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Exploring the Islamic Approach to Halal Science: Analysis of Ijtihad Methodology for Determining Permissibility and Prohibition of Blood Plasma in Food Additives

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Abstract: The significance of the Islamic principles of Halal and haram to a sustainable society cannot be overemphasized in the current global struggle against socio-economic, medical, and environmental issues. Halal science products and services are becoming attractive to corporate industries, especially in the food industry. Although related studies in the Halal industry have been gaining attention in recent times, with the global economic outlook to hit $4.96 trillion by 2030, little is known about the research that speaks to the fundamental Islamic principles of halal and haram in the food and services industries. Modern industries are conscious of employing workers who can contribute to the sustainability of the business amid the emerging contemporary realities. This study explicates contemporary Ijtihad methodology of *Taḥqīq manāt al-hukm* (verifying causal effect existence) and *takhrīj manāt al-hukm* (coming up with effective cause) in food additives like blood plasma content. To this effect, the study employs qualitative methodology in data gathering and analysis of classical and contemporary literature reviews. This study found that comprehensive Ijtihad methodology and application is a necessity for understanding the modern realities of Halal and Haram in food additives using blood plasma contents.

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1. Introduction

Halal Science encompasses a systematically organized realm of knowledge dedicated to the observation and experimental exploration of natural phenomena within the realms of living organisms, including humans, animals, plants, and their respective environments. The evolution of Halal science has led to the establishment of a structured methodology for offering analytical services, specifically designed to detect contamination in both raw

materials and finished products intended for the Halal market (Nazaruddin *et al.*, 2023). The emerging field of Halal technology is focused on conducting research and development for Halal products, and it seeks to enhance the database of the Halal industry to support its expansion in food, and consumer goods (Azam & Abdullah, 2020). The advancement of Halal science has hinged upon two key factors: the intellectual capacity to conduct Halal research and foster innovation, as well as the availability of ample funding for Halal science-related products and services. While numerous institutional initiatives are aimed at improving funding for Halal research and innovation, as well as nurturing small and medium enterprises (SMEs) engaged in Halal-compliant activities for long-term growth and export, relatively little is known about efforts to promote the role of an Islamic perspective in ensuring the sustainability of Halal science. Sustaining Halal science in fields such as food, and other natural sciences necessitates the support and commitment of those who safeguard the Halal standards for the industry (Azmi *et al.*, 2018; Muhamed *et al*., 2014). The concepts of halal and haram in Shariah represent two intertwined aspects that require adherence to Shariah evidence for a determination of whether something is classified as halal or haram. This fundamental principle is grounded in the understanding that the authority to proclaim something as halal or haram rests exclusively with Allah, the Supreme Lawgiver (Abdullahi & Muhamad, 2021; Yusuf Al-Qaradawi, 2014). The Hadith Ṣaḥīḥ al-Bukhārī 52, of the prophet (PBUH) also emphasizes that:

> The lawful is clear and the unlawful is clear, and between the two of them are doubtful matters about which many people do not know. Thus, he who avoids doubtful matters clears himself regarding his religion and his honor, and he who falls into doubtful matters will fall into the unlawful as the shepherd who pastures near a sanctuary, all but grazing therein. Verily, every king has a sanctum and the sanctum of Allah is His prohibitions. Verily, in the body is a piece of flesh which, if sound, the entire body is sound, and if corrupt, the entire body is corrupt. Truly, it is the heart (Muhammad bin Ismail Abu ‘Abd Allah al-Bukhari, 1994)

This point of evidence in this hadith is: “and between the two of them (halal and haram) are doubtful matters about which many people do not know”. A principle of Usul al-fiqh; *mafhum mukhalafah* (understanding negative imperatives) proves that, since the hadith says many people do not know about doubtful matters, it suggests that few scholars and specialists in the field of doubtful matters might be endowed with the knowledge to scientifically search for the truth and realities of the doubtful matters (Al-Imam Al-Alāmah Ibn Daqīq Al-ʿEid, n.d.).

