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MINI REVIEW

Halal issue in blood plasma-based food products

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Abstract

The development of the food industry hastily grows along with the development of science and technology. This is inevitable due to the demand and supply. However, several issues exist in food technology from the perspective of Islamic law. As an example, prominent discussions include meat culture, the inclusion of non-slaughtered animals in meat product manufacturing and blood plasma usage in food. In the context of this article, blood plasma has been employed in the production of foods that can serve a variety of functions, such as egg replacers, natural colour enhancers, emulsifiers, fat replacers, curing agents, and proteinase inhibitors. However, there is a strong taboo in Islam against using blood as a dietary ingredient. Thus, this article studied the usage of blood plasma in food according to Islamic law. This article is a qualitative study using the library study approach and inductive, deductive, and comparative content analysis of various written sources to achieve the identified main objective. This study concluded that blood plasma is haram and cannot be used in food manufacture based on *istidlal nas,* legal maxims and principles of *maqasid Al-syariah.* Thus, further study is needed to find an alternative to replace food plasma usage in food products.

1. Introduction

Nowadays, pork, blood, carcasses, and liquor are no longer conventionally used in their original and raw form. It can no longer be simply recognized externally. Instead, several labels appear that seem to originate from the resulting products such as gelatin, alcohol, glycerin, or blood plasma which have been widely used in the food industry (Mariod and Fadul, 2013; Rahman *et al.,* 2014; Toldrà *et al.,* 2019).

Technological development has obscured the status of these foods. This issue arose from the development of food manufacturing efforts in accordance with the Industrial Revolution 4.0 era. As a result, a variety of products produced with the usage of a specific material appear, which needs further inspection to ensure their validity.

In the context of this topic, blood plasma has been employed in the production of foods that can serve a variety of functions, such as egg replacers, natural colour enhancers, emulsifiers, fat replacers, curing agents, and proteinase inhibitors (Ahmad Fadzillah *et al.,* 2020). These roles are determined by the source of blood plasma utilized, which can be cow, chicken, or pig plasma. In other uses, there is also the production of plasma powder from the blood. In other words, plasma that is converted into powder after drying. Usually, plasma powder is mixed with meat stock and a thickening agent until its presence can no longer be identified easily due to its easy solubility and good emulsifying properties. This matter is claimed to be able to make meat chunks more solid and long-lasting. The usage of plasma powder in meat products could improve the quality and retain the texture as well as act as a blood protein alternative to substitute fat (Mohd Kashim *et al.,* 2017). Other than that, it is also believed to give additive value in food additive manufacturing such as protein supplements, iron, as well as bioactive compounds for food products.

Blood plasma (46-63% content in the blood) is separated from the blood through a centrifugal process (high-speed rotation) on a fresh blood sample. As a

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result, blood cells sink to the bottom due to having more weight while the blood plasma floats on the top layer. Blood plasma's constituents are water, protein (albumin, globulin, fibrinogen), amino acids (protein-forming compounds), hormones, enzymes, nitrogen residuals, nutrition, and gas.

According to Mohd Kashim *et al.* (2017), it is estimated that as much as 1.5 million tons of pig blood are produced yearly in China. The blood contains protein equal to 2 million tons of meat or 2.5 million tons of eggs. Due to this, the largest source of protein would disappear if the blood is simply thrown away, more so this scenario could lead to a significant environmental pollution issue in the country. As a solution, several initiatives were proposed such as making blood plasma an additive in food products.

Referring to the original state, plasma is the liquid part of the remaining blood after the blood cells consist of white blood cells (WBCs), red blood cells (RBCs), and platelets are isolated (Figure 1). It could be useful as a food additive in the food industry due to its neutral taste and lightly-coloured nature. Furthermore, the presence of blood plasma improves the food quality in terms of the food texture such as beautifying the shape and adding elasticity (Mazlina *et al.,* 2015). This is because blood plasma contains iron and high-nutrition proteins. Therefore, the food industry players began taking the opportunity to cultivate animal blood into blood plasma that provides additive nutrition to food.

