Journal of Halal Research, Policy and Industry
Desember 2024
Vol. 3, No. 2

ANALYSIS OF THE HALALITY CRITICAL POINT OF GOAT MILK YOGURT AND DATE (*Phoenix dactylifera*) EXTRACT FORTIFICATED WITH ZINC

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Abstract: *Halal is one of the requirements for products to enter the global market, one of which is Indonesia. Law No. 23 of 2014 concerning halal product guarantees has a mandate regarding the demand for the government to form a Halal Product Guarantee Organizing Agency. This study aims to determine the critical point of halal goat milk yogurt and zinc-fortified date extract. The design used in this study is descriptive research with a literature study method. This study uses observation sheets and stationery, which are useful for writing down the results of observations at the research location. The materials used in making zinc-fortified goat milk yogurt are fresh goat milk, Lactobacillus bulgaricus and Streptococus thermopillus bacteria, zinc sulfate monohydrate, and ajwa date extract. Critical Points of Halal Goat Milk Yogurt and Zinc Fortified Date Extract in terms of ingredients are Lactobacillus bulgaricus and Streptococcus thermopillus bacteria, Zinc Sulfate Monohydrate, and Ajwa Date Extract while in terms of process is during the fermentation of yogurt at a temperature of 37 C for 24 hours. Suggestions that can be taken from the study are that it is hoped that further researchers can dig deeper by using more journals or previous studies to get more detailed results related to this descriptive study. At the same time, the general public and producers can pay attention again to the composition and process of the product.*

Keywords: *Critical Point, Halal, Yogurt, Goat Milk, Date Juice (Phoenix dactylifera), Zinc.*

INTRODUCTION

Indonesia is a country with a majority Muslim population. Islam teaches us to practice Islamic law in society (Hapsari et al., 2022). The most important thing is according to the guidelines for life for Muslims, namely regarding halal and haram. Allah SWT taught the first halal matter through the revelation of the Prophet Muhammad SAW. The concept of halal in the food industry has been explained in detail in the Qur'an and hadith (Kurniadi & Frediansyah, 2016). Halal food has its own meaning: food products that are more than just food. Now the public's interest in halal food products is increasing. In addition, Law No. 23 concerning halal product guarantees has been implemented gradually. In guaranteeing the products produced, a halal certificate is needed to adjust halal provisions sustainably and can continue to be traced (Fathia et al., 2022).

Halal is one of the requirements for products to enter the global market, one of which is Indonesia (Atma et al., 2017). Law No. 23 of 2014 concerning halal product guarantees has a mandate regarding the demand for the government to form a Halal Product Guarantee Organizing Agency, commonly called BPJPH. BPJPH, held by the Ministry of Religion in 2018, must function according to its provisions and consequences. BPJPH, together with the MUI and the Halal Inspection Institution (LPH), carry out various procedures by the mandate of the Halal Product Guarantee Law, but with different duties and functions according to their respective institutions. In terms of full authority in providing the Halal label, it is carried out by BPJPH. Still, the Halal Certificate is a written fatwa from the MUI according to Islamic law, which states that the product is guaranteed to be halal. Apart from the substantive or legal issues regarding the provision of halal labels on a product, there are

problems with critical points in determining the law on processed materials and halal product laboratories located in Indonesia (Purwanto, 2018). There are various methods of food processing, one of which is the biotechnology method. Biotechnology has 2 methods, namely conventional biotechnology and modern biotechnology. Conventional biotechnology means microbes used as the main ingredient in making food by fermentation, such as cheese, tape, yogurt, kefir, nata, and tempeh (Faturrohim, 2021). This conventional biotechnology can be in the form of good bacteria, fungi, and yeast. While modern biotechnology is a living thing used to produce goods and services in a complex manner and use the latest living creature technology. Biotechnology has various benefits, namely producing foods with high nutritional value, fermenting food and beverage products, and flavoring products (Faturrohim, 2021).

