

## Implementation of Identification of Critical Points for the Halalness of Vegetable Materials and Their Derivative Products from an Islamic Economic Perspective

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### ABSTRACT

The aim of this research is to determine the implementation of identifying critical points for halal vegetable materials and their derivative products and the implementation of identifying critical points for halal vegetable materials and their derivative products from an Islamic economic perspective. This research uses a literature review of various main references in halal certification criteria and knowledge about ingredients and processing processes for products originating from plants (plant based products). It is concluded that vegetable ingredients in the sharia specifically mention that nothing is haram, so vegetable ingredients (vegetables) are basically halal. However, if the product is processed using additional ingredients or processing aids that are not halal, then the product status can change to non-halal. Identification of critical points for vegetable ingredients can be analyzed using a decision tree to identify critical points for halal vegetable ingredients.

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## **INTRODUCTION**

Consuming halal food & tayib is Allah's commandment, which must be carried out by all Muslims. This command can be granted by serving Allah. To consume halal food is based on faith and piety to follow Allah's commands which respect worship & provide benefits in this world & the hereafter. Otherwise, if we consume what is haram (subhat), it is an immoral act, which may bring sin & evil in this world & the hereafter. Allah SWT says that He created everything to fulfill the needs of human life: "He is Allah who created everything on earth for you" (Q.S Al-Baqarah (2): 29). This verse states implicitly or explicitly that basically all food and drinks are halal for human consumption, because they contain benefits and goodness, except for those that are forbidden because they are harmful and dangerous and are considered dirty or if the food is consumed excessively. Allah SWT has ordered all mankind to consume halal food according to His words: "O mankind, eat what is halal and good from what is on earth, and do not follow the steps of the devil; because actually the devil is a real enemy for you." (Q.S. Al-Baqarah (2): 168).

The use of vegetable ingredients and their derivative products in various industries, such as vegetable oils, snacks and cosmetic products, requires special attention to halalness. Vegetable ingredients and their derivative products can contain ingredients that have halal or haram status, so it is important to understand the halal critical point in the production process.

From an Islamic economic perspective, halal products are a very important factor in determining product quality and safety. Islamic economics focuses on sharia principles governing economic activities, including the use of halal and haram materials. Therefore, identifying the critical point for the halalness of vegetable ingredients and their derivative products is very necessary to ensure the halalness of the products produced. In the Al-Qur'an it is stated that haram food & drinks are prohibited for consumption: 1. Carcasses, 2. Blood, 3. Pigs, 4. Animals slaughtered in the name of someone other than Allah SWT, 5. Khamr or intoxicating drinks. There are very few foods that God has forbidden to eat in the world. Food on earth is basically halal, unless expressly prohibited in the Qur'an & Hadith. However, with the development of food technology, various processed food products have been created, the halal status of which is questionable (subhat). Many haram ingredients are used as raw materials, additives, preservatives in various processed products because they are more economical.

Vegetable ingredients and their derivative products can be contaminated with haram/unclean ingredients if there are additional ingredients and processing processes that do not comply with halal standards. In some industries, such as the food and cosmetics industry, the use of vegetable ingredients and their derivative products must meet strict halal standards. Therefore, it is important to identify critical halal points for vegetable ingredients and their derivative products to ensure the halalness of the products produced. This research will discuss implementation further identify the critical point of halal vegetable ingredients and their derivative products from an Islamic economic perspective.

## LITERATURE REVIEW

### *Practice of Islamic Regulations in Identification and Avoidance of Foods with Haram Ingredients*

Identifying and avoiding foods that contain prohibited ingredients is recommended by Islamic law. Today, people in non-Muslim countries may be aware that vegetable and dairy products such as bread, pastries, biscuits, chocolate, ice cream, cheese and margarine may contain prohibited ingredients. These ingredients are also found in sausages, corned beef, soups and other foods, but the labels are not clearly indicated. Many countries have laws on food labels that must indicate key ingredients, but labeling practices do not actually take Islamic rules into account. For example, ingredients referred to as animal fats, gelatin, emulsifiers, and edible fats may be derived from prohibited raw materials. Bread and other bakery products may not have ingredient labels. Because of this, it is almost impossible for Muslim consumers to ensure that food items permitted in shops are completely free of prohibited ingredients.

