

Integrated Supervision of Official Department Tomicrobes Existence in Elementary School Students Food

Hary Budiman¹
{haryBudiman63@yahoo.coi.id¹ }

Faculty of Public Health, University of Baiturrahmah, Padang, Indonesia¹

Abstract. : According to UU No 18/2012 concerning food states that food safety is an effort to prevent food from biological, chemical, and physical contamination. BPOM in 2017 reported a case that 16.35% of food poisoning in Indonesia came from snacks at school, and as much as 42.14% came from household snacks. The purpose of this study is to Obtain Supervision Relationships associated with the existence of Microbiology on the food quality of elementary school children. This type of research is descriptive. Snacks were sold in 19 elementary school canteens from January to April 2019. The total samples were 49 samples. Sampling was carried out in the morning until lunch break. Samples from the canteen were divided into three forms, namely dry snacks, wet snacks, and beverages with ice cubes. Laboratory test results obtained by contamination of *Staphylococcus aureus* in 1 sample (2.04%) dry snacks and *E. coli* in 3 samples (6.12%) beverages with ice cubes, and other types of bacteria 91.82% including *E. coli* and *Staphylococcus aureus*. Whereas no *Bacillus cereus* and *Salmonella* were found. Food surveillance between related sectors involving the Padang City Health Office, the police, and the media has been carried out properly and integrated.

Keywords: Supervision, The Existence of