Yogurt ferments milk and lactic acid bacteria, namely *Streptococcus themophilus* and *Lactobacillus bulgaricus*. Yogurt was first discovered in the Middle East around 10,000 - 15,000 years ago due to the presence of lactic acid bacteria in milk stored in the stomachs of animals which were then contaminated. After that, yogurt became known as a product with good probiotic health content. Yogurt has probiotic content, vitamin content, and several other benefits for body health. Now yogurt is in great demand by the public because it is rich in health benefits. The fermentation process in yogurt uses microbes that have a critical point of halalness which can make the resulting product non-halal. The process of making yogurt also has a critical point of halalness at the stage of adding additives in the form of flavors, colorings and stabilizers (Hapsari et al., 2022). Critical points in the process of making yoghurt have 3 risks, namely the first critical point is at the stage of determining the total milk solids which can be in the form of skim powder, casein and or whey. Animals producing skim milk powder, casein or whey can come from non-halal animals, which causes the risk of non-halal. The second critical point is when a bacterial starter is added, which is usually multiplied in a medium. The composition of the bacterial growth media may contain haram ingredients. At the same time, the third critical point is the addition of food additives which may come from non-halal ingredients (Atma et al., 2017).

Etawa goat milk yogurt contains calcium, phosphorus, and vitamins A, E, and B, with a higher complex than PFH cow milk yogurt (Faiqoh et al., 2022). Date extract can be considered as an additional ingredient in goat milk yogurt. According to Wijayanti et al., (2019), active compounds in dates such as flavonoids, steroids, phenolics, and saponins in addition to functioning as free radical scavengers also act as antidiabetics. Dates can inhibit glucose absorption through enzymes that inhibit carbohydrate hydrolyses, such as a-glucosidase and a-mylasase. Food fortification is usually used to improve mineral and vitamin status, and reduce nutrient deficiencies (Kahraman & Ustunol, 2012). According to the United States Department of Agriculture Yogurt (USDA) report (2015), yogurt is a functional food product that is low in zinc. The difference from previous research is in the process and materials used when making the product.

Thus, business actors are expected to pay attention to the critical point of halalness in making yoghurt products properly. Because food processing using conventional biotechnology methods or those based on microbes, namely fermentation, tends to be more risky at the point of halalness so that it is useful for the future in making products based on microbes. Therefore, the author is interested in revealing this research with the title: "Analysis of the Critical Point of Halalness of Goat Milk Yogurt and Zinc Fortified Date Palm Extract".

CONCEPTUAL FRAMEWORK

The conceptual framework above explains the relationship between the variables involved

in this study. This study is about the critical point of a functional food product that needs to be analyzed through the ingredients and process of bacterial fermentation and making fermented goat milk yogurt with zinc sulfate fortification.

Two variables were studied, namely, ingredients and process. In terms of ingredients, there is fresh goat milk that has not been studied and there are *Lactobacillus bulgarius* and *Streptococus thermopillus* bacteria, ajwa date extract, and zinc sulfate monohydrate which are variables that must be studied. Furthermore, milk pasteurization and cooling have not been studied in terms of the manufacturing process, and yogurt fermentation for 24 hours must be studied.

METHODOLOGY

The design used in this study is descriptive research with a literature study method or commonly called a library study. A literature study is a technique for finding ideas or references to solve problems in a study. A literature study is another term for a literature study, literature review, theoretical study, theoretical basis, literature review, and theoretical review (Hapsari et al., 2022). This research was conducted in December 2023 - August 2024.

The variables in this study are the critical point of halal goat milk yogurt and date palm extract (Phoenix dactylifera) fortified with zinc. The research variable Goat milk yogurt with date palm extract and zinc fortification means Making goat milk yogurt products with date palm extract and zinc fortification. The research variable critical point of halalness means Identifying the Critical Point of Halalness of Goat milk yogurt products with date palm extract and zinc fortification in terms of ingredients and processes.

The data collection procedure in this study is by collecting primary data and secondary data, primary data is taken directly or by observation seen from the ingredients and process of making goat milk yogurt products with zinc fortification, while secondary data uses existing data, namely from literature or previous research journals related to this study. Data analysis in this literature study research uses descriptive analysis and observation results from manufacturing goat milk yogurt products fortified with zinc.