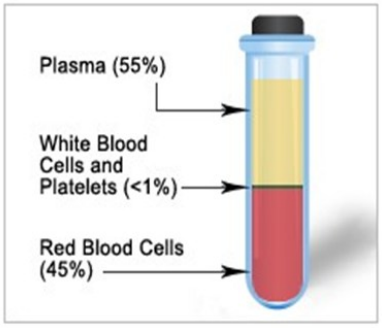

Figure 1. Plasma classification from fresh blood components.

It is estimated that the food industry uses around 30% of blood produced from animal blood (Bah *et al.,* 2016). Animal blood will be processed, and the contents are separated until blood plasma is obtained, thus drying into dry plasma blood that is ready to be used as additive materials in the following cultivation process.

As an example, centrifuged slaughter method removes blood platelet which gives a red colouring to the blood. Next, the leftover remains is the blood plasma, the beige-coloured fluid, which is then dried using spraying and used as a protein source. This blood source usually comes from poultry animals such as cows, pigs, goats, buffalo, and others. However, only pig's and cow's blood are often utilized compared to other impractical animal species (Ofori and Hsieh, 2011).

For this issue, there are several food products that contain animal blood plasma as a food additive. Food additives or additional ingredients in the food are all the chemical ingredients that are intentionally added into the food to enhance the characteristics, quality, taste, uniqueness, and others for the food. In the meantime, the meat industry also used blood protein to be used in the food industry as a binding agent, original colour freshener, emulsifying agent, and fat and meat converter.

Usually, transglutaminase enzymes and plasma powders are among the blood-based food additives (Sahilah *et al.,* 2016). This is because it has high solubility and emulsifying ability, low viscosity, and it can retain certain properties of food. Other than that, it can also give texture to processed food products such as meat and fish.

In food product manufacturing, both ingredients are often used in fish balls, sausages, cheese, yoghurt, solid meat, and others. The commercial name for such products is "surimi" which is produced from fish content (Mahaiyadin and Osman, 2017). Due to the low viscosity level, the fish content has a lesser thickening ability. Thus, the industrialists began adding thickening agents that are based on blood plasma protein powder or transglutaminase enzymes (Jamaludin and Radzi, 2009).

There are studies in Malaysia that report the use of blood plasma in nutrition as a food condiment (Aravindran *et al.,* 2014). Surimi is one of the products that is commonly manufactured utilizing blood plasma. In this context, the Ministry of Health Malaysia (2015) noted that transglutaminase is a vital source in the production of surimi. Transglutaminase is an enzyme that is utilized as a food conditioner in surimi products. It usually comes from two sources: pig plasma protein and bovine plasma protein, which work together to keep the quality of surimi stable in terms of its capacity to create strong gels. Religious authorities take the production of blood plasma-based surimi products extremely seriously. JAKIM's advice and reminder to Muslim consumers to exclusively purchase halAl-certified surimi products demonstrates this (Siti Jamilah *et al.,* 2021). This is because Malaysia, along with Thailand and Vietnam, is one of the main importers of surimi products in Southeast Asia (Siti Jamilah *et al.,* 2021).

In a different example of blood application in the food industry, bovine plasma protein isolate is used to substitute wheat flour in bread making and egg white in pastry making. In the meantime, globin concentrate is produced which can be used as a fatless meat substitute

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in meat pie products. Among others, products from the blood called fibrin gel are added to raw meat until they become reformed meat products. This type of meat is also called *super glue steaks* and is marketed around Europe. Blood can also be used as a red colouring in food.

Based on current practices regarding the use of plasma, it can be concluded that it is extensively utilized in the production of food products. However, this practice raises significant concerns from an Islamic perspective, particularly due to the prohibition on the consumption of blood as outlined in Shariah law. Therefore, this study will examine the issue of using blood plasma in food products and its ruling in Islamic law.

