Study *of Hazard Analysis Critical Control Point* **(HACCP) On Unlabeled Soft Drink Products Sold by Street Traders In Banda Aceh**

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Abstrak : Peredaran minuman ringan tak berlabel yang dijual oleh pedagang kaki lima dalam proses produksi masih diragukan keamanannya sehingga menimbulkan keresahan pada masyarakat. Oleh karena itu, perlu pengetahuan tentang food safety knowladge and practice. Untuk meningkatkan kualitas dan keamanan produk dibutuhkan penerapan HACCP. HACCP menggunakan Panduan Penyusunan Rencana HACCP yang direkomendasikan oleh Standar Nasional Indonesia. Hasil HACCP menunjukan bahwa yang ditetapkan sebagai CCP adalah proses perebusan air mineral, penambahan pewarna/sirup/bubuk pop ice dan pengemasan. Penerapan HACCP yang sesuai akan meningkatkan kualitas dan keamanan produk minuman ringan tak berlabel yang dijual pedagang kaki lima.
Kata kunci : Minuman ringan, HACCP
Abstract : Circulation of unlabeled soft drinks sold by street vendors in process production still questionable safety, causing unrest in society. Therefore, need to be knowledgeable about food safety knowladge and practice. To improve the quality and safety of products required the application of HACCP. HACCP using Plan Preparation Guide of HACCP recommended by the Indonesian National Standard. The results of HACCP showed that the CCP is defined as mineral water boiling process, the addition of a dye / syrup / powder pop ice and packaging proceses. The HACCP application suite will improve the quality and safety of products not labeled soft drinks sold hawkers.
Key word : Soft drink, HACCP

1. INTRODUCTION

Nowadays, the development of science and technology led to huge changes to the lifestyle of people, especially in meeting the needs of nutrition and food processing. According to the Head of National Agency for Drug and Food Control the Republic of Indonesia No. HK. 00.05.52.4040 about food category is non-alcoholic beverages in the form of processed drinks in powder or liquid additive containing both natural and artificial foods are packaged in ready for consumption. However, in the process of production of soft drinks is still questionable safety.

The circulation of unsafe soft drink products on the market raises anxiety in the society; so they need more knowledge about food safety knowledge and practice. Therefore, as is food safety knowledge and prectice, there is a possibility for the society to avoid the consumption of dangerous beverages [1]

Hazard Analysis Critical Control Point (HACCP) is a system of control in preventing the occurrence of problems that is based on the identification of of critical points in the stage of handling and production processes [2]. HACCP is used to prevent the occurrence of hazards that can be used as a guarantee of food quality in meeting consumer demands. Accordingly, in the presence of HACCP is expected to prevent the risk of complaints because of the dangers in food [3].

The phenomenon of poisoning cases in unlabeled soft drinks that are sold by street vendors has become one of the most serious issues requiring special attention and special handling of the production of soft drinks. The purpose of this research is to know the application of HACCP on unlabeled soft drink products that are sold by street vendors in banda aceh.

2. METHODOLOGY

In the method of the research, samples that will be used as research object are unlabeled soft drinks sold by street vendors. Sampling was done in several places of soft drinks street hawkers in some areas of Banda Aceh. The method of the research used is descriptive research, with the steps as follows;

a. Direct Data Collection (Field Study)

- Interview

The interview conducted directly with the street vendors whom selling unlabeled soft drinks.

- Observation

The observation was made directly about the condition of activities at the location of the street vendors.

b. Indirect Data Collection (Literature Study)

- Study Literature

In collecting the data, it was collected by utilizing the data available in books, articles, journals and other sources and relates it to the data obtained from the result of the research in the Laboratory.

- Data Documentation

Once the data is collected, the data were documented and recorded on the data results from the research and implementation of the activity.

- HACCP Planning System

In this stage, it was applied from HACCP principles.