Islamic Perspective in Halal Science, therefore, categorizes Halal science into Ijtihad matters that are explicitly mentioned or require further scientific evidences to determine the existence of causal effect (*Taḥqīq manāt al-hukm*). Therefore, the Ijtihad methodology opined certain procedures to clarify halal or haram of a product or sciences using scientific knowledge (Miskam *et al*., 2015; Shahirah & Mohd, 2019). Even with the pivotal role of the custodians of Halal knowledge in understanding what is permissible (halal) and prohibited (haram), Halal science has presented solutions to numerous challenges especially in the food industry. However, the industrial nature of food consumptions in the modern era makes it challenging for Shariah scholars to make determinations of halal or haram without essential information from Halal scientists and experts, which is crucial for identifying the underlying causes (*illah hukm*). Regardless of the industry involved, the declaration of whether food substances are halal or haram in contemporary contexts should adhere to a set of three primary processes: (i) *Tasawwur*, (ii) *Istidlal*, (iii) *Hukm*. The remaining parts of this study encapsulate four sections. The first section presents the Ijtihad methodology of halal and haram on contemporary matters. The second section explicates the application of the contemporary Ijtihad methodology in the food industry with a case study. The third section highlights the findings of the study while the last section presents the conclusion of the study.

2. Materials and Methods

The research adopts a qualitative approach, utilizing a combination of classical and contemporary literature reviews to gather and analyze data. The primary focus is on the Ijtihad methodology, specifically *Taḥqīq manāt al-hukm* and *takhrīj manāt al-hukm*, to explore the causal effects and effective causes associated with the presence of blood plasma content in food additives. This methodological choice allows for a comprehensive examination of the contemporary Ijtihad process and its application in understanding the Halal and Haram implications of specific components in the food industry.

3. Results

3.1 Analysis of Ijtihad Methodology of Halal and Haram in Contemporary Realities

According to scholars of Usul; Shihāb din Abu Abas Ahmad bin Idris (2004) and Zuhair (2011), there is a necessity to research the cause of the rule (*Illah hukm*), especially on matters that are not specified in the primary source of Shariah (Quran and Sunnah). Modern industries are increasingly recognizing the importance of collaboration between Shariah research and Halal science in the development and innovation of sustainable Halal products. The Islamic perspective on Halal science is underscored by the realization that Shariah

scholars may face challenges in making juristic decisions regarding contemporary issues in the food industry without engaging in collaborative research with Halal scientists, and vice versa. This is where the Islamic perspective finds its relevance, as it involves the application of contemporary Ijtihad methodologies such as *Taḥqīq manāt al-hukm* (verifying the existence of causal effects) and *takhrīj manāt al-hukm* (identifying effective causes) in areas related to the food, and services industry (Busari, 2021). The need for *Taḥqīq manāt al-hukm* answers the cause of the law, which necessitates the presence of the law and its absence necessitates the absence of the law. Today, there are substances that are potential materials in Halal science for production and services, but they fall into the ambiguity of whether to declare them as halal or haram. Hence, the scientist or the Shariah scholar may not be able to declare it as halal or haram for use and consumption without conducting collaborative research (Sugibayashi *et al.*, 2019). For this study, the application of the Ijtihad methodology to understanding modern realities of Halal and Haram can be seen through the Juristic study of plasma blood in food additives.

3.2 Taḥqīq Manāt Al-Hukm (Verifying Causal Effect Existence) and Takhrīj Manāt Al-Hukm (Coming Up with Effective Cause)

Al-Manat (the pivot of the rule) is the portion that spells the rule. *Al-Manat* is also referred to as a causal effect (*illah*) that indicates the presence of Shariah rules in a matter. The Ijtihad method of deriving rules requires deducing the causal effect in the original case through retrieval of the *manat*, proving its existence in the new case through investigating the *manat*, and purifying the cause from what is not suitable to be a causal effect through refining the *manat* (Al-Fauzan, 2001 & Az-Zubaidiyy, 2014). It is the role of Islamic jurists to search for the *Illah* in the original case and how it relates to the new case to juxtapose a relationship of causal effect between the original case and the new case (Rohani, 2013). An example of an original case is blood which is categorically prohibited in Islamic law based on the verses of the Quran: [5:3]. Plasma blood is a new case common in the food industry and requires the determinant of the presence of the same causal effect (filthiness, harm, and diseases) before it could be granted similar rulings as blood.

