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Original Article

Control of the critical points for the safety of pasteurized milk in CV. Cita Nasional

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Abstract

Objective: This study aims to determine the control of critical points in the production of pasteurized milk in CV. Cita Nasional by implementing the Hazard Analysis Critical Control Point (HACCP) system.
Methods: This research was descriptive qualitative with the aim of exploring the data in depth and specifically. The data collection technique used is observation. The observation technique was used to determine the critical point of pasteurized milk production in all production chains.
Results: The control of the critical point of pasteurized milk production in CV. Cita Nasional was done by determining the source of contamination in each part of production. The source of hazard in the mixing process is contamination from tools, workers and the environment. The source of hazard in the pasteurization and homogenization process is the pasteurization time and temperature that are not fulfilled. The source of hazard in the cooling process is contamination by spore-forming bacteria that do not die during the pasteurization process. Sources of hazard during the packaging process come from packaging that is not sterile enough, contamination from workers and the environment. The source of hazard from the distribution process to consumers is product temperature fluctuations and container damage during the shipping process.
Conclusions: The control of the critical points for pasteurized milk was carried out by applying SOP and HACCP principles as an effort to prevent and guarantee products that can be consumed in a Safe, Healthy, Whole and Halal (ASUH) way.

Keywords: Critical point control; Pasteurized milk; Sanitation

INTRODUCTION

Although milk has the advantage of possessing diverse nutritional content, it also has inherent disadvantages. Milk contains properties that are easily damaged and susceptible to physical and microbiological influences [1]. The high microbial contamination in milk can pose a health risk to the public. Bacterial contamination in milk can occur from tools, suppliers or during the production process. Therefore, appropriate actions and processing are needed to improve the quality of milk [2].

The Milk Processing Industry can carry out pasteurized milk processing procedure effectively through careful handling of the appropriate packaging and storage stages, so as to produce highly nutritious dairy products. One of the factors that affect the quality of milk is cleanliness and sanitation [3]. As sanitation has a very important role in the dairy industry sector, cleanliness must be guaranteed and food safety requirements must be met [4]. Sanitation needs to be implemented from upstream (breeders) to downstream (consumers) to minimize the level of microbial contamination and obtain good quality milk.

CV. Cita Nasional is a pasteurized and homogenized milk processing company. The processing of pasteurized milk is carried out by heating the temperature at a predetermined time and using certain equipments [5]. The pasteurization process carried out according to the SNI policy is the heating process of the milk heating process at a minimum temperature of 72°C for 15 seconds which is commonly called High-Temperature Short Time (HTST) or at a temperature of 63°C for 30 minutes which is commonly called Low-Temperature Long Time (LTLT) [1]. The purpose of pasteurization is to maintain product quality by selectively controlling the growth of organisms and extending the shelf life of milk [6]. This process can kill pathogenic bacteria in milk [7].

To improve the quality of milk, it is necessary to increase food safety which is guided by the HACCP system. HACCP is a system for identifying the entire production chain from the stage of receiving raw materials to the marketing stage [8]. There are 9 stages in the production of pasteurized milk, including: 1) acceptance of fresh milk; 2) screening; 3) storage of fresh milk; 4) separation; 5) pasteurization; 6) storage of pasteurized milk; 7) packaging; 8) cold storage; 9) distribution [9]. The HACCP concept is very well used for the management of the entire food production chain as a guarantee of product quality to minimize exposure to microbes that occur [10]. The results of the application of HACCP can be used by various industries (small, medium, large) to ensure the safety of the products produced [11].

This study aims to determine the control of critical points in the production of pasteurized milk in CV. Cita Nasional by implementing the HACCP system. This control is used to prevent microbial contamination in the processing of dairy products. Effective prevention can produce safe, healthy and halal dairy products for the community.

MATERIAL AND METHODS

Location and time of research

The research was conducted at CV. Cita Nasional, Jl. Raya Salatiga Kopeng Km. 5 Sumogawe, Getasan, Semarang Regency. The research was conducted in August 2022.