2. Types of blood plasma and its use as consumer products

Nowadays, blood plasma is processed and utilized in different forms. One of them is colouring. Haemoglobin powders are a source of red colouring obtained from animals. The usage of colouring has the advantage of handling the low iron issue. Other than that, blood plasma acts as an emulsifier. Blood globin is better compared to other proteins that are used as emulsifiers in meat and food products. There is research that says globin has the best emulsifying capacity (Nakamura *et al.*, 1984). Blood protein has a good emulsifying capability and can substitute casein function and egg in the meat emulsifying process. Blood proteins such as haemoglobin for emulsifying agents can also act as an iron source.

Blood plasma can also be used in food products, used to substitute fat. Blood protein has the potential to be a fat substitute that can reduce the cost of meat products in the industry. It can also reduce the food calories in every gram of fat substituted (Ofori and Hsieh, 2012). As an example, the use of blood protein as a fat substitute is better compared to sausage fat fibre. There is also a cow meat burger that contains plasma powder U70 and Protoplus U70 (Mohd Kashim *et al*., 2015). Both are blood products resulting from meat solidification and the like. Therefore, blood protein provides a cheaper protein alternative as a fat substitute in low-fat meat product manufacturing.

Blood plasma can also be used to substitute eggs to produce darker-toned products. Blood plasma usage to substitute all the egg whites in the cake and bread-making industry is more effective due to lower cost. Therefore, the cake made with blood has a higher weight rate. As an example, cow's blood that is decolourized acts as an egg white substitute in cake layers (Myhara and Kruger, 1998).

The use of plant protein is better compared to animal protein which prevents protein nutrition deficiency. However, there are some among the entrepreneurs that produce protein supplement products from pig's and cow's blood plasma. The blood helps accelerate athletes' daily weight gain. Other than that, the iron content in blood plasma is also used in food products. For example, cow's blood has a large amount of iron from animal sources. Using cow's blood can also add nutrition to food. It can also act as a bioactive compound. Protein hydrolysis from pig's blood is used in an enzyme mixture for heavy reactor used for bioactive peptide production. Red blood cells, plasma, and defibrinated blood are isolated from the pig's blood and used as substrates for hydrolysis (Mohd Kashim *et al*., 2015).

In the meantime, blood plasma is also utilized and used as consumer products, which include:

i) Dried blood plasma in the form of powder is used as food additives in different "surimi"-type imitation food such as fish cake, crab legs, imitation shrimp, fish balls, crab sticks, fish nuggets, and squid balls.

ii) Ingredient for making pastry, cake, pancake, pie, pudding, bread by substituting egg or egg white in the process by spraying plasma powder to improve quality, acquire a fluffier texture, and save cost.

iii) Soup and pastry or added in milk for the production of some children's food products or medicinal products or others.

iv) Patty meat, super glue steak, ground beef, minced meat, steak, and burger

v) Flour used in pasta making, by substituting the original wheat ingredient with plasma powder spray on the low-grade flour to add protein and save cost.

vi) Fibrimex® product and Plasma Powder FG which are patented by a Dutch company Sonac B.V. It functions as a meat binding agent which can be used on raw meat and frozen meat without affecting the product quality.

vii) Harimix (C, P or P+) and Haemoglobine which is marketed by the same company, Sonac B.V. as a stabilized haemoglobin-based product and haemoglobin powder for iron deficiency problems.

viii) PP-brand plasma powder product by the company Sonac B.V. is produced from pig and cow plasma.

ix) Dry plasma spray and red colouring products, Prolican 70, Protein and Myored made by the company Lican Functional Protein Source, Chile, produced using pig and cow plasma.

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x) Immunolin® product commercialized by Proliant Inc. uses plasma as an active component in supplements to improve body immunity function. They also produced two other plasma-based products, which are AproRed and B7301.

xi) Vepro 95 HV and Plasma by the company Veos NV, Belgium, as a dry, frozen, and liquid plasma product (Ofori and Hsieh, 2011; Ofori and Hsieh, 2012).