3.3 Application of Ijtihad Methodology of Halal and Haram in Food Additive: Case Study of Plasma Blood

Blood consists of red blood cells, white blood cells, and platelets. A liquid in which these elements swim is called plasma or blood plasma. Blood plasma is considered as one of the components of blood. It is a transparent liquid substance that is yellowish. Blood plasma represents the intravascular part of the extracellular fluid. Blood plasma makes up about 55%

of the total blood volume in the human body. 92% of blood plasma is water and contains protein, glucose, hormones, carbon, oxygen, etc. Its function: transporting nutrients needed for the cell and transporting the products of metabolism. From an Islamic perspective, Shariah scholars are obliged to follow the process of declaring an act, substance, or service as halal or haram based on the three main processes: (i) *Tasawur* (visualization), (ii) *Istidlal* (seeking evidence), and (iii) *Hukm* (juristic rule).

3.4 Food Additives

Food additives are defined as any substance or combination of substances, distinct from primary food ingredients, that becomes part of a food product during any stage of its production, processing, storage, or packaging (Karunaratne, & Pamunuwa, 2017).

As per European regulations, food additives are substances that do not typically serve as food on their own or function as essential ingredients in food products. Regardless of whether they have nutritional value, these additives are intentionally incorporated into food items for technological reasons during their production, processing, preparation, treatment, packaging, transportation, or storage. This intentional addition is expected to either directly or indirectly make the additive or its derivatives a part of the final food product. Food additives are essential in today's food supply, providing access to a variety of food year-round and enabling convenient options that reduce the need for daily shopping. They perform crucial, often unnoticed functions in food production. As people have moved away from farms, additives help maintain food quality during long-distance transportation. Additionally, these additives improve the nutritional value of certain food and enhance their taste, texture, consistency, and color, making them more appealing to consumers. Food additives serve a specific function in food (Gherezgihier, *et al*., 2017).

1. Preservatives serve the purpose of prolonging the shelf life of specific products and guaranteeing their safety during this extended duration. Most significantly, they slow down the natural breakdown of these products by inhibiting bacterial growth, which, if left unchecked, can result in the generation of toxins and ultimately lead to instances of food poisoning (Teshome *et al.*, 2022).

2. Antioxidants are substances that mitigate the oxidative deterioration responsible for the development of rancidity, flavour deterioration, colour changes, and the loss of nutritional value in food products. Fats, oils, flavourings, vitamins, and colourants have the potential to undergo spontaneous oxidation in the presence of oxygen when they are exposed to the air (Fliege *et al.*, 2021).

3. Emulsifiers and stabilizers serve the essential function of enabling the blending of ingredients that would typically not combine well, specifically fat and water. Once this union of the aqueous and lipid phases is achieved, stabilizers work to sustain this mixture. These additives play a vital role in the manufacturing of various products, including mayonnaise, chocolate, ice cream, homogenized milk products, and fat spreads (Cox *et al.* 2020).

4. Colorants are employed to improve the visual attributes of food products. Similar to all additives, their usage is subject to rigorous regulation and is authorized only when a demonstrable necessity exists. For instance, they may be used to restore colour that is lost during processing, such as canning or heat treatment, to maintain a consistent appearance, or for decorative purposes. Colour holds significant importance in how consumers perceive food, often indicating specific flavours (Gherezgihier *et al*., 2017).

5. Flavour enhancers elevate the inherent flavours of a food product. They can either be derived from natural sources using techniques such as distillation, solvent extraction, or maceration, or they can be artificially synthesized (Vasilaki *et al.* 2021).

3.5 A Case of Blood Plasma in Food Additives

Blood plasma, or simply plasma, is the liquid part of blood with a pale yellowish appearance. It forms the basis of whole blood, excluding red blood cells, white blood cells, and platelets. Plasma is often confused with serum but contains fibrinogen. It consists of about 91% to 92% water and 8% to 9% solids, including coagulants like fibrinogen for clotting, plasma proteins (e.g., albumin and globulin) maintaining osmotic pressure, electrolytes (e.g., sodium, potassium) regulating pH, immunoglobulins for fighting infections, and small amounts of enzymes, hormones, and vitamins (Mathew *et al*., 2023).

Blood plasma is the fluid that is part of the blood. It is the clear yellow fluid that makes up most of the fluid volume in the blood and that carries red blood cells, white cells, and platelets and distributes them throughout the body (Weatherspoon, 2021). Plasma consists of water and other compounds dissolved in it, such as proteins (such as albumin and globulin), hormones, salts, sugars, fats, and other chemicals. Plasma plays a crucial role in transporting nutrients, oxygen, vitamins, harmful substances, wastes, medicines, and many other elements in the human body. Also, plasma in food additives can be used to treat a variety of conditions, including anemia, blood clotting disorders, autoimmune diseases, severe burns, poisoning, liver disease, kidney disease, and many other health conditions (Fisher, 2018).