Research methods

This research is descriptive qualitative and, aims to explore data in depth and specifically [12]. The data collection technique used is observation. Observations were made to analyze the sources of hazard at critical control points of the production process. Regarding operations for quality assurance, the SNI ISO 9001: 2015 states that organizations must plan, implement and control processes which must meet the requirements of products and services and to implement measures. These processes are determined by: determining requirements for products and services; establish criteria for product and service acceptance processes; determine the resources needed to achieve product suitability and requirements; implement controls over processes that comply with the criteria; determine, maintain and retain documented information to ensure that processes have been carried out as planned to demonstrate suitability of products and services in accordance with service requirements. To implement this, CV. Cita Nasional makes GMP and SSOP based on HACCP and SNI. The GMP and SSOP are used as quality assurance for pasteurized milk products. It contains the framework in determining critical control points in the pasteurized milk production process. The critical control points are outlined as three types of measurements, namely the chance of contamination, the level of severity and significance based on food hazard conditions. Chance of contamination indicates the possibility of contamination in the production process. Severity is how severe the hazard is causing damage to the material. Significance refers to whether or not the contaminated material can still be used in the production process. As for the quality assessment of CV. Cita Nasional outlined three levels of pollution, namely low, medium and high. The quality assessment at this level of pollution is used to assess the chance of contamination, severity and significance. The pollution level is said to be high if the conditions can be controlled, but it can increase to an unsafe level. Pollution level is moderate if conditions can be controlled by reducing to safe limits. Pollution level is low if conditions can be controlled and no hazard will occur.