Before going any further in the discussion, it is better to look into the details of the good and bad elements of blood plasma. This is important to understand the pros and cons of using blood plasma in food products. Blood plasma in general has its benefits, which include:

i) Blood plasma consists of 91-92% water, 8.9% protein, 0.9% inorganic salts and other constituents. According to Bishop *et al.* (2010), blood plasma consists of 92% water and 8% soluble ingredients such as glucose, protein, vitamins, minerals, urea, uric acid, carbon dioxide, hormones, and antibodies (Bishop *et al*., 2010). Plasma protein in vertebrate blood generally consists of albumin, globulin, and fibrinogen (Herrero *et al.,* 2009).

ii) A source rich in iron and high-nutrition protein gives a higher-quality function to food. High protein content in blood reaches 18% and is called liquid protein.

iii) Plasma contains amino acids, ammonia, purine nucleotide metabolic products, and pyrimidine. The protein content quantity in plasma is (9.5%) and the moisture content (90.5%) is important to determine its capability and add value to its function as a food additive (Kriger, 2014).

iv) Thrombin and fibrinogen enzymes are obtained from blood plasma. It is used on meat as the thrombin converts fibrinogen into fibrin which interacts with the collagen which acts as a binding agent for meat chunks. These enzymes are also widely used in poultry, fish, and seafood products. Meat product usage that contains this enzyme preparation does not increase the risk of allergic or intolerance reactions.

v) Hormones, amino acids, and albumin are protein components in blood plasma that have medicinal properties.

vi) Blood-coagulating enzyme thrombin is used with blood plasma and is a meat-binding agent in cut meat or minced meat processing (Grundy *et al.,* 2008).

vii) Blood plasma as an emulsifier (Ahmad Fadzillah *et al.,* 2020) is used in meat product emulsifying such as sausage to bind the meat protein, fat, and water in a stable emulsion.

viii) Helps spread fat in the product to provide the proper texture and produce quality sensory in the final product.

ix) Provides a cheaper protein alternative that can be used as a fat substitute in low-fat meat product manufacturing (Ofori and Hsieh, 2012).

However, despite the benefits of blood plasma, there are several downsides. It is important to take notes on the downsides, which include:

i) It is believed to contain different microorganisms and metabolic products that are dangerous and toxins that originate from the blood.

ii) Product that contains blood plasma can cause allergic reactions due to the blood protein contents such as bovine serum albumin (BSA) and Immunoglobulin G (IgG). According to Ofori and Hsieh (2011), BSA and IgG that are found in milk as well as cow's blood are reported to be a cause of milk and meat allergy.

iii) The microbe content such as *Salmonella* in animal protein products is high compared to plant protein products and has a difference in growth reaction that can be seen in animals. This requires radiation, heating, or chemical processes to eliminate viruses and germs (Oxford Haemophilia and Thrombosis Centre, 2020).

3. Usage of blood plasma in food products based on Islamic law

Islam emphasizes the aspect of food and drink, more so the aspect of its follower's way of life. In terms of consumer aspects, especially food and drinks, a rough guideline that should be fulfilled should be regarding *halal* and *tayyib* (good). This is according to the word of Allah SWT; which means; "O humanity! Eat from what is lawful and good on the Earth" (Surah Al-Baqarah, 2: 168).

Halal is when something is optional and allowed, bears no risk and *Syari'* (Allah) gives permission to do it (Al-Qaradawi, 1986). While *tayyib* in the verse involves something that seems beneficial to humans and does not harm the body and mind (Ibn Kathir, 2000).

Allah SWT gave Muslims an option to enjoy what He has created, but there are several guidelines that need to be followed. Taking the aspect of nutritional diet as an example, Islam forbids eating pork, carcasses, non-slaughtered animals and animals with blood flow. Therefore, blood is basically an excrement component and is forbidden to be eaten in Islam. This issue is stated in the words of Allah SWT in surah Al-Baqarah, 2; 173

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and surah Al-Maidah, 5: 3.

The verse clearly states the prohibition of blood. Ibn Kathir (2000) provided a description that Allah SWT in this verse prohibits eating carcasses and blood. The prohibition of flowing blood is also according to how it harms the religion and body. The word of Ibn Kathir clearly states that blood will affect someone's religiosity if they consume it. Based on such, Abd Razak *et al.* (2016) categorized blood as an excrement that can contaminate food and negatively affect the spiritual aspect.