First, Table 1 describe the *Tasawwur* (visualization) of the new issue requires the dissection of purpose, process, and result.

Table 1. Visualization of the Subject Matter

Tasawwur of the purpose suggests the reason behind the action and use of plasma blood for food additives.	*Tasawwur* of Process indicates the procedure and instruments used whether they fall within halal or haram.	*Tasawwur* of *Maal* (consequence), describes the result of the matter which depicts an adequate measure of the propensity between the benefits and arms to the people, animals, and environment.
-**Means of food transportation** The plasma transports waste products, such as uric acid, creatinine, and ammonium salts, from the cells of the body to the kidneys. -Approximately 7 percent of the plasma is protein, it is important for tissue repair and growth. -**Means of waste transportation** Plasma carries salts, also called electrolytes, throughout the body. Without these salts, muscles would not contract and nerves would not be able to send signals to and from the brain. -**Protection against the antibody** Immunoglobulins, also known as antibodies, are proteins that protect the body against bacteria.	-(Hydrodynamic) (Centrifuge -Plasma treatment -Kinds of plasma product (Powder) (Liquid) (Spray-Dried) (Dried) -Food additives Including plasma as a constituent of the food industry in producing food additive	**Interests:** Add healthy contents such as protein and albumin. Food of high quality in taste, color, and smell and does not spoil quickly. Reducing the cost of using the alternative and producing the best product. **1.** Helps maintain blood pressure and volume. **2.** Supply critical proteins for blood clotting and immunity. **3.** Carries electrolytes such as sodium and potassium to our muscles. **4.** Helps to maintain a proper pH balance in the body, which supports cell function. Harm: -Allergy to protein and albumin. -Blood contamination containing dangerous organisms. -The moral aspect is that blood is a dirty thing and is usually recovered.

Second, Table 2 explains the *Istidlal* (seeking evidence) for new issues requires juristic and scientific evidence from a respective specialist.

Table 2. Inferencing Shariah Rules on the Subject Matter

Dalil Fiqhi (Juristic evidence)	Dalil Ilmi (Scientific evidence)
	- Presence of harm: It has been proven that the use of blood plasma is for the benefit of improving food, and it has evils and harms to humans according to the methods of treatment and the source of blood.
Primary source **- Quran:** Forbidden to you are carrion, blood, and swine; what is slaughtered in the name of any other than Allah [5:3]. He has only forbidden you ˹to eat˺ carrion, blood, swine,[1] and what is slaughtered in the name of any other than Allah. But if someone is compelled by necessity—neither driven by desire nor exceeding immediate need—they will not be sinful [2:173].	**- Purification:** It has been proven that blood plasma, which is often used in the food industry, after careful processing, has changed its shape, color, smell, and some of its characteristics. **- Natural phenomenon:** It has been proven that whoever takes blood plasma after treatment is not like someone who takes liquid blood from humans or animals, and it is not achieved that it violates the instinct.
- Sunnah: On the authority of Abdullah bin Omar, may God be pleased with them, he said: The Messenger of God, may God's prayers and peace be upon him, said: "Two dead bodies and two types of blood have been made lawful for you [Ibn Majah (n.d.) and Ahmad, (2004)]. **Secondary Source** The basis of the blood component is the prohibition	**- Custom:** It has been proven that the use of blood plasma in the manufacture of some foods is known to the owners of these industries, and it is not possible to violate private customs. **- Harmful:** It has been proven that blood plasma has a name other than blood, and the stagnation in the blood is in its form, smell, and lack of benefit, and this differs in plasma, so it does not become malignant. **- Ambiguity:** It has been proven that blood plasma ambiguously fluctuates between being blood and being something else, and after treatment and when used it is not called blood, so it is accompanied by the principle of permissibility.

Considering issues surrounding plasma blood which is a kind of blood, in Shariah, blood is generally forbidden. However, plasma blood is a kind of blood that requires professional information about its reality to be considered as blood or something else.

3.5.1 Blood plasma components' benefits

There are certain benefits in the components of plasma blood:

First, Protein: Cytokines serve as cellular signalling molecules generated by cells to facilitate communication among themselves and oversee vital cellular functions. Hormones, on the other hand, are molecules discharged by a specific organ or cell type to influence another, often located at a distant site within the body. They travel through the bloodstream to produce effects over long distances.