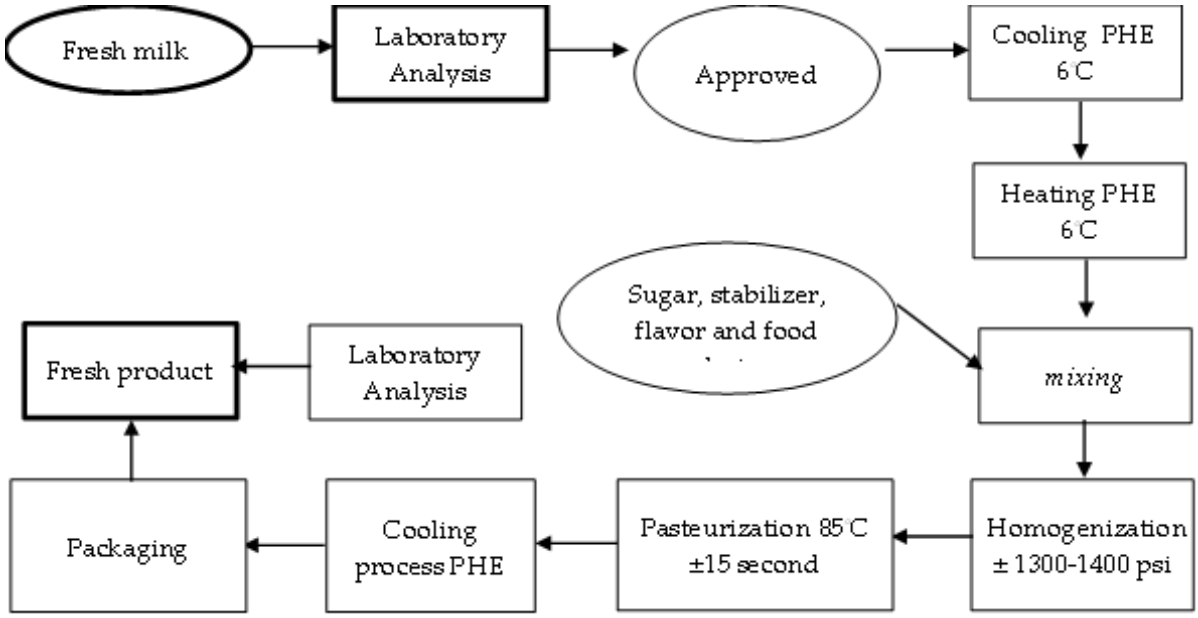

Figure 1. Production flow of CV. Cita Nasional

Data collection was done by evaluating sources of hazard and critical points in each process based on SNI 3951:2018, namely: 1) Fresh milk has a source of hazard that often occurs, namely biological in the form of microorganism growth, physical from cow dung and chemical from antibiotics. Critical point testing can be done by testing milk samples during the receiving process from suppliers; 2) Mixing contains a source of biological hazard in the form of spore-forming microorganisms and physical in the form of dust, hair and metal. Critical point testing can be carried out by adding sugar which is carried out in a sterile room first and the ingredients are stored in a sterile place; 3) Pasteurization and homogenization have a source of biological hazard in the form of pathogenic microorganisms. Critical point testing can be carried out with the use of proper pressure and temperature; 4) Cooling contains sources of biological hazard in the form of microorganisms, mold and yeast. Critical point testing can be carried out by cooling to an appropriate temperature; 5) Filling and packaging contain sources of biological hazard in the form of microorganisms, mold and yeast, physical in the form of dust and, hair and chemical in the form of alcohol. Critical point testing is carried out under overall supervision to prevent contamination from workers and packaging; 6) Distribution and retail contain sources of biological hazard in the form of mold, yeast, *S. Aureus*, *Clostridium sp.* and *Bacillus sp.* Critical point testing is carried out by monitoring the distribution with periodic checks (Figure 1).

The research sample used was pasteurized milk obtained directly from CV. Cita Nasional. This research is descriptive qualitative, aims to explore the data in depth and specifically [13]. The data collection technique used is observation. Observations were conducted using SNI ISO 9001: 2015 guidelines, the Food and Drug Supervisory Agency *(BPOM)* and the Food Research Institute guidelines. Medicines and Cosmetics of the Indonesian Ulama Council (LPPOM-MUI) guidelines were followed at each stage, namely receiving fresh milk, filtering, storing fresh milk, separating, pasteurizing, storing pasteurized milk, packaging, cold storage and distribution. Furthermore, observation was carried out to collect data for determining the critical point of pasteurized milk production in all production chains.

RESULTS

CV. Cita Nasional is a company engaged in milk processing. Milk processing cannot be separated from sanitation activities, process control, quality control and material transfer. Sanitation has the goal of preventing contamination of microorganisms or hazardous materials that can change product

quality. In the food industry, many systems have been developed that can guarantee quality from raw materials to consumers (from farm to table), such as HACCP.

The HACCP system can be interpreted as a management to ensure the safety of food products in the food processing industry by using a logical, systematic, continuous and comprehensive approach concept. HACCP certification is required by the food processing industry to guarantee that the products produced are safe for consumption by the public. Therefore, CV. Cita Nasional must fulfill 2 prerequisites to obtain HACCP certification, namely Good Manufacturing Products (GMP) and Sanitation Standard Operating Procedures (SSOP). In the pasteurized milk production process at CV. Cita Nasional carried out HACCP assessments on: 1) Raw materials, additives and packaging materials (Table 1) and 2) Milk pasteurization processing (Table 2).

Hazard analysis in raw and packaging materials

The results of determining the HACCP system of raw material and packaging at CV. Cita Nasional is shown in Table 1.

Raw material

The raw material needed in the manufacture of pasteurized milk is fresh milk that comes from the village unit corporation around this area. Fresh milk sent to CV. Cita Nasional uses tanker trucks equipped with coolers to maintain the temperature of fresh milk so it does not spoil. The tank is made of stainless which has 2 parts, namely the inside and the outside, and is equipped with an insulator so that the temperature in the tank does not easily rise. Fresh milk has a moderate chance of hazard, or if it is prevented it does not cause a high chance of hazard. However, if the milk is contaminated, the hazard causes a high degree of severity which will cause damage to the finished product. Physicochemical tests include organoleptic tests (color, flavor, aroma), temperature tests, alcohol tests, pH tests, fat tests, MBRT tests, resazurin tests, carbonate adulteration tests, glucose tests, vegetable fat tests, total solids tests, peroxide addition tests, and antibiotic tests.