Al-Qurtubi (2006) also asserted that blood is prohibited from being eaten or utilized according to scholars' agreement. This prohibition involves all types of blood excluding blood that does not flow within the meat, frozen meat such as liver, and fish blood according to part of Hanafiyyah. The restriction on blood usage is also an important matter to be given attention, especially regarding the aspect of its usage in the food industry.

The proposed discussion showed that blood plasma is certainly used in food products. Looking at the blood plasma and blood, it is found that the blood plasma is among the most important blood components, plasma taken from blood in the flowing blood category. Blood in fact contains red blood cells, white blood cells, platelets, and plasma. Therefore, blood without plasma is something assumed to be impossible. According to the perspective of Islamic law, if a fact cannot be broken down, then it follows the law in its entirety. There is the method (**الجزء يأخذ حكم الك**) where the part takes the entirety law. Examples of these applications are:

i) A person manages to "rukuk" in time with the imam so he gets one full "raka'at", eventhough the person only managed to do a part of the "raka'at" (Siddiqi, 2000),

ii) A person finds mineral yields in their owned land, so the person can own the mineral yields because the mineral yield is part of the owned land. (Samurah, 2001).

Blood plasma is in the same context of discussion because blood plasma is part of blood. This means, something impossible to call blood in the absence of plasma (Ahmad Fadzillah *et al.,* 2020). So the law of using blood plasma is taken from the entirety of the law of using blood. This means consuming blood or blood plasma is prohibited. More so the blood plasma is the largest constituent of blood. According to the Health Encyclopedia, the plasma component takes up around 55% of blood. Therefore, the *fiqh* method "majority takes the entirety law" (**للأكثر حكم الكل**) will be used (Al-Burnu, 2003). This means blood plasma which is the largest component will take the law of blood usage, which is prohibited to be eaten and utilised. There are also other methods that support this statement such as; "mentioning a part of something that cannot be broken down is the same as mentioning its entirety" (**ذكر بعض ما لا يتجزأ كذكر كله**)(Al-Hamawi, 1985). Such a method provides a description that when a component cannot be broken down, if separated it loses its entity, then that component has an entirety law. Such is blood plasma that uses the law of blood which is prohibited to be eaten.

Other than that, the words about blood in the verse in surah Al-Maidah, 5: 3 is absolute in nature, which encapsulates all types of blood and its components, scholars stated (**المطلق يجري على إطلاقه ما لم يقم دليل التقييد نصا أو دلالة**), an absolute statement remains absolute as long as there is no proposition that binds it through Islamic text or guidance (Al-Burnu, 2003). Therefore, the verse can be understood through absolute words that provide an understanding of the prohibition of blood consumption.

There are several views that claim blood plasma used in food products is optional. Among the arguments or reasonings proposed include: (i) The usage of blood plasma in food products is miniscule and it can be categorised as blood that can be excused. (ii) Blood plasma in food products has gone through the *"istihalah"* (transformation of material) process, so it is *"halal".* (Mohd Kashim *et al.,* 2017)

As explained, the status of blood is prohibited for consumption and utilization. Therefore, the usage of a small amount of blood component in food products is also prohibited. Scholars excusing situations when blood stains remain on clothes after being washed (Al-Bujayrimi, 1996) cannot be used as an argument to excuse blood in food. This is because both situations are different contextually. This is clear when a carcass that went through a purification process can be utilized but it is not permissible for consumption (Al-Tilmisani, 2016).

Thus, the use of blood plasma no matter how miniscule can affect the *halal* status of a food product (Jamaludin and Radzi, 2009). This can be understood from the method "when something prohibited is put together with something that is permissible, the prohibited (*haram*) status trumps the permissible (*halal*) status" (**إذا اجتمع الحلال والحرام غلب الحرام**)(Al-Hamawi, 1985). More so when there is an element of leniency for situations that are hard to avoid or *Umum Al-Balwa,* especially in the consumer aspect that involves the element of excrement, several rules or guidelines should be given attention.