Secondly: Electrolytes: Sodium constitutes the predominant ion present in plasma and is the primary contributor to plasma osmolarity.

Thirdly: Amino Acid: Tissues or plasma proteins can undergo degradation, with their constituent amino acids being repurposed for the synthesis of various biological structures. This process may entail the involvement of macrophages in the gastrointestinal tract, the lymphatic system, and the lungs.

Fourth: Nitrogenous Compound: Nitrogenous waste compounds like urea are generated through the breakdown of different substances within the body. They are then transported via the bloodstream to the kidneys for elimination.

Fifth: Nutrients: Nutrients obtained from the gastrointestinal tract or other source organs are conveyed within the bloodstream, including substances like glucose, fats, amino acids, minerals, and vitamins.

Sixth: Dissolve Gases: The plasma additionally holds minor concentrations of dissolved oxygen and carbon dioxide, along with a substantial quantity of nitrogen (Thomas, 2023).

Blood can be processed into secondary products like gelatin, keratin, belts, footwear, and pharmaceutical items. Surprisingly, blood-derived products can be used in edible goods, with haemoglobin providing valuable iron for children's snacks like biscuits. Haemoglobin can also replace chocolate colouring. In Kenya, bovine blood is used to make porridge flour, combating anaemia in children. There are still issues around the use of blood plasma for food additives especially its health implication for human safety and well-being (Siti Jamilah *et al.*, 2021).

Boxman *et al*., (2017) also contended that Black Pudding products could potentially be susceptible to zoonotic threats like hepatitis E, as a consequence of inadequate sterilization and the sourcing of blood from unhealthy animals Scientific evidence indicates that there is a debated potential for bovine blood to serve as an alternative iron source for addressing anaemia in young children (Miskam *et al*., 2015). Enhancing the process of decolorizing globin from heme pigment has been proposed to improve the nutritional value of haemoglobin in the blood (Yang & Lin, 1998). Similarly, it has been demonstrated that blood used as an emulsifier in meat-based products may compromise food safety due to its higher microbial content (Jin & Choi, 2021).). There is a growing demand for halal authentication methods to detect the presence of blood derivatives in food products (Ng *et al*., 2021). Apart from scientific exposition about plasma blood, Shariah scholars have viewed the position of blood in the Quran as encapsulating every blood although there are exceptions according to the tradition of the prophet (PBUH): "Two dead bodies and two types of blood have been made lawful for you" (Ibn Majah, n.d.; Ahmad, 2004). The two permissible kinds of blood are the kidney and spleen. However, they are called a kind of blood but in reality, after being cooked are safe as human edibles. Based on the fact that they are safe to eat as cooked food, researchers might be wondering whether a similar interpretation can be given to purified blood plasma claimed to be safe for making food additives.

The question of whether to interpolate in this instance depends on three things. First, the extent of the relationship between the original case and the new case. Secondly, the reality of plasma blood purification is based on modern techniques. Finally, the existence of halal and *Tayyib* alternatives for making food additives. The process of interpolation in Islamic jurisprudence requires the presence of an original case (*Al-Aslu*) from the Quran or Sunnah textual sources. In this situation, can the above-mentioned in this study be used for analogical deduction (*Qiyās*)?

There are several three kinds of *Istiḥālah* (purification). The *Istiḥālah Sahihah* (Accepted *Istiḥālah*), is recommended for use because the transformation process involves converting halal materials with either halal or haram conversion agents, resulting in the production of halal finished products. However, the other two are not scientifically recommended for use. Second; *Istihalah Fasidah* is considered non-permissible for consumption because the combination of permissible or impermissible substances with permissible or impermissible catalysts in a blending procedure leads to the production of impermissible final products has elements of ambiguity which is strongly disliked in Islamic law. Third; (Damaged *Istihalah* and *Istihalah Mulghah* (Unaccepted *Istihalah*) because the transformation of forbidden raw

materials combined with forbidden conversion agents into forbidden end products thus remain haram (forbidden) (Jamaludin, 2018).