CV. Cita Nasional has an SOP that is used when receiving milk. The SOP explains the requirements for the process of receiving milk. If the milk does not meet the requirements, the milk will be rejected. After the milk has been analyzed in the laboratory, the milk is transferred using a hose which will then be channeled into a tank containing fresh milk. Then the fresh milk is cooled using a Plate Heat Exchanger (PHE) with a 4°C temperature and the fresh milk can be processed. Fresh milk has a moderate chance of hazard, but if prevented, then it does not have a high chance of hazard. However, if the milk is contaminated, the hazard causes a high degree of severity which will cause damage to the finished product. High significance means that the material contaminated with a hazard cannot be used for further processing.

The manufacture of pasteurized milk in CV. Cita Nasional uses sugar as a sweetener in its products. Each pasteurized milk manufacture uses about 7% sugar. Examinations carried out on granulated sugar as a sweetener in the process of making pasteurized and homogenized milk are organoleptic tests and brix tests. The source of hazard from sugar is the quality of the sugar or during storage. Contamination from Clostridium spore bacteria is caused by contamination carried by bees, while physical contamination in the form of hair and metal can be caused by workers and storage. Sugar has a high chance of being contaminated by microorganisms if the storage area is not clean. Preventive measures are needed, such as sterile storage so that no physical objects are mixed in the sugar.

The flavor used is a liquid flavor agent and has a reddish color. The flavor agent used has various codes. Strawberry flavor has code D1 04231 and chocolate flavor has code D1 04253. The type of dye used in the manufacture of pasteurized Ponceau 4R milk for strawberry flavor and Sunset Yellow 216 for orange flavor. Ponceau 4R is a synthetic dye made from natural pigments from plants which are usually also used to make candy or to give color to syrup products. The source of the danger of contamination of flavors and dyes is contamination by suppliers. The chance of contamination of the flavor is very low because

the flavor is in liquid form which is sealed until it is used in the production process.

Packaging

Pasteurized milk products in CV. Cita Nasional is packaged in 3 types, namely 150 ml cups, 450 ml pillows and 110 ml minipacks. Chocolate, strawberry, mocha and vanilla flavors are available in the packaging of pasteurized milk cups. Pillow packs are available in pasteurized milk with chocolate, strawberry, sweet white and plain flavors. The source of packaging contamination is from workers during the packaging and storage process, causing contamination by spore microorganisms.

Hazard analysis in pasteurized milk process

The results of determining the HACCP system of the pasteurized milk process at CV. Cita Nasional is shown in Table 2.

Mixing

The mixing process is the mixing of raw materials for the manufacture of pasteurized milk products. Mixing begins with adding additional ingredients such as carboxymethyl cellulose (CMC), whey and sugar, which are put into the mixing funnel then put into a special mixing tank. After that, it is mixed with fresh milk in the tank. The mixing process uses a tank that has an agilator to assist the mixing process. The tank is made of stainless steel. At the time of mixing, heating was carried out using a Plate Heat Exchanger (PHE) at a temperature of 50-600C for 15 minutes. The source of the contamination hazard in the mixing process comes from biological sources such as mold and yeast microorganisms. Meanwhile, the source of the hazard of physical contamination comes from dust and adhering hair. The chance of contamination as a source of hazard from the mixing process is moderate, so the severity of the production process is also low.

Pasteurization and homogenization

The first cooling process was done at a temperature of 15°C for 5 minutes using a plate cooler. The mixed milk is transferred to the intermediate tank. In the tank, we added additional ingredients such as flavor and coloring. Intermediate tanks are tanks that store semi- finished products that have not undergone pasteurization and homogenization processes, but the mixing and blending processes have been completed.