3. DISCUSSION AND RESULT

a. HACCP Team Building

The establishment of the HACCP team consists of 3 (three) people, 2(two) persons from the same educational background and 1 (one) person with different educational background. The team directly involved in the field of observation process. Further, the field of observation process was established in interviews with street vendors and saw of the production process of soft drinks directly.

b. Product Description

Product description of unlabeled soft drink that is sold by the street vendors can be seen in table 1. Product descriptions aim to know the type of final product in the form of soft drinks, main composition, processing, packaging, how to store and use instructions (how to consume). [4

Table 1. Product Description of Unlabeled Soft Drink

Products	Soft Drink
Main Raw Ingredients	Water, sugar
Additives	Dye, syrup, pop icee powder
Processing	Making Process of coloured
Packaging	Plastics
Storage time	Approximately 2-3 days if stored according to standard storage (kept in cold temperatures with closed and not leaked)
Storage suggestions	Avoid direct contact with the sun, hard impact and leaks.
How to use	Cosumed directly
Consumer	Children up to adults

Unlabeled soft drink that sold by street vendors is the own production, which is the products are some kind of coloured soft drinks such as syrup and pop ice.

c. Identification of User Objectives

This study is aimed to identify how to use soft drink produk by consumen, how to serve and consumen group who cosume the produk [5]. In using the unlabeled soft drink produks as the thirst release that can be cosumed by children up to adult. Unlabeled soft drink can be directly cosumed after the production process is finished.

d. Diagram of Flow Product

Flow diagram of production process of unlabeled soft drink can be seen in figure 1 below:

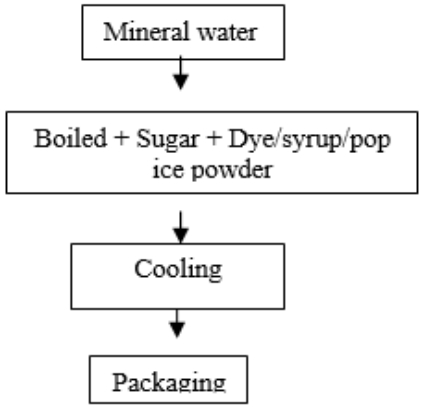

Figure 1. Making Process of Unlabeled Soft Drink

Figure 1 is a flow diagram of the production process of unlabeled soft drinks. Flow diagram of making process of unlabeled soft drink is important to determine the control stage in eliminate or reduce the occurrence of hazards and also facilitate for monitoring during the production process.

e. HACCP Application of Principles

- Hazard Analysis

Hazard analysis aims to identify hazards that may occur in the production process and the prevention that needs to be done in controlling the hazards [6]. In hazard analysis, this is done to identify hazard characteristics, so that significant or high-risk hazards should be considered in determining a critical control point.

The types of hazards present in unlabeled soft drink products include physical, chemical and biological hazards. Physical hazards include broken glass, canned pieces, stones / pebbles, twigs of wood, hair, nails and others. Chemical hazards include non-food additives, pesticide residues, heavy metals, and allergen materials. Biological hazards include the presence of bacteria, microbes and viruses. These hazards can cause various health problems in humans [7] (Murdiati, 2004).

Hazard analysis exists in the raw materials and production processes unlabeled soft drinks and that can be seen in Table 2 and

3 below:

Table 2. Hazard analyzes and significant hazard on the raw ingredients of unlabeled soft drink

No.	Raw Ingredients	Hazard	Cause of danger	Level of Risk			Control Measures
				Low	Medium	High	
1	Mineral Water	Biology : Bacteria of E. Coli Chemical: pesticide residues and heavy metals	Unboiled Mineral Water and Processed			√	Boil the water until it cooked (boiling) to ensure water used does not contain water microbes (Bacteria of E. Coli).
2	Sugar	Physical : Stones / Pebbles	-	-	√		Handling visually during the process.
3	Dye/Sweetener/Syrup/Pop Ice Powder	Chemical : Artificial food additives Physical : Contamination of foreign objects (Stones/Pebbles)	The addition of artificial colouring and sweeteners exceeds the maximum levels that be appointed by BPOM			√	The use of natural food addictives (sweeteners and dyes) The use of artificial food addictives (sweeteners and dyes) which is

Table 3. Hazards Analysis and Hazards Significants on the production process of unlabeled soft drink

No	Production Process	Hazards	Cause of danger	Level of Risk			Control Measures
				Low	Medium	High	
1	Boiling Mineral Water	Biology : Bacteria of E. Coli Chemical: pesticide residues and heavy metals	Unclean Mineral Water The heating process is not enough time to kill the microorganism			√	Boil the water until it cooked (boiling) to ensure water used does not contain water microbes (Bacteria of E. Coli) and heavy metals.
2	Adding Sugar	Physical : Stones / Pebbles	Sugar still contains stones/pebbles and another foreign objects	-	√		Handling visually during the process.
3	Adding Dye/Syr	Chemical :	The Addition			√	The use of natural

	up/Pop Ice Powder	Artificial food additives Physical : Contamination of foreign objects (Stones/Pebbles)	of dyes exceeds the maximum levels that be appointed by BPOM				food addictives (sweeteners and dyes) The use of artificial food addictives (sweeteners and dyes) which is permitted by BPOM
4	Cooling	-	-	-	-	-	-
5	Packaging	Physical: Dust of the air	Unclean Packaging Process occurs contaminations		√		The equitments of packaging process have to cleaned or sterilized first.