The food industry uses a variety of "functional" and other ingredients. It can come from discarded blood, prohibited pig tissue, or permitted sources from ruminants and plants. No Western food laws require food labels to indicate the origin of these substances, whether from animals or plants. Some of the ingredients used in food are shown below (Saepudin, 2022):

1. Gelatin and other thickening agents: Edible gelatin is made from collagen cooked from the skin and bones of slaughtered animals, such as pigs and cattle. Ingredients derived from different animals are often not processed separately and may be imported from abroad, making their origins more unclear. To make soup, gelatin is generally used. meat, pastries, ice cream, etc. Alternative thickening and firming agents of vegetable origin such as pectin, agar and alginate are of course acceptable along with gelatin of permitted animal origin.
2. Rennin and pepsin: These are used as milk coagulants to prepare cheese and can be obtained from pork shanks or stomachs. The source of these enzymes can be identified only if the manufacturer states so. The acid formed by bacteria is widely used for curdling and cheese making. This is quite acceptable.
3. Rennin and pepsin: These can be obtained from pork stomachs or calves and used as milk coagulants to make cheese. The source of this enzyme can only be found if the manufacturer states it. In general, the acids made by bacteria are used to thicken and make cheese. This is quite natural.
4. Emulsifiers such as polysorbates, monostearate, and monoglycerides can come from plants or animals.
5. Animal fats, especially lard, and their derivatives, are widely used to make a wide variety of acceptable foods, such as bread, dough, cakes, pastries, and biscuits, poultry and calf sausages, chocolate soups and sauces, margarine, and perhaps other food ingredients.

## ***Knowing the Critical Points of Food, Drinks, Medicines to Detect Halal Products, We Can Start to Understand the Critical Points (CP) that Make a Kind of Halal Product Status Questionable***

### ***1. Medicines***

Gelatin it is popular in the food industry, also used as medicine capsules. The problem is, almost all gelatin is made from pork skin & bones. Only a small amount of gelatin is made from beef and fish bones. Placenta lead medication is also haram for consumption.

### ***2. Drinks***

Drinks derived from fermented ingredients (fermented alcohol) contain high levels of ethanol, so they are prohibited. Several drinks are produced from the fermentation process:

- a. Palm wine (coconut, palm or sugar cane sap),
- b. Brem fluid (juice from sticky "tape"),
- c. Fruit juice stored at room temperature in open conditions > 2 days,
- d. Season raisins or other sweet salad soaked > 2 days,
- e. Fermented tea containing alcohol, and the like.

Some other critical points by drinks product can also come from industrial beer some other critical points by Product. Drinks can also come from industrial beer by products such as "Shandy", this drink is categorized as a soft drink by "BPOM Indonesia" because it contains alcohol.

### ***3. Food***

Food product that are not yet clearly halal & safe:

- a. Candy: Chewing on compromised components is not halal. This candy not only consists of sugar and flavorings like hard candy, but also adds chewy ingredients, generally chewing gum and gelatin.
- b. Jelly Chewy jelly is made from starch or gelatin konyaku. Other ingredients to watch out for in jelly: flavors, dyes, artificial sweeteners.
- c. Snacks Snacks like many people and children are crunchy and tasty. With various flavors such as meat, chicken, seaweed, pizza.
- d. Chocolate. The critical point of halal chocolate lies in the use of an emulsifier, a substance that functions to unite additional components that are difficult to mix. Can natural products be haram or subhat? Mineral water and gas filtering/purification process using activated carbon or other materials

## ***Halal Testing***

"Halal" is used to indicate food that is halal or permitted. Halal food not only prohibits certain ingredients and foods that are called "Haram", but also ensures that the food does not contain harmful substances, chemicals, physical ingredients, or colouring. Many times, food safety checks are carried out in laboratories using the same methods as those used for Halal foods. Specific Halal Tests: Halal certification requires proof that the product is free from alcohol in addition to standard quality and food safety testing. Alcohol in food can be a fermentation by product or synthetic ethanol added to the product.