Semi-finished milk products will be transferred to the balance tank. In the balance tank, controlling the speed of milk entering and exiting is carried out. After that, pasteurization was carried out using PHE which had a temperature of 60°C and homogenization was carried out using a homogenizer. The homogenizer used by CV. Cita Nasional is made from stainless steel and has a pressure of 1300-1400 Psi. Then the milk is heated again using PHE for 15 seconds at a temperature of 80-85°C. The PHE used is made from stainless steel and has regenerative properties. The regenerative system of PHE is divided into 3 parts, including regenerative PHE, pasteurization and plate cooler.

The source of critical point from the pasteurization and homogenization process is insufficient heating temperature and time. The pasteurization process is a process of heating milk which aims to kill pathogenic bacteria and spoilage bacteria at a temperature of 80-85°C for 15 seconds. If the pasteurization temperature is not met, then the pathogenic bacteria are still able to survive, and thus the milk product will not last longer than the shelf life of pasteurized milk, which is around 7 days. The chance of microorganism contamination during the pasteurization process is very low because the heating process inhibits the growth of microorganisms.

Cooling

The cooling process uses PHE until the temperature reaches 21°C. Furthermore, the milk will be cooled again using a plate cooler until the temperature reaches 4°C. After the milk has undergone a second cooling, it is collected into tanks to keep the milk cold. At this stage, laboratory testing is carried out to see the quality of the finished pasteurized milk product. If the yield of dairy products conforms to the standards, then the milk will be packaged. The source of hazard from the cooling process comes from spore-forming microorganisms.

Table 1. The results of determining critical control points at raw, food supplement and packaging materials

No	Process Stage	Hazard	Opportunity	Severity	Significance	Hazard Source	Critical Point
1	Fresh milk	• Biological: microorganisms (Salmonella sp., E. coli, S. aureus	S	T	T	• Contamination during milking and contamination from air, tools, workers during quality inspection	• Pasteurization of fresh milk to reduce contaminants. The hazard will disappear at the High Pasteurization stage.
		• Physical: cow dung, dust	S	R		• Contamination during milking and quality testing when receiving milk	
		• Chemical: antibiotics, aflatoxins and pesticides	R	T	S	• Animal feed, medicines	
2	Sugar	• Biological: spore forming microorganisms (Bacillus cereus, Clostridium perfringens), insect	T	R	S	• Contamination fromsuppliers, worker handling and storage	• Monitoring the condition of the storage room because there is a big chance of contamination if no precautions are taken.
		• Physical: thread, hair, metal lead, tin, copper	R	T	S	• Contamination fromsuppliers, worker handling and storage	
3	*Flavor* and dye	• Physical: metal	R	T	S	• Contamination from suppliers	• Monitoring the condition of the storage room because there is a big chance of contamination if no precautions are taken.
4	Packaging	• Microorganisms: spores (Bacillus, Clostridium, Mold and Yeast)				• Suppliers and workers during handling and storage as well as from the air	• Overall supervision of packaging and workers so that they are not contaminated with microorganisms.

T = Height; S = Moderate; R = Low

Table 2. The results of determining critical control point at Pasteurized and homogenized milk production process