Among the main guidelines is it is not something

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that intentionally occurs, and it occurs naturally or due to its natural properties, not because of human negligence or action (Md. Ariffin *et al.,* 2016). The issue of blood plasma can be seen to not fulfil this guideline, where it is intentionally put into food products for certain purposes.

Other than that, when the usage is in consideration, blood plasma is allowed according to the transformation (*istihalah*) concept. Fundamentally, the scholars are not in agreement about this concept. The conclusion from the scholars' view on *istihalah* is as follows (Norhidayah and Saadan, 2016): (i) Accept the *istihalah* concept, where a change in the state of matter of excrement to a pure state of matter naturally or unnaturally. (ii) Does not accept the *istihalah* concept, Syafi'i teaching excludes three cases which are carcasses' skin that has gone through a purification (*Al-dabgh*) process, alcohol that turned into vinegar naturally, and worms from carcasses because a new life is assumed to occur in these cases.

It should be emphasized that the *istihalah* process occurs after a structural change in the state of matter physically or chemically (Jamaludin *et al.,* 2012). Changes that occur must be genuine and not simply changes in properties (Syed Yusuf *et al*., 2018). Therefore, gelatine is still prohibited because there is no change in chemical structure despite the change in physical change in structure. However, the claim that blood plasma is allowed because of the *istihalah* process following the blood identity cannot be physically perceived (Mohd Kashim *et al.,* 2015) and cannot be accepted. This is because the change means physical change, whereas the change in the chemical structure of blood plasma also needs to be proven. This proving needs to be carried out through lab research.

From a thorough observation of the status of blood plasma in food products, the prohibition does not only follow the text of Al-Qur'an, hadith, methodology of *usul Al-fiqh* and *fiqh*, it also follows higher objectives of Shariah *(maqasid Al-Syari'ah).* In this matter, the basis of the order to consume food that is *halal* and clean *(tayyib)* is to ensure genuine benefits in nutrition. Therefore, all food that contains elements of excrement brings harm, is unhygienic, and a mix of what is *halal* and haram are prohibited in the Islam nutrition syariat (Mohd Kashim and Husni, 2017). To be exact, the concept of *halal* and clean *(tayyib)* that has seven criteria which are the food product must not contain anything unhygienic, alcohol, animal blood, human source, pig, carcass, and dangerous ingredients (Othman *et al.,* 2018) is to ensure the status of the objectives of Shariah which consists the conservation of five important matters which are religion, life, intellect, dignity, and asset.

This is because the elements can bring harm to people's health. Islamic law strictly prohibits any form of harm, as understood from the (**الضرار يزال**) method which means any harm must be eliminated (Al-Suyuti, 2009; 'Azzam, 2005). This method also means any harm must be prevented from occurring, or wholly eliminated if it happened or necessarily eliminated ('Azzam, 2005).

From this premise any harm through nutrition is prohibited, the usage of blood plasma in food products be it seasoning, texture and quality enhancer, stabilizer, colouring, or body immunity stimulant is not allowed due to the harm it can lead to health. This is explained by which is that blood plasma has been scientifically proven to contain elements that are harmful to health such as microorganisms and microbes, as well as causing allergic reactions through consumption. Thus, the consumption of food product that contains blood plasma ingredient is prohibited.

It is true that some people may assume that the advantages of blood plasma in nutrition products should be utilized among entrepreneurs. However, this action is clearly contradictory to the concept of conservation of life *(hifz Al-nafs)* which is emphasized in the objectives of Shariah *(maqasid Al-Syari'ah).* In the early centuries of *maqasid Al-Syari'ah,* the conservation of life was simply understood through retaliation *(qisas)* punishment which aimed to preserve the life of mankind (Afridi, 2016). This is due to the dimension of the early thought prioritizes the aspect of safeguarding and protecting while the current thought emphasizes expansion, development, and rights (Muhammad Iqbal, 2016). Through this contemporary thinking, the objectives of Shariah preservation medium can be fronted in the modern framework. For example, *hifz Al-'aql* (safeguard of intellect) is not only preserved through intoxicating drinks prohibition as written in verse 90 Surah Al-Maidah. The preservation of intellect can also be preserved through sufficient education to prevent any brain drain symptoms ('Audah, 2010; Moh. Hefni, 2011; Arina Haqan, 2018, Syukur Prihantoro, 2017; Harun *et al*., 2021).