Although alcohol is usually discovered through headspace GC analysis with FID detection, to determine the origin of ethanol, more sophisticated tools such as Isotope Ratio Mass Spectrometry (IRMS) are required.

## METHODOLOGY

This qualitative descriptive study uses phenomenology. This library research uses secondary data from scientific articles and other documents. Next, the data obtained is analyzed by making a descriptive explanation that includes words, images and symbols related to the research subject. In this research, data analysis was carried out in three stages: data reduction, data categorization, and data verification. Data reduction was carried out by cutting and simplifying all data that was relevant to this research. Then, the reduced data is categorized according to the research topic by reviewing literature from various main references for certification criteria.

## RESEARCH RESULT AND DISCUSSION

### *Implementation of Identification of Critical Points for Halal Vegetable Materials and Derivative Products*

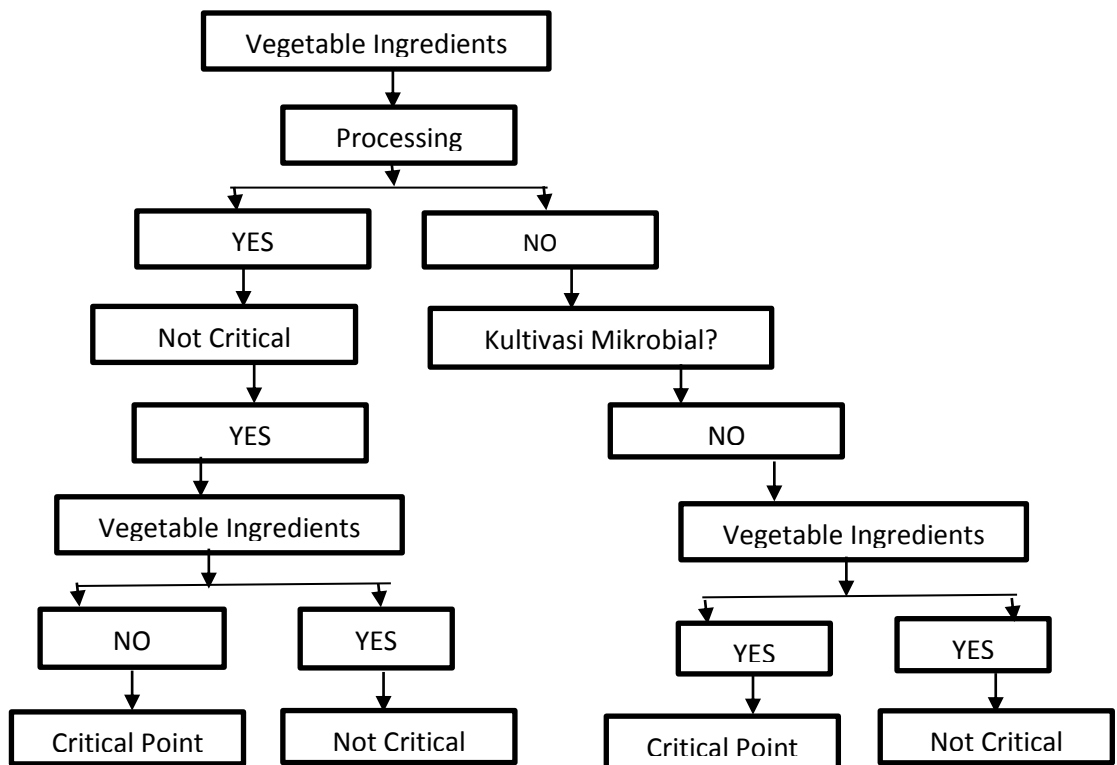


Figure 1. Decision Tree for Identification of Critical Points for Halal Vegetable Ingredients and Derivative Products

Source : (Saepudin, 2022)

By looking at the image of the critical point identification decision tree for vegetable ingredients, it can be said that plant products without processing, such as spices, vegetables, grains, nuts, and so on, are halal. The next process is to check whether there is a processing process. If there are none, then the status

is clearly halal, not critical. However, if processing occurs, it needs to be investigated further to find out whether microbial growth occurs or not. If microbial growth occurs and the fermentation process is categorized as an alcoholic drink (khamr), the product is clearly haram and cannot be used to make halal products.

However, if the fermentation process that occurs is not to produce khamr, this process is considered a critical point that cannot be missed. If there is no microbial cultivation, it is necessary to carry out processing processes, such as drying, freezing, grinding, stirring or other methods. If only a physical process is carried out without using additional ingredients, it does not affect the halal status. For example, vegetable materials undergo a drying process using an oven at a certain temperature or using sunlight to reduce the water content of the material without any additional ingredients. However, if the process uses additional materials or process aids then this is a critical point, meaning that the halal status can be decided after reviewing the halalness of the additional materials and process aids involved in the processing process.

Explanation of the explanatory decision tree above, below we will discuss several examples of processed vegetable products where additional ingredients or processing aids can change the status of the product to non-halal: (Jumiono & Rahmawati, 2020).

### *1. Dried Products*

Dried products are products that come from plants (vegetables, fruit, spices, herbs) that are processed by reducing the size and then drying them. For example, dried pepper in granular or powder form. The final product can be pure pepper without any additional ingredients, but can also be mixed with additional ingredients, for example adding fillers such as maltodextrin or lactose or adding anti-caking agents such as silicate (SiO<sub>2</sub>) or fat derivatives such as stearate. Raisin products can be added with vegetable oil so that they do not stick to each other.

The critical point in dried products is the additives, namely lactose and vegetable oils used. Lactose is a production product of cheese making which during the manufacturing process can use a coagulating agent in the form of the enzyme renin (rennet) to separate whey from milk. The halal status of rennet determines the status of milk derivative products such as cheese, whey and lactose.

### *2. Wheat Flour*

Wheat flour is made from wheat that is finely ground into flour. Wheat is a plant material that has a clear halal status and the wheat milling process only involves a physical process, however, wheat flour products made from wheat can be given additional ingredients to enrich their nutritional content (fortification). In Indonesia, there is an obligation for wheat flour producers to add nutrients in the form of vitamins and minerals according to SNI standards for wheat flour. These additional ingredients in the form of vitamins and minerals in wheat flour can cause changes in the halal status of wheat flour.

The halal status of vitamins depends on various things, including: 1) the origin of the vitamins used, whether they are animal, vegetable or microbial products. If it comes from an animal then it is halal if it comes from a halal type of animal that is slaughtered according to Islamic law, but if it is a fermented product then it is necessary to check the halalness of the production media used, and 2) Vitamins are generally unstable so they require a coating agent, especially Vitamins that have many double bonds so they are not easily oxidized.

### 3. *Oleoresin*

Oleoresin is a semi-solid extract consisting of resin and essential oils or fats obtained by evaporating the solvent used for its production. The source of oleoresin generally comes from chilies and various other types of spices. As the name "oleo" suggests, oleoresin is a product in the form of oil, but for its use in industry, oleoresin is often applied to water-based products, so oleoresin needs to be made in such a way that it can dissolve in water (water soluble or w/s). Oleoresin can become water soluble if an emulsifier is added so that oil-based products can dissolve in water-based products. This emulsifier generally comes from fat derivatives, for example polysorbate (Tween) and Glyceryl monooleate. The halal status of an oleoresin product depends on the emulsifier added.

### 4. *Vegetable Emulsifier*

As the name suggests, vegetable emulsifiers are emulsifiers that are sourced from vegetable ingredients. Examples of vegetable emulsifier products are soya lecithin and mono/diglycerides. The following are several examples of vegetable emulsifier products and their halal critical points:

#### a. *Soya lecithin*

Soya lecithin is made from soybeans which is a halal ingredient, but you need to pay attention to the presence of additional ingredients to improve its functional properties, for example by adding the enzyme phospholipase. This phospholipase enzyme probably comes from animal pancreas. Enzymes are critical materials that need to be traced to the source or production medium if the enzyme used is the result of a microbial process.

#### b. *Emulsifier*

Mono or diglyceride types can come from the hydrolysis of vegetable oils such as cottonseed oil, rapeseed oil, corn oil and others. The initial form is triglycerides and then the fatty acid chain is cut (hydrolyzed) to produce mono or diglycerides. This hydrolysis process generally uses enzymes, so the halal status of the mono or diglycerides produced depends on the halalness of the enzyme used.

#### c. *Hydrolyzed Vegetable Protein (HVP)*

HVP is widely used in the food industry to create the aroma and taste of broth without the addition of boiled bones, vegetables or other ingredients. HVP is produced from vegetable proteins such as soybeans, corn and wheat

through a hydrolysis process. This hydrolysis process can use acid (aHVP) or use enzymes. If the hydrolysis process uses enzymes, then the status is critical and it is necessary to pay attention to the halal status of the enzymes used in the hydrolysis process.

#### *5. Vegetable Oil*

Vegetable oil is oil that comes from plants, for example corn oil, soybean oil, coconut oil, palm oil, margarine, and so on. In the manufacturing process there are several critical points, namely the possibility of using activated carbon which is used in the refining process. If the activated carbon used comes from bones, it is necessary to examine whether it comes from the bones of halal animals slaughtered according to Islamic law or not.

The halalness of vegetable oil also needs to be assessed from the presence or absence of additional ingredients in the vegetable oil. In various countries, especially in America and Europe, the definition of vegetable oil can mean vegetable oil mixed with animal oil. If the animal oil content is a maximum of 10%, it can still be classified as vegetable oil. Margarine is another example of vegetable oil. The ingredients in making margarine are vegetable oils/fats, but generally apart from vegetable oils other ingredients can also be used such as emulsifiers, flavors, vitamins and colorings. So the additional ingredients in margarine are a critical point that needs to be reviewed for halalness. When using flavors, it is necessary to study the origin of the flavor components and the use of flavor solvents. When using vitamins, it is necessary to examine the source and ingredients that make up the vitamin. For dyes, it is necessary to examine the halalness of the dye source, the solvent used for liquid solvents and the coating for dry/powder dyes.

#### *6. Sugar*

Sugar products in Indonesia are generally made from sugar cane, in other countries they can come from beets, maple and stevia. The critical point in making sugar is the use of activated charcoal and resin in the refining process. Activated charcoal is critical because it may come from animal bones (bonechar). Meanwhile, the use of resin is also a critical point because there is the possibility of using gelatin in the initiation process of making the resin polymer.

#### *7. Colouring Materials*

Natural coloring ingredients can come from plants, for example bixin, chlorophyll, cantaxanthin, and so on. Bixin is obtained from the rhizome plant (*Bixa orellana*), chlorophyll for the green dye and cantaxanthin for the red dye. Dyes that come from plants generally have unstable characteristics because the compounds generally have many double chains so they are easily oxidized and change color. To increase its stability and prevent oxidation, a matrix coating is generally used. The critical point for dyes that come from plants is the use of the matrix/coating material, which can also use gelatin.

Apart from that, the critical point can also come from the solvent used to dissolve the dye. In several cases, it has also been found that emulsifiers are

used in natural dyes to make their application easier, whether dissolved in the main medium of water or the main medium of oil/fat. Emulsifying ingredients generally use ingredients derived from fat so their halalness will depend on the fat source. From a food safety perspective, it is indeed safer to use natural dyes, however, from a halal perspective, these natural dyes have a risk of being non-halal due to the additional ingredients used to anticipate the instability of the ingredients.

#### 8. *Jam*

Jam is generally made from fresh fruit with the addition of sugar, pectin, citric acid, sodium benzoate and food coloring. The critical point in this jam/jam product is the additional ingredients used. Sugar is a critical ingredient in the refining process which has the potential to use activated charcoal from bones. The addition of citric acid is also a critical ingredient because it has the possibility of being produced microbially, so it is necessary to study the fermentation media used in the manufacturing process. The use of dyes is also a critical point in terms of the extracting agent and solvent if alcohol is used, as well as the coating agent used to make the natural dye last longer.

#### 9. *Candied Fruits*

The ingredients for making sweets are generally the same as those used for making jam/jam. Generally made from fresh fruit with the addition of sugar, citric acid, coloring and flavor. The critical point is the halalness of the sugar, citric acid and coloring used. Flavor is also a critical point both in terms of the ingredients that make up the flavor itself and the use of solvents such as ethanol, triacetin and glycerin.

#### 10. *Fruit juice/concentrate*

Fruit juice on the market generally comes from fruit juice that has been concentrated and mixed with other ingredients such as sugar, stabilizers (CMC, xanthan gum, guar gum, etc.), enzymes, colorings, flavors, acids, vitamins and gelatin. The critical point in this fruit juice product is the fruit concentrate used because the manufacturing process can involve enzymes. An example of an enzyme used is the pectinase enzyme to break down the dissolved pectin in fruit juice so that the resulting fruit juice is clear. In the process of clarifying fruit juice, gelatin has the potential to be used as an auxiliary material to bind impurities contained in fruit juice. After the impurities are bound to the gelatin, centrifugation is then carried out to precipitate the gelatin which has bound the impurities in the fruit juice so that clear fruit juice is produced. So the critical point for halal fruit juice is the use of enzymes, colorings, flavors, acidifiers and vitamins used.

#### 11. *Fruit in cans*

Fruit in cans is generally made from fresh fruit with the addition of a solution of sugar, citric acid, and flavors can also be added. Canned fruit originating from sub-tropical regions is very commonly used to decorate cakes, food and drinks, such as plums, cherries, peaches and others. The critical point

in canned fruit is the sugar, acidifying agents such as citric acid and the flavors used. In my experience, it has been quite difficult to determine the halalness of canned fruit because not many have been certified halal.

### *12. Sauce*

Sauce is a thick sauce containing spices from certain ingredients such as tomatoes, chilies, and so on. However, currently there are also many "tomato flavored sauces" and "chili flavored sauces" circulating because they use raw materials in the form of papaya or sweet potato with the addition of coloring and flavor to resemble the original sauce, the addition of MSG to provide a savory taste, and acid to increase its shelf life. Sauces also often add oleoresin to increase the spicy taste. The critical point in sauce products is the critical ingredients used, namely sugar, flavor, oleoresin and MSG.

### *13. Starch and its derivatives*

Starch/carbohydrates and their derivative products such as maltodextrin, glucose syrup, fructose syrup and so on are products that have a critical point. The critical point of halalness comes from the manufacturing process. Process auxiliary materials to produce starch derivative products generally involve the use of enzymes. As previously explained, enzymes are critical products because they are probably products of animal origin that require an examination of the type of animal and how it is slaughtered. Apart from enzymes, another critical point is the use of activated charcoal for the product purification process.

## ***Implementation of Identification of Critical Points for Halal Vegetable Materials and Derivative Products in an Islamic Economic Perspective***

Implementing the identification of critical points for the halalness of vegetable ingredients and their derivative products from an Islamic economic perspective is an important approach to ensure that products consumed by Muslims meet established halal standards. This implementation requires cooperation from various parties, including government, industry and society, to ensure that vegetable products and their derivatives comply with halal principles in the Islamic economy. Thus, the implementation of identifying critical points for halal vegetable materials and their derivative products from an Islamic economic perspective can be carried out by using halal raw materials, halal additional materials, halal auxiliary materials, halal production processes, halal packaging, halal labels, halal product guarantee systems, inspection institutions halal, the Indonesian Ulema Council, and the Halal Product Guarantee Organizing Agency. Implementing the identification of critical points for the halalness of vegetable ingredients and their derivative products from an Islamic economic perspective is an approach that aims to ensure that each stage in the production and distribution chain of vegetable products meets the halal standards set by Islamic sharia. Here is a detailed explanation of the implementation:

1. Identification of Critical Points: Identification of critical halal points includes determining the stages in the production process that have the potential to cause non-halal issues. These tipping points may include:
  - a. Selection of Raw Materials, namely determining whether the vegetable materials used are free from contamination from haram or unclean materials.
  - b. Processing Process, namely ensuring that the production process is not contaminated by haram materials, for example through the use of equipment that has been used to process haram materials.
  - c. Packaging and Storage:\* Ensure that the product is not contaminated during packaging and storage.
  
2. Halal standards, namely from an Islamic economic perspective, halal standards for vegetable ingredients and their derivative products are based on sharia principles which include:
  - a. Halal means raw materials and products must come from halal sources.
  - b. Thayyib means products must be good, clean and healthy to consume.
  
3. Supervision and Certification: To ensure the halalness of vegetable products, a strict monitoring and certification system is required, such as:
  - a. Halal Certification is given by a recognized halal authority body, such as the MUI in Indonesia.
  - b. Halal Audit, namely carrying out periodic audits to ensure compliance with halal standards.
  
4. Economic Benefits, namely the implementation of identifying halal critical points provides various benefits from an Islamic economic perspective, including:
  - a. Consumer Trust by increasing consumer confidence in the products being sold, because they believe that the product is halal and thayyib.
  - b. Wider Market Access, namely halal products have a wide market, not only in Muslim-majority countries but also in non-Muslim countries that have Muslim communities.
  - c. Business Sustainability By ensuring product halal, companies can maintain business sustainability and avoid potential conflicts with sharia principles which could be economically and reputational detrimental.
  
5. Challenges in Implementation: Some of the challenges that may be faced in this implementation include:
  - a. Supply Chain Complexity, namely ensuring the halal nature of the entire supply chain can be complex and requires good coordination between suppliers, producers and distributors.
  - b. Certification Costs: The halal certification process can require quite large costs, especially for small and medium businesses.

- c. Knowledge and Awareness, namely increasing knowledge and awareness regarding the importance of halal among all stakeholders in the production chain.

It is concluded that the implementation of identifying critical points for halal vegetable ingredients and their derivative products from an Islamic economic perspective is an important step to ensure that products are produced in accordance with sharia principles and meet the needs of Muslim consumers, as well as having a positive impact on the economy as a whole.

## **CONCLUSSION AND RECOMMENDATION**

Vegetable ingredients in the sharia specifically state that nothing is haram, so vegetable ingredients (vegetables) are basically halal. However, if the product is processed using additional ingredients or processing aids that are not halal, then the product status can change to non-halal. Identification of critical points for vegetable ingredients can be analyzed using a decision tree to identify critical points for halal vegetable ingredients. Products derived from herbal ingredients can be contaminated with haram/unclean ingredients due to additional ingredients or processing processes. In implementing the identification of critical points for halal vegetable ingredients and their derivative products from an Islamic economic perspective, it is an important approach to ensure that products consumed by Muslims meet established halal standards. This implementation requires cooperation from various parties, including government, industry and society, to ensure that vegetable products and their derivatives comply with halal principles in the Islamic economy.

## **ADVANCED RESEARCH**

The following are suggestions for further research regarding the implementation of identification of critical points regarding the halalness of vegetable ingredients and their derivative products from an Islamic economic perspective, namely the development of a research methodology which is an interdisciplinary approach by combining economics, food science and Islamic studies to obtain a comprehensive understanding of the identification of critical points of halalness. vegetable ingredients.

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