Halal science experts recommend paying particular attention to additives with complex implications. For example, (1) Glycerol/Glycerine is considered haram when derived from pork or non-halal meat sources. (2) Emulsifiers are deemed haram if sourced from pork or non-halal origins, such as blood. (3) Edible Bone Phosphate (E542) is classified as haram if obtained from pork or non-halal meat sources. Nevertheless, there are safe sources of additives that can be used. For instance, Curcumin/Turmeric is considered Halal when it is pure ground turmeric powder or granular. Similarly, Tartrazine is Halal when used as a 100% dry colour, and Quinoline Yellow is Halal under the same condition. Indigo Carmine/Indigotin is Halal when used as a 100% synthetic colour without the addition of pork glycerine. Chlorophyll is Halal when used in its 100% powder form or when water or vegetable oil is used as a solvent. Carbon Black/Vegetable Carbon (Charcoal) is Halal when used as a 100% dry colour. Potassium Bromate is a compound used to treat flour and is considered Halal. Other Halal compounds used to treat flour include Chlorine, Chlorine Dioxide, and Azodicarbonamide. Additionally, Maltol and Dimethylpolysiloxane are suitable for use as flavour enhancers. When it comes to Halal glazing agents, Beeswax falls under the miscellaneous category, and Carnauba Wax is considered Halal (Muslim Consumergroup, n.d).

4. Discussion

Weighing between the benefits and harms of plasma blood is a necessity in this study because the higher objective posits the need to compare the extent of benefit to harm to life, health, and economic survival of humanity. This study emphasizes the importance of adding nutritious elements to food for better taste and quality while reducing costs. It also highlights the benefits of these nutrients, such as regulating blood pressure, supporting blood clotting and immunity, and aiding the transport of electrolytes to muscles. Assists in preserving the body's optimal pH balance, which is essential for sustaining cellular function. On the other hand, this study also found that plasma blood in food additives has concerns related to protein sensitivity, blood contamination by harmful microorganisms, and the ethical perspective that often views blood as unclean and subject to reclamation.

The inference that the liver and spleen are lawful and they are blood on the permissibility of blood plasma is subject to consideration because they are not from liquid blood based on the hadith: On the authority of Abdullah bin Omar, may God be pleased with them, he said: The

Messenger of God, may God's prayers and peace be upon him, said: "Two dead bodies and two types of blood have been made lawful for you" (Ibn Majah, n.d.and Ahmad, 2004). Inferring by measuring the plasma on the animal's limb after its purification is also a matter of consideration, because the animal's limbs either contain blood or not, and neither of them can be purified unless the impurity is removed, and this is not achieved here.

However, there are claims that plasma is not blood with invalid evidence because the association of the ruling is based on the association of the cause, not the association of the names. The reason for the prohibition of blood is impurity and harm and whenever this is confirmed based on evidence, prohibition holds.

The inference that blood plasma has turned into something other than blood also seems ambiguous and may not be correct, because plasma is an integral part of blood. Evidence suggests that after treatment, its name and characteristics do not change, nor its form and function. Based on the aforementioned evidence, it is fair to assert that it is not permissible to manufacture food containing blood plasma. It is also not permissible to eat food containing blood plasma. Apart from health and medical reasons when there are no alternatives, blood plasma should not be sold or donated to manufacture food additives. Moreover, sales of food containing blood plasma may not be sold and the use of blood plasma from a forbidden source is strictly prohibited.

5. Conclusions

This study explores the Islamic perspective on halal science with a special focus on the use of plasma blood for the production of food additives. The study employed Ijtihad methodology towards this perspective which emphasized three main procedures including (i) *Tasawwur* (visualization), (ii) *Istidlal* (seeking evidence), and (iii) *Hukm* (juristic rule). The study found that plasma blood is included in the types of spilled blood prohibited for consumption based on the shariah evidence. Although there is scientific purification for a substance like plasma blood, the reality from evidence suggests that after subjecting blood plasma to treatment for purification, there seems no evidence that all constituents of blood that subject it to prohibition have been rid of, the treatment and separation do not change the reality of blood plasma from the reality of blood. The focal effective cause for the prohibition of plasma blood is because plasma and blood share the function of transporting body waste.

However, there are halal alternatives to plasma in food, therefore, halal is not left to what is ambiguous. This study concludes that plasma taken from halal blood, such as the liver and spleen of a halal slaughtered animal, are halal and good for consumption because of the

permissibility based on Shariah textual sources. Also, the plasma taken from the blood of marine animals is deemed permissible by some jurists because of the permissibility to consume marine animals. Other scholars also viewed that plasma taken from a small quantity of blood through halal slaughter seems insignificant and might be ignored. On the other hand, plasma used for food production for health purposes is exclusive as it might relates to necessity, the provision of health, and the protection of lives.

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