The main ingredient of this unlabeled soft drink is mineral water. Mineral water becomes dangerous if it is not clean or has been contaminated by bacteria and heavy metals. The occurrence of hazard to the water used comes from the use of unclean water. If it left unchecked that will reduce the quality of beverages in production. Control measures to water quality include the use of boiled mineral water until boiling so free from bacteria and heavy

metals and safe for consumption.

f. Boundary Determination of Critical Control Point (CCP)

Furthermore, any significant hazards should be defined whether it is Critical Control Point (CCP) or not. Critical Control Point (CCP) is a point, step or procedure where the controls can be applied and food hazards can be prevented, eliminated or minimized to acceptable limits. If this stage is uncontrollable it can cause a food safety hazard [8].

Based on the results of decision tree analysis for raw ingredients, it is known mineral water, sugar, dye / syrup / sweetener is not a Critical Control Point (CCP). The three of raw ingredients have significant hazards potential; however the next processing stage is considered capable of eliminating or reducing the amount of contamination to the required safe amount. In addition, cross-contamination that may occur during processing is also considered capable of being controlled

Although not considered as a Critical Control Point (CCP), raw ingredients need to be controlled and well supervision. The determination of Critical Control Point (CCP) on raw ingredients can be seen in table 4 below:

Table 4. The determination of Critical Control Point (CCP) on raw ingredients

No	Raw Ingredients	P1	P2	Information
1.	Mineral Water	Yes	Yes	Not a CCP
2,	Sugar	No	Yes	Not a CCP
3.	Dye/syrup/Pop ice powder	Yes	Yes	Not a CCP

In the process of boiling water occurs a critical point due to the used of unclean water and insufficient heating to kill water microbes. The dangers that occur the bacteria E. Coli, Shigellla, sp, from water. The control needs to be done by boiling the water first.

Critical control point (CCP) also occurs in the addition of dye. The addition of dye / syrup / powdered ice which is often used by street vendors is synthetic dye and exceeds the limit of the use recommended by BPOM. Therefore, there are health problems to the consumers. The control needs to be done with the addition

of fruit juice that produces natural dyes. The determination of the Critical Control Point (CCP) on the making process of unlabeled soft drink products can be seen in table 5.

CCP can be identified using knowledge of the production process and all potential hazards and hazard signification of analysis as well as specified preventive measures. In addition to help located the correct Critical Control Point (CCP) and should be use in the CCP Decision Tree. The decision tree chart is a logical question series that asks every danger [8]. The answers of each questions will facilitate and bring the HACCP Team to logically decide whether it is CCP or not. In the other hand to the decision tree chart for the processing, in addition to help establishc it can also be used CCP Decision Tree for raw ingredients and production processes [8].

Tabel 5. The Determination of Critical Control Point (CCP) in the Production Process of Unlabeled Soft Drink

No	Processing Stage	P1	P2	P3	P4	Information
1	Boiling Mineral Water	Y	Y	-	-	CCP
2	Adding Sugar	Y	T	T	-	Not a CCP
3	Adding Dye/ Syrup/Pop Ice Powder	Y	T	Y	T	CCP
4	Cooling	-	-	-	-	-
5	Packaging	Y	T	Y	Y	CCP

In the determination of Critical Control Point (CCP) in table 5 it can be seen there are four critical points contained in the processing unlabeled soft drink products. The four of Critical Control Point (CCP) include boiling mineral water, adding dye / syrup / pop ice powder and packaging.

Further, at the boiling step of the mineral water hazard identified that there is still water contaminated with E. coli bacteria, heavy metals and pesticide residues. Bacteria of E. coli, heavy metals and pesticide residues found in the boiling process is caused by the lack of boiling water (not reaching the boiling point) so that bacteria do not die at this stage.

The boiling process of mineral water has a high severity if it uncontrolled appropriately. The control measures carried out by

boiling mineral water until boiling (cook) reaches 100^{o}C boiling point.