In this issue, food that does not contain any harmful elements can ensure the well-being of the body. This means life can be preserved through *halal* and good nutrition that is clear of any harmful elements (Khatijah Othman *et al.,* 2018). While *halal* and good food consumption is not included in *Al-daruriyyat hifz Al-nafs* (the necessity in safeguarding life), it is still a method to preserve the life element at the stage of *Al-hajiyyat* where if it is abandoned, it can break down the benefits at the stage of *Al-daruriyyat* (Al-Shatibi, 1997; Ibrahim and Harun, 2024) in the form of loss of life.

Therefore, the status as discussed in the article

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follows the Islamic legal maxims (**درء المفاسد أولى من حلب المصالح**) which means avoiding any harm is prioritized over gaining benefits (‘Azzam, 2005; Ridzwan *et al*., 2019). Thus, the usage of blood plasma in food products while it has certain benefits, avoiding the harmful content is a bigger priority.

4. Future perspective of blood plasma in the Halal global food industry

Islam has provided rules that must be followed by its believers which are called Islamic law. Consideration of Islamic law must also be based on clear principles and methods. Thus, in the discourse of Islamic law, several methods and principles have been established through inductive, deductive and comparative observations by Islamic scholars. Thus, knowledge such as the methodologies of *fiqh,* maxims, parameters and related principles are organized (Saleem, 2010; Mohamad Yunus, 2019).

Therefore, in line with the development of the food industry and in ensuring that a product is *halal* or Shariah compliant, the existing theory of Islamic law should be the main consideration. Therefore, the use of blood plasma may be taken not from blood in the category of flowing blood because of the clear prohibition in the Islamic text as well as the justification that has been mentioned before. However, Islamic law requires the use of blood that does not flow based on the use of the method of *mafhum mukhalafah* (contrary understanding) or the theory of *Al-'am Al-makhsus* (what is general but there is evidence of the exclusion of some of what it applies to) to surah Al-Baqarah, 2; 173 and surah Al-Maidah, 5:3 (Che Abdullah and Abdul Rahman, 2017; Rosele, 2021). Therefore, a study is necessary to identify whether blood plasma can be taken from clotted blood and categorize the non-flowing blood that is required by Shari'ah to be eaten such as blood in flesh, liver, and so on (Nurdeng, 2009; Ahmad Fadzillah *et al.,* 2020).

In addition, the functions of blood plasma consumption in food consumption can be sought from *halal* alternatives and not from faecal sources. Examples include functions such as dyes, emulsifiers, fat substitutes, egg substitutes, protein supplements, iron and bioactive compounds. While it is possible that the use of blood plasma is to improve the quality of food, the rules of sharia must also be followed. In line with the principle of taking something that is less harmful than taking a large amount of harm, one should take food that is of less quality than taking food that has a faecal element that is more harmful.

5. Conclusion

Blood plasma taken from blood in the food industry is an issue that needs to be paid attention to in Islamic law. However, justifying blood plasma based on the *istihalah* (transformation) theory or *istihlak* (process of perishing) is not something that can be accepted unless lab testing is carried out for products that use blood plasma. Prohibition of blood does offer a certain wisdom, therefore in discussion, Islamic jurisprudence clearly prohibits blood utilization. With the proposed arguments and explanations, the review finds itself agreeing that the usage of blood plasma in food consumption is prohibited. As a result, the use of blood plasma in food products by some manufacturers in affluent countries should be avoided. What is striking in this regard is that there is resistance to the use of blood plasma in developed countries, even though product processing has gone through Hazard Analysis and Critical Control Point monitoring (HACCP). This indicates that the prevention inherent in Sharia has a *maslahah* for the customers. As a result, more studies on the usage of blood plasma in specific food goods ought to be evaluated from the point of view of Islamic Sharia.

Conflict of interest

The authors declare no competing interests.

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