No	Process Stage	Hazard	Opportunity	Severity	Significance	Hazard Source	Critical Point
1	Mixing	• Biological: spore-forming microorganisms (B. cereus, C. perfingens, Koliform), insect	S	R	R	• Contamination from tools and workers	• Sugar is sterilized by heating it first by making a sugar solution
		• Physical: dust, hair, metal	S	R	R	• Contamination from tools and workers	• Flavor is stored in sterile packaging
2	Pasteurization 82-85^{0}C, 15 minute	• Biological: pathogenic microorganisms (Salmonella, Enteropathogenic, E. coli)	R	T	S	• Insufficient heating temperature and time	• The use of the right temperature after that is done cooling to provide optimum conditions for the starter
3	Homogenization 1300-1400 psi	• Biological: pathogenic microorganisms (Salmonella, Enteropathogenic, E. coli)	R	T	S	• Insufficient temperature, pressure and homogenization time	• The use of appropriate pressure and temperature after that is done cooling to inhibit microbial growth • This process is designed to reduce the hazard until it is safe.
4	Cooling 4^{0}C	• Biological: Mold and yeast microorganisms, thermoduric microorganisms	T	R	S	• Bacterial spores that have germinated, as well as contaminant microorganisms from the addition of sugar that have not died	• Cooling process to inhibit bacterial growth.
5	*Filling* and Packaging	• Biological: mold and yeast microorganisms, Staphylococcus Aureus, Clostridium sp and Bacillus sp	T	R	S	• Contamination from less sterile packaging, tools, workers and the environment	• Overall supervision of the sterilization of packaging and workers so as not to be contaminated with microorganisms again
			S	R	R	• Contamination from less sterile packaging, tools, workers and the environment	
		• Physical: dust, hair					
		• Chemistry: Alcohol	S	S	S	• Contamination from alcohol (use of alcohol as a sterilizer)	
6	Cold distribution and retail	• Biological: mold, yeast, S. Aureus, Clostridium sp and Bacillus sp	T	R	S	• Temperature fluctuations and packaging damage	• Re-checking the packaging before the distribution process takes place, repairing raw materials for packaging and monitoring distribution temperature

T = Height; S = Moderate; R = Low

Filling and packaging

Finished milk products that are in the tank are flowed using a filling machine using a pump in the tank. During the packaging process, a filomatic in-line cup filling device is used to fill the milk into the cup packaging and sealing to close the cup packaging. The temperature used in the sealing machine reaches 200°C. In addition, the tool used is a pure pack machine which functions to fill and pack milk according to the packaging type (pillow) packaging. Pasteurized and homogenized milk products that have been packaged in primary packaging are then arranged in crates which are the product's secondary packaging. The source of hazard from the filling and packaging process is biological contamination, namely mold and yeast microorganisms originating from unsterile packaging, tools, workers and the environment. The chance of a source of hazard from the cooling process is very high if no precautions are taken. Milk must be packaged immediately and given another cooling process to keep the temperature stable. Unstable milk temperature will cause damage to the product.

Distribution and retail

Pasteurized milk products that have been packed and arranged in crates are then loaded into transport trucks. Transport trucks have temperature control so that the temperature of the milk products remains stable during the distribution process. The distribution pattern used by CV. Cita Nasional is the following: producers - agents - retailers - consumers. Pasteurized milk from CV. Cita Nasional is sold to general consumers through the use of intermediaries, agents and retailers. Sources of hazard from the product distribution process are temperature fluctuations and packaging damage. The temperature in pasteurized milk products must remain at 4°C. The increase in milk temperature will lead to accelerated growth of microorganisms. Therefore, the shelf life of dairy products is reduced. The chance of product damage in the distribution process is very high. This is because during the distribution process there will be a temperature change in the milk product.

DISCUSSION

Based on the results of the research above, sanitation activities are the main aspect that receives special attention in the industrial sector, especially the dairy processing industry [7]. Prevention of bacterial growth and control of spoilage in milk can be minimized by carrying out effective sanitation [13]. In CV. Cita Nasional, sanitation activities play an important role in preventing microbial contamination to produce quality milk products. In addition, sanitation also aims to produce dairy products that meet predetermined food safety standards [6]. Sanitation activities in CV. Cita Nasional are room sanitation, equipment, employees and pest control.