The addition of dye / syrup / pop ice powder is used by street vendors so that the products sold able to attract the attention of consumers. However, the addition of dye / syrup / pop ice powder will demage the health of consumers, especially the addition of artificial coloring. The addition of artificial dyes has a high risk because of the addition of excessive artificial colouring is not in accordance with government regulations and the use of artificial colourings that are not allowed. The control measures are conducted with the addition of natural dyes derived from fruits and vegetables. The use of added dyes should be permitted by the government.

Packing process that is unclean causing contamination of foreign objects and the presence of bacteria. This packaging process has medium risk (medium). The proceeding should be performed by cleaning (sterilize) the equipment which used in the packaging process first.

g. Determination of Monitoring Procedures (Monitoring)

Monitoring is a scheduled measurement or monitoring of a CCP with its critical limits. Monitoring is also defined as a planned action from the observation or measurement of the parameters control which undertaken to assess whether the CCP is under control [9]. Monitoring procedures can be seen in table 6.

Table 6. Hazard Analysis Critical Control Point (HACCP) Table Production Plan of Unlabeled Soft Drink

Processing Stage	Critical Limits	Monitoring Procedures					Correction Measures
		What	How	Where	Who	When	
Boiling of Mineral water	Boiled water does not contain bacteria of E. coli	Water surface, taste and smell	Perform visual checking	On a water boiling place	Street Vendors	In every production process takes place	Boiling water reaches 100°C boiling point
Adding Dyes/Syrup/Pop Ice Powder	The Indonesia Minister of Health Regulation No. 722/Menkes/Per/IX/88	Level of dye given	Observing of dye administration dosage	During the process of adding dyes	Street Vendors	In every addition of dye / syrup / pop ice powder takes place	Menentukan kadar zat warna yang digunakan
Packaging	Sterile and clean	There is dirt in the packing place	Clean the packing place thoroughly	At the time of packaging process	Street Vendors	In every packaging process	Provide good and correct packaging process training

4. CONCLUSION

Hazard Analysis Critical Control Point (HACCP) on unlabeled soft drink products by the street vendors is one of the food safety control systems. It showed in the results of HACCP research indicated that the process of boiling mineral water, the addition of dye / syrup / pop ice powder and packaging are defined as Critical Control Point (CCP). In conclusion, it is necessary to get a better production process and cleanliness of mineral water as raw ingredients in accordance with the requirements. The determination of HACCP will improve the quality safety of unlabeled soft drinks sold by street vendors in Banda Aceh.

REFERENCE

[1.] Gunawan W, Popy A. 2007. Evaluasi bahaya dan penetapan titik kendali kritis pada pembuatan makanan jajanan yang dijual dikawasan wisata Baturaden Purwokerto. Jurnal Pembangunan Pedesaan. 7(3):156 – 164

[2.] Diki Nanang S, Riyanti Eka F. 2014. Kajian HACCP (Hazard Analysis and Critical Control Point) pengolahan jambu biji di Pilot Plant sari buah UPT. B2PTTG-LIPI Subang. Agritech. 34(2) : 266 – 276

[3.] Nuryani A. 2006. Pengendalian mutu penanganan udang beku dengan konsep HACCP. Tesis. Pasca Sarjana Magister Managemen Universitas Diponegoro, Semarang.

[4.] Iffa Z, Sudarmaji. 2008. Hazard Analysis and Critical Control Point (HACCP) pada pengelolaan pasien rawat inap di Rumah Sakit Islam Lumajang. Jurnal Kesehatan Lingkungan. 4(2):57 – 68.

[5.] Aminuddin F, Arif R, lely R. 2013. Desain sistem keamanan pangan Hazard Analysis and Critical Control Point (HACCP) pada proses produksi gula PG.Kebun Agung Malang. Jurnal Rekayasa Manajemen Sistem Industri. 2(6) : 1168 – 1179.

[6.] Widyana L. P, Yenny P, Fatma Z. 2010. Penerapan HACCP terhadap penurunan bahaya mikrobiologis pada makanan khusus anak berbasis hewani di rumah sakit umum daerah Dr. Soedarso Pontianak. Jurnal Gizi Klinik. 7(1):8-16

[7.] Murdiati A, Priadi S, Rachmawati Y. 2004. Susu pasteurisasi dan penerapan HACCP. JITV. 9(3):172 – 180.

[8.] Sutrisno K. 2009. HACCP dan penerapannya pada produk bakeri. eBook Pangan.

[9.] The European Commission (ALA funds) & CODEX. 2005. Buku Pelatihan Penerapan Metode HACCP.