RESULTS AND DISCUSSION

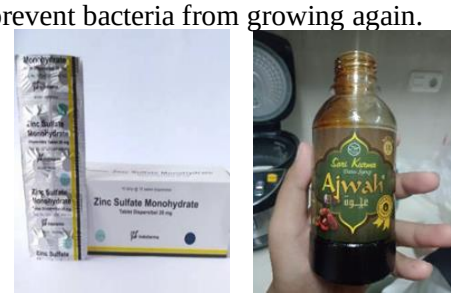
Ajwa date extract has a critical point of halalness because even though it is from halal ingredients produced by Al-Badri Surabaya, it has gone through a process and has not been registered on the BPJPH website. The next ingredient, *Lactobacillus bulgaricus* and *Streptococus thermopillus* bacteria, has a critical point of halalness because the bacteria come from the stomach of an animal whose clarity is not yet known whether it comes from a haram or halal animal, and the process of slaughtering the animal is in accordance with Islamic law. After that, zinc sulfate monohydrate has a critical point of halalness because this zinc does not yet have a halal certificate, as evidenced by not being registered on the BPJPH website. However, fresh goat milk is included in the positive list of ingredients because it is directly obtained from the Kandang Bambu Sugeng Rawo farm and has not gone through any process.

The Critical Point in Date Palm Juice refers to the research of Retnowati & Kusnadi (2014), namely that date fruit sorting is done by selecting good dates. Then the date seeds are separated from the fruit. The dates are crushed using a blender by adding water (dilution) according to the needs, namely 1:4, 1:5, 1:6. Then the date juice is filtered and separated from the pulp. The date juice that has been separated from the pulp is then blanched. Blanching is carried out to inactivate enzymes and reduce the number of initial microbes. Furthermore, the critical point of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* bacteria, supported by research by Hapsari et al. (2022) that the critical point of this stage lies in the animals that are the source of glycerol and animal enzymes used. If glycerol and enzymes are taken from halal animals and slaughtered according to sharia, then this process becomes halal and bacteria can be used for the next process. After that, zinc sulfate monohydrate is a material that has been processed so it is said to be included in the critical point of halalness

because in the manufacturing process it is still feared to be contaminated with things that do not meet the halal criteria (Halal Supervisory Agency, 2023). Meanwhile, fresh goat's milk is included in the positive list referring to KMA No. 1360 of 2021 concerning materials exempt from the obligation to be halal certified.

The fermentation process has a critical point in the time and temperature range during manufacturing because the starter concentration and the process's length significantly affect the product's success. Furthermore, the pasteurization process of milk does not enter the critical point because it aims to reduce pathogenic bacteria that are harmful to health. After that, the cooling process does not enter the crucial point because the cooling process is a process of slowing down decay but must also meet the safe time standard. If not, the bacteria will grow again.

Referring to the research of Nizori et al. (2018), the fermentation process is carried out with various combinations of temperature and time. The fermentation process is carried out at temperatures between 35^0 C - 46^0 C with a time range ranging from 3 to 24 hours to produce the best quality yogurt with a soft consistency and high viscosity. Furthermore, from the research of Nurcahyo et al. (2019), pasteurization is a heating process at a temperature below 100^0 C for a certain period that can kill milk microbes. It is hoped that this heating will kill pathogenic bacteria that are harmful to human health and minimize the development of other bacteria during heating and storage. After pasteurization, a cooling process is carried out, which is helpful in slowing down the decay time in milk with a temperature reaching 40^0 C to prevent bacteria from growing again.



(a) (b)

Figure 1. Research Materials. (a) zinc sulfate monohydrate. (b) ajwa date extract produced by Al-Badri Surabaya

Table 1. Research results in terms of materials

Materials	CRITICAL POINT / POSITIVE LIST
Susu Kambing Murni	POSITIVE LIST
Date Palm Juice	CRITICAL POINT
STLB Bacteria	CRITICAL POINT
Zinc sulfat monohydtrate	CRITICAL POINT

Source: Primary Data, 2024

Table 2. Research Results from Process Perspective

Process	CRITICAL POINT / NOT
Pasteurization	NOT
Cooling	NOT
Fermentation	CRITICAL POINT

Source: Primary Data, 2024

CONCLUSION

The conclusion that can be concluded based on the research conducted regarding the analysis of the critical point of halalness of goat milk yogurt and date extract (*Phoenix dactylifera*) fortified with zinc as follows: The Critical Point of Halalness of Goat Milk Yogurt and Date Extract Fortified with Zinc in terms of ingredients, namely *Lactobacillus bulgaricus* and *Streptococcus thermopillus* bacteria, Zinc Sulfate Monohydrate and Ajwa Date Extract. And the Critical Point of Halalness of Goat Milk Yogurt and Date Extract Fortified with Zinc in terms of the process, namely during yogurt fermentation at 37^0 C for 24 hours.

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