Room sanitation relates to the cleanliness of the milk processing production room, packaging, storage and all rooms around CV. Cita Nasional. Cleanliness of the room and environment determines the quality of dairy products to prevent microbial growth [14]. Equipment that is not good and clean is also a risk factor for bacterial contamination meaning that sanitation activities are needed on the equipment used [15]. Meanwhile, other pollutants can be in the form of hair from employees and insects [16]. Sanitary activities carried out thoroughly during the processing, packaging and distribution process will produce hygienic milk products, which have a long shelf life and are safe for consumption by the public [14]. In order to maintain the quality of milk production, most of the food industry implements a system to be able to provide quality assurance to consumers, such as implementing the HACCP system. HACCP is a system implemented in the food sector to ensure that the food produced is safe for consumption [8]. HACCP implementation must be implemented throughout the food chain, starting from milk collection, processing, storage to sale to consumers [10, 17]. In order to guarantee food safety and quality for consumers, every company requires HACCP certification, including CV. Cita Nasional that must meet the certification requirements in the form of GMP and SSOP.

GMP is a procedure used to control food processing conditions including production

hygiene, equipment design, hygienic facilities, maintenance and sanitation [18]. Meanwhile, SSOP is a sanitation program that aims to improve the quality management and safety of dairy products [19]. Both of these conditions must be carried out optimally to obtain HACCP certification. If the company is able to implement the HACCP system effectively, it can contribute to controlling the level of food safety [20].

Pasteurized fresh milk by CV. Cita Nasional comes from the local village unit corporation. There are several sources of hazard that can reduce the quality of milk, namely biological, physical and chemical hazards [2]. Biological contamination can occur due to the development of microorganisms, such as *Salmonella sp.*, enteropathogenic, *E. coli*, and *S. aureus* [21, 22]. Prevention can be done through the pasteurization process with certain equipment and temperatures [4]. Other sources of hazard are physical hazards in the form of dust and cow manure, and chemical hazards in the form of antibiotics, aflatoxins and pesticides. Dust can occur due to an unsanitary environment and vehicle fumes from tank trucks during milk delivery. Therefore, proper handling is needed by following good and correct processing procedures according to GMP and SSOP [15]. In addition, CV. Cita Nasional also uses physicochemical analysis to ensure that the product safety meets HACCP standards. The analysis aims to test dairy products for microbial contamination [3].

Pasteurized milk processed by CV. Cita Nasional is given a sweetener (Brix). The sweetness standards given are in accordance with BPOM standards, namely at levels 12-13 [23]. Sources of contamination in sweeteners can come from biological or physical hazards. Biological hazards can occur due to contamination of the *Clostridium botulinum* spore bacteria [24], causing damage to the milk content making it unfit for consumption [25]. Furthermore, physical contaminants such as hair can occur through intermediary employees who do not comply with the established SOPs [16], for example not using head coverings during the process of sweetening milk. Other prevention efforts carried out by CV. Cita Nasional is the selection of sugar from suppliers who can guarantee that the sugar used is safe for consumption and tests for metal content in sugar are carried out. Sugar storage management in the warehouse also affects the quality of sugar, so it must be stored in a safe place from physical contamination such as insects.

Flavorings are used to add flavor, while colorings are used to give milk an attractive appearance. The flavors and colorings used by CV. Cita Nasional are in accordance with BPOM standards [23]. The dyes used are natural dyes. A stated by Indratmi [26], natural dyes are safe for consumption and contain additional nutrients. The hazard that can occur is contamination by metal suppliers. If cow's milk contaminated with metal is consumed, it can accumulate in the body, which can endanger health [27]. Prevention efforts that can be done by CV. Cita Nasional is to selectively choose safe suppliers.

In the process of packaging and storing milk in CV. Cita Nasional there is a hazard of contamination with spores, such as *Bacillus*, *Clostridium*, mold and yeast. The bacteria spores can survive in milk processing and can damage dairy products [25]. Prevention that can be done is to keep the storage in dry conditions. All storage containers and containers must be cleaned and sanitized regularly [14].

Mixing is done using special equipment, in the form of a mixing tank. The use of tanks made of stainless steel must be kept clean because the contamination of biological bacteria such as *B. cereus*, *C. perfingens* and coliform can grow from the equipment used. Therefore, storage areas and equipment must be in a clean condition when used [19]. Other factors for the growth of bacteria in milk are physical hazards from workers and exposure to dust. Dust becomes an indirect source of contamination resulting in the development of coliform bacteria [28]. Prevention that can be done by CV. Cita Nasional workers is to adhere to apply SSOP guidelines to minimize hazards during production [20] and carry out sanitation of equipment such as flushing milk line pipes and mixing tanks [14].

