear as they are categorized as haram products because it is still in the phase of *tahawwul fasid*. However, there is a product that is considered halal and even some Muslim consumers consider it as a sunnah product, and that is vinegar. But according to the concept of *tahawwul*, not all vinegar products are classified as halal products and only vinegar that has passed beyond the *tahawwul sahih* phase can be categorized as *sahih* or halal vinegar. Accordingly, in this study the researcher selected the same type of palm vinegar, though there were different fermentation period for each products.

MATERIALS AND METHODS TAḤAWWUL

Scientific Approach

Two types of nipah palm vinegar originating from Malaysia were selected as a sample of the study. The two samples of vinegar products produced through traditional processes, both of two samples are non-halal logo from the Malaysian government. The first palm vinegar, which is palm sample A, palm vinegar Bestari Jaya Selangor, which is produced within 15 days from the day the palm was taken and palm vinegar Penaga, Penang as which is sample B produced within 90 days from the date the palm was taken. In order to determine the alcohol and acetic acid

content in the samples, both samples were injected into gas chromatography in duplicate as described by Jamaludin et al., 2016.

RESULT AND DISCUSSION

Vinegar is one of the oldest traditional foods produced through the fermentation process. Generally, Muslim consumers believe that all vinegar is categorized as halal product, and it is classified as one of the favourite food of the Prophet Muhammad. However, the status *hukm* and ruling of vinegar is still uncertain since the presence of alcohol and concentration of an acetic acid reflect the halalness of a product. The results of laboratory studies on the content of alcohol, acetic acid in two different vinegar samples are different. The difference content between the two sample can be seen in the following table 1.

Sample ID	Percentage of Alcohol (%)	Percentage of Acetic acid (%)	pH	Percentage permitted by JAKIM (%)	Part of <i>Tahawwul</i>
A	1.93	0.003	2.83	1	<i>fasīd</i>
B	0.17	0.017	2.92	1	<i>ṣaḥīḥ</i>

Table 1: Percentage Of Alcohol, Acetic Acid And pH in Nipah Palm Vinegar

Analysis of Acetic Acid Content

In general, vinegar is a product that contains acetic acids, the contents of acetic acid vinegar is different according to the type and source of its preparation, acetic acid is a major component of vinegar products, and it is a major component of vinegar that can give a sour taste to the product. Malaysia Food Regulations 1985 suggests the amount of acetic acid in vinegar is less than 4 percent volume for each weight of acetic acid. The higher the percentage of acetic acid found in the vinegar then it will affect the level of reduction in the percentage of alcohol content in vinegar. From the results obtained, both of two samples vinegar contained less than 4% of acetic acid.

Analysis of the Contents of Ethanol

Alcohol is an organic substance or known as ethanol or ethyl alcohol that commonly found in alcoholic drink such as wine and beer. Vinegar is like wine diluted ethyl alcohol because it is fermented from alcohol. Its also as indicator to show the stages of fermentation process. Alcohol is one of the most controversial topic debated among Muslims as it is one of the things that are prohibited in the Qur'an (Bonne & Verbeke, 2008).

However, a little ethanol content is permissible as additives to foods used as dyes, preservatives, emulsifiers and anti-acid based on the concept of '*umūm al-balwā'* (widespread affliction that virtually difficult to avoid) which is a difficult test to eliminate or could not be prevented (Razak and Ramli, 2018). In this case, JAKIM has determined that the content of alcohol is not to exceed 1% v/v in any kind of soft drink while for alcohol as stabilizer in food or drinks the content must not exceed 0.5% (JAKIM, 2015). In this study, the alcohol content for both samples were different and able to indicate the fermentation stage.

Analysis of pH Content

Vinegars can be produced from any sugar-containing material that can be converted by successive alcoholic and acetous fermentation. pH value is important to categorise vinegar based on the acid strength. Acetic acid is the major acid in vinegar and give the global standards of taste. Low pH value shows high level of acidity in vinegar. As depicted in Table 2, both sample have different pH value. Vinegar that has passed through *tahawwul ṣaḥīḥ* process has high acidity at 2.83 and at the same time its acetic acid content increased by 0.017% while vinegar that is still in *tahawwul fasīd* does not meet the pH concept in fermentation of vinegar as it has a higher pH value of 2.91 and corresponding to acetic acid content at 0.003%.

Therefore, the concept of *taḥawwul* can be used as determination of the regulation of vinegar by looking at the content of alcohol, acedic acids and pH present in vinegar products. The results showed that both of vinegar product contains ethanol with a different percentage. The study found that the percentage of alcohol in Palm Vinegar during *taḥawwul fasīd* is higher than the percentage of alcohol in Palm Vinegar with *taḥawwul ṣaḥīḥ*. Palm vinegar during *taḥawwul fasīd* contain 1.93% which consider as haram while palm vinegar with *taḥawwul ṣaḥīḥ* contain 0.17% which is considered as halal.

Based on this study, the concept of *taḥawwul* is a concept that can be used to determine the halal status of the products produced through the fermentation process. These determinations can be seen based on the form, color, and duration of fermentation. The long fermentation period in palm vinegar between 30 days and 90 days can make the vinegar be classified as halal because it contains low alcohol content and the vinegar produced during the *taḥawwul fasīd* which is between 10 to 15 days can be classified as haram vinegar as it still contains high alcohol content that can cause harm and intoxication.

CONCLUSION

In conclusion, a product produced by fermentation process must go through the *taḥawwul ṣaḥīḥ* process. Products made before passing the *taḥawwul ṣaḥīḥ* process may contain high levels of alcohol that can be detrimental to health. The concept of *taḥawwul* consists of *taḥawwul ibtidā'*, *taḥawwul wustā'*, *taḥawwul akhīr* and *taḥawwul shubḥah* can be used as the basis for permissible fermentation products such as vinegar.

This is because it can identify *takḥammur* fermentation process in producing *khamr* and *takhalul* fermentation process in producing *ṣaḥīḥ* vinegar. *Ṣaḥīḥ* vinegar can be identified based on the source of its manufacturing, its manufacturing process, the fermentation process set to form vinegar and the alcohol content therein shall not exceed more than $\leq 1\%$ v/v for traditional vinegar and does not exceed more than $\leq 0.5\%$ v/v for industrial vinegar.

REFERENCES

- Abdel Naser, Zohri A., Etnan Mostafa M. 2000. *Ethanol Production from Dates in Saudi Arabia on Industrial Scale*. Faculty of Science, Assiut University, Egypt. *Mycobiology*, 28(2): 76-81.
- Abū Shuhbah, Muḥammad. 1983. *al-Wasīṭ fī Ulūm Muṣṭalaḥ al-Ḥadīth*. al-Jaza'ir: Alam al-Ma'rifah.
- Aḥmad Faraj, al-Sayyid. 1993. *Maqāl fī al-Insān Wa al-Tawhīd*. Cairo: Dār al-Wafā Lil-Ṭibā'ah Wa-al-Nashr Wa al-Tawzī'.
- Ahmad Khilmy Abdul Rahim, Mohd Shahril Ahmad Razimi & Mohd Murshidi Mohd Noor. 2017. *Pengurusan Pemiayaan Perdagangan Antarabangsa Islam Dalam Sistem Perbankan Islam di Malaysia*. International Journal of Islamic Business. Vol. 2 Issue 1. 1-14.
- Ahmad Khilmy Abdul Rahim, Mohd Shahril Ahmad Razimi & Mohd Murshidi Mohd Noor. 2014. *Surat Kredit-I Sebagai Metod Pembayaran Dalam Perdagangan Antarabangsa Dan Isu-Isu Syariah*. Procedia - Social and Behavioral Sciences. Elsevier.
- Armanios, F. & Ergene, B. 2018. *Halal Food: A History*. New York: Oxford University Press.
- al-Ba'labakī, Rūḥī. 1995. *Al-Mawarid A Modern Arabīc-English Dictionary*. Beirut: Dār al-'Ilm lī al-Malayin.
- al-Baghāwī, Abī Muḥammad Ḥusayn Bin Mas'ūd. 1991. *Tafsīr al-Baghāwī*. Riyāḍ: Dār al-Ṭayyibah.
- al-Ḥalabī, Shihāb al-Dīn Aḥmad Ibn Yusūf Samin. 2008. *al-Dur al-Masūn fī 'Ulūm Kitāb al-Maknūn*. Damsyiq: Dār al-Qalam.
- al-'Ijī, Adud al-Dīn 'Abd al-Raḥmān Ibn Aḥmad. 1824. *al-Mawāqif*. Beirut: Dar al-Jīl.
- al-Nashmī, Ajīl Jāsīm. 2015. *Tahwil al-Bunuk al-Taqlidiyah Ila Bunuk Islamiyah al-Mabadi' wa al-Dawabit wa al-Ijra'at*. Kuwait: Kuwait University.
- al-Rāzi, Muḥammad Ibn Abī Bakar Ibn Abd al-Qādir. 1986. *Mukhtār al-Ṣiḥaḥ*. Cairo: Maktabah Lubnan.
- al-Ṭaḥānawī, Muḥammad Alī. 1996. *Mawsū'ah Kashāf al-Iṣṭilāḥāt al-Funūn wa al-Ulūm*. Lubnan: Maktabah Lubnan Nāsirūn.

- al-Ṭayyib, Aḥmad Ibn Bashīr. 2014. *Kitāb al-Ḥikam al-Musamma al-Nafs al-Raḥmanī fī al-Ṭawr al-Insānī*. Beirut: Dar al-Kutub al-‘Ilmiyah.
- al-Zagūl, Rātīb ‘Abd al-Raḥīm. 2012. *al-Bayān fī Marāḥil wa Anāṣir Khalq al-Insān*. Oman: Dār al-Ma’mūn li al-Nashr wa al-Tawzī’.
- al-Zuḥaylī, Wahbah Muṣṭafa. 1997. *al-Fiqh al-Ḥanbalī al-Muyassar bī Adillatih Wataṭbiqātih al-Mu’āsirah*. Damshiq: Dār al-Qalam.
- Barakāt, Niẓām. 2000. *al-Aḥzāb al-Arabiyyah Wadawruhā fī al-Taḥawuulat al-Dimaqrāṭiyyah*. In Abd Raḥmān, Ḥamdī. 2000. *al-Taḥawwul al-Dimaqrāṭī fī al-Ālam al-Arabī Khilāl al-Tis’ināt*. Cairo: n.pb.
- Bashier, S. H. 2004. *Ibn al-Arabi's Barzakh' The Concept of the Limit and the Relationship between God and the World*. New York: State University of New York Press.
- Dewan Bahasa dan Pustaka. 1997. *Kamus Kejuruteraan Kimia*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Dirar, H. A. 1992. *Sudan's Fermented Food Heritage, in Applications of Biotechnology to Traditional Fermented Foods*. National Academy Press, Washington, DC, pp. 27–35.
- Dirar, M. 1993. *The Indigenous Fermented Foods of the Sudan*. Cambridge: CAB International University Press.
- el-Syafa, Ahmad Zacky. 2018. *Membumikan Shalat: Aktualisasi Makna Shalat Dalam Kehidupan*. Surabaya: Pustaka Media.
- Gillot, C. 2005. *Entomology*. Netherlands: Springer.
- Glenn, D. R. & Rogers, P. L. 2005. *Industrial of Indigenous Fermented Food Processes: Biotechnological Aspects*. In Steinkraus, K. 2005. *Industrialization of Indigenous Fermented Foods, Revised and Expanded*. New York: Marcel Dekker, Inc.
- Goodman, W.G. 2009. *The Juvenile Hormones*. In Gilbert, L. I. 2009. *Insect Development: Morphogenesis, Molting and Metamorphosis*. San Diego: Academic Press.
- Hammad, Hamza Abed al-Karim. 2015. *The Legitimate Requirements of Transformation of Conventional Banks to Islamic Bank*. Al-Qanatir International Journal of Islamic Studies. Vol. 1. No. 1.
- Ḥammād, Nazīh Kamāl. 2003. *Al-Adawiyyah al-Mushtamilah Ala al-Kuhul al-Mukhaddārat*. Majallah al-Majmak al-Fiqhi al-Islami li Rabitah al-Alam al-Islami. Vol. 16 (14): p.69-120.
- Hasan, Iman. 2017. *al-Mujtama’ al-Madani wa al-Dawlah wa al-Tahawwul al-Dīmaqrāṭī Itār Nazārī wa Mafāhimī*. Bahrain: Ma’had al-Bahrayn li al-Tanmiyah al-Siyasiyyah.
- Holley, D. 2015. *General Zoology: Investigating the Animal World*. Indianapolis: Dog Ear Publishing.
- Holley, D. 2017. *General Biology II: Organisms and Ecology*. Indianapolis: Dog Ear Publishing.
- Hornby, A. S. 2000. *Oxford Advanced Learner's Dictionary of Current English*. U.K: Oxford University Press.
- Hugenholtz, J. 2013. *Traditional Biotechnology for New Foods and Beverages*. Current Opinion in Biotechnology. 24: 155-159.
- Ibn Arabī, Muḥy al-Dīn. 2006. *al-Futuḥāt al-Makkiyah*. Beirut: Dar al-Kutub al-‘Ilmiyah.
- Ibn Manẓur, Muḥammad Ibn Mukarram Ibn Alī. 1996. *Lisān al-‘Arab*. Beirut: Dār Sadir.
- Ibrāhīm Anis, Abd al-Halīm Muntaṣir, Atiyah al-Ṣuwaliḥī & Muḥammad Khalf Allāh Aḥmad. 2004. *al-Mu’jam al-Wasīṭ*. Cairo: Maktabah al-Shuruq al-Duwaliyyah.
- Jeyaram, K., Singh A., Romi, W., Devi, A.R., Singh, W.M., Dayanithi, H., Singh, N.R. & Tamang, J.P., 2009. *Traditional Fermented Foods of Manipur, Indian*. Journal of Traditional Knowledge, 8(1): 115-121.
- Kim, E. K., An, S. Y., Lee, M. S., Kim, T. H., Lee, H. K., Hwang, W. S., Choe, S. J., Kim, T. Y., Han, S.J., Kim, H. J., Kim, D. J. & Lee, K. W. 2011. *Fermented Kimchi Reduces Body Weight and Improves Metabolic Parameters in Overweight and Obese Patients*. Nutr. Res. 31 (6), 436–443.
- Kwak, N. S. & Jukes, D. J. 2001. *Functional Foods. Part 1: The Development of a Regulatory Concept*. Food Control. 12, 99-107.
- Lewicka, P. 2011. *Food and Foodways of Medieval Cairenes: Aspects of Life in an Islamic Metropolis of the Eastern Mediterranean*. Leiden: Brill NV.

- Makwana, M. & Hati, S. 2019. *Fermented Beverages and Their Health Benefits*. In Holban, A. M. & Grumezescu, A. 2019. *Fermented Beverages: Volume 5*. The Science of Beverages. Duxford: Woodhead Publishing. P 1-29.
- Marco, M.L., Heeney, D., Binda, S., Cifelli, C. J., Cotter, P. D., Foligne, B., Ganzle, M., Kort, R., Pasin, G., Pihlanto, A., Smid, E. J., & Hutkin, R. 2017. *Health Benefits Of Fermented Foods: Microbiota and Beyond*. *Current Opinion in Biotechnology* 44, 94-102.
- McCarthy, Ed & Mulligan, M. E. 2006. *Wine for Dummies*. Hoboken: Wiley Publishing, Inc.
- Merriam-Webster. 1984. *Merriam-Webster's Dictionary of Synonyms*. Massachusetts: Merriam-Webster Incorporated.
- Mishra, S. S., Ray, R. C., Panda, S.K. & Montet, D. 2017. *Technological Innovations in Processing of Fermented Foods*. In. Ray, R. C. & Montet, D. 2017. *Fermented Foods, Part II: Technological Interventions*. Boca Raton: CRC Press.
- Min Yong, L. F. 1992. *Future Directions. In Applications of Biotechnology to Fermented Foods: Report of an Ad Hoc Panel of the Board on Science and Technology for International Development*. Washington, D. C.: National Academy Press.
- Mohammad Aizat Jamaludin, Dalya Hashim, Russly Abdul Rahman, Mohd Anuar Ramli, Mahmood Zuhdi Ab. Majid, Rashidi Othman & Alifah Amin. 2016. *Determination of Permissible Alcohol and Vinegar in Shariah and Scientific Perspectives*. *International Food Research Journal*, 23(6): 2737-2743.
- Mohd Zaidi Mat Satar, Mohd Wahid Samsudin & Mohamed Rozali Othman. 2011. *Determination of Hydrocyanic Acid in Nipah Fruit (Nypa fruticans)*. *The Malaysian Journal of Analytical Sciences*, Vol. 15 (2): 258-264.
- Muhammad Munib, Muhammad 'Ijj al-'Arab. 2008. *al-Nukhbah al-Siyāsah wa al-Taḥawwul al-Dimaqrātī fī al-Baḥrayn: 1992-2002*. Master Dissertation, Jāmi'ah al-Qahirah, Kulliyah al-Iqtisād wa al-Ulūm al-Siyāsiyyah.
- Mulyadi, Arie Febrianto., Dewi, Ika Atsari & Deoranto, Panji. 2013. *Utilization of Nypa (Nypa fruticans) Bark for Making Biocharcoal Briquette as Alternative of Energy Sources*. *Jurnal Teknologi Pertanian* Vol. 14 No.1.65-72.
- Nor Musfirah Muhammad. 2011. *Penggunaan Alkohol Dalam Pemakanan Menurut Perspektif Syarak*. Masters thesis, University of Malaya.
- Nowak, J. & Kuligowski, M. 2017. *Functional Properties of Traditional Food Products Made By Mold Fermentation*. In Ramesh C. Ray & Didier Montet. 2017. *Fermented Foods, Part II: Technological Interventions*. Boca Raton: CRC Press.
- Nur Yuhasliza Abd Rashid & Shaiful Adzni Sharifuddin. 2016. *Analysis of Organic Acids Content in Various Types of Vinegars with High Performance Liquid Chromatography*. *Buletin Teknologi MARDI*, 10 (2016): 57 – 62.
- Ray, R. C. & Joshi, V. K. 2014. *Fermented Foods: Past, Present and Future*. In Ray, R. C. & Didier, M. (eds.). *Microorganisms and Fermentation of Traditional Foods*. Florida: CRC Press.
- Riaz, M.N. 1997. *Alcohol: The Myths and Realities*. In: *Handbook of Halal and Haram Products*. Hill, R. (Ed.): New York, Publishing Centre of American Muslim Research and Information. pp. 16-30.
- Shaurub, El-Sayed Hassan. 2013. *Asāsiyāt Ilm al-Ḥasharāt al-Tibbiyah wa al-Biṭriyyah*. Cairo: al-Maktabah al-Akādīmiyah Sharikah al-Musāhamah Misr.
- Shaykh Zādah, Muhammad Bin Muṣliḥ al-Dīn Muṣṭafā. 1991. *Hāshiyah Shaykh Zādah Alā Tafsīr al-Qāḍī al-Bayḍāwī*. Turki: al-Maktabah al-Haqīqah.
- Steel, M. 2005. *New Oxford English-English-Malay Dictionary*. (Ab Rahman, Z, Trans.) Selangor: Fajar Bakti Sdn. Bhd.
- Wanninger, A. 2015. *Evolutionary Developmental Biology of Invertebrates 5: Ecdysozoa III: Hexapoda*. New York: London.
- Wizārat al-Awqāf wa al-Shuūn al-Islāmiyah. 1986. *Al-Mawsū'ah al-Fiqhiyah*. Kuwait: Wizārah al-Awqāf wa al-Shuūn al-Islāmiyah.

Website

Dzulkifly Mat Hashim. 2010. *Unraveling The Issue Of Alcoholfor The Halal Industry*. Retrieved 15 August 2018. [http://hdcglobal.com/upload-web/cms-editor-files/b08c8a04-c946-4ebe-99b9-2492bd32fcfc/file/11\)%20En%20Dzulkifli%20Mat%20Hashim%20-%20WHR2010_Unraveling%20the%20Issue%20of%20Alcohol_Final.pdf](http://hdcglobal.com/upload-web/cms-editor-files/b08c8a04-c946-4ebe-99b9-2492bd32fcfc/file/11)%20En%20Dzulkifli%20Mat%20Hashim%20-%20WHR2010_Unraveling%20the%20Issue%20of%20Alcohol_Final.pdf)

Interview

Mr. Othman Md Isa. *Entrepreneur Traditional Nipah Palm Vinegar Kampung Tepi Laut, Pasir Gebu, Penaga, Pulau Pinang, Malaysia*. February 12, 2018.

Guidelines

Jabatan Kemajuan Islam Malaysia (JAKIM). 2015. *Kompilasi Pandangan Hukum Muzakarah Jawatan Kuasa Fatwa Majlis Kebangsaan Bagi Hal Ehwal Ugama Islam Malaysia*. Putrajaya.

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