Pasteurization and homogenization processes are processes that must be considered because insufficient heating time

Table 3. Pasteurized milk food safety certification results CV. Cita Nasional

No	Certification	Results	Information
1	SNI ISO 9001:2015	Verified	Able to implement a quality management system that meets standards
2	National Agency of Drug and Food Control (BPOM)	B	Has implemented Good Processed Food Production Methods with the results of the assessment CPPOB B (Good)
3	Institute for the Study of Food, Drugs and Cosmetics Indonesian Ulema Council (LPPOM- MUI)	B	Assumed to have implemented the Halal assurance system in the Fair category

and temperature cause contamination of pathogenic bacteria. Prevention can be done by monitoring the adequacy of time and temperature, calibrating temperature gauges and monitoring the performance of heating devices. Pasteurization must be carried out correctly according to SNI policy, namely the process of heating the milk at a minimum temperature of 72˚C for 15 seconds, which is commonly called High Temperature Short Time (HTST) or at 63˚C for 30 minutes, which is usually called Low Temperature Long Time (LTLT) [2]. This pasteurization aims to kill pathogenic bacteria and extend the shelf life of milk up to 7 days [13,29].

The cooling process aims to guarantee microbiological quality. The cooling process can be carried out at a temperature of 4-7°C. The hazard that can occur is the development of spore bacteria. Efforts to prevent this hazard are by accelerating the cooling process in order to inhibit the growth of spore bacteria. Refrigeration does not cause a lack of nutritional value in milk [27], but can extend the shelf life of milk and reduce the rate of microbial growth.

The stages of filling using a pump and packaging into packages and arranging them in crates must be kept clean so that the milk products remain hygienic. Bacteria that can develop, for example mold and yeast. The contamination of these two bacteria can cause dairy products to spoil quickly [14]. Changes that will occur are abnormal product appearance and distorted odors. Prevention can be done by sterilizing the tools used and keeping the environment clean [15,28].

Completely packaged dairy products can be distributed to consumers through producers. Milk is transported using trucks equipped with refrigeration equipment to extend the shelf life of the milk. The temperature used when shipping to consumers is around 4˚C. In addition, the monitoring of temperature is still being carried out and the packaging remains closed. This aims to minimize microbial contamination during shipping [26]. Shipping in the right way must be implemented to provide safe and healthy quality milk to consumers [19]. Overall, the results and discussion show that the quality assurance system and food safety for pasteurized milk products at CV Cita Nasional are in accordance with HACCP procedures and comply with SNI ISO 9001: 2015, BPOM and LPPOM-MUI (Table 3).

CONCLUSION

Control of the critical points for the safety of pasteurized milk in CV. Cita Nasional is carried out by determining critical points for sources of hazard or contamination in each part of the whole chain of pasteurized milk production at CV. Cita Nasional. The critical point assessment model with HACCP guidelines on CV. Cita Nasional requirements for raw materials, additives, packaging and milk pasteurization processes, several critical points were found in fresh milk (biological and chemical), sugar (physical) and flavorings (physical). As for the production process, critical points were found in the process of pasteurization (biology) and homogenization (biology). However, with the SOP that has been implemented, this can be controlled. Applying SOP and HACCP principles as well as sanitation of tools, workers and the environment is an effort to guarantee that pasteurized milk products from CV. Cita Nasional can be consumed in a Safe, Healthy, Whole and Halal (ASUH) way. Pasteurized

milk production process in CV. Cita Nasional were in accordance with SNI ISO 9001: 2015, BPOM and LPPOM-MUI.

CONFLICT OF INTEREST

There is no conflict of interest in this research related to published articles, both in terms of article writing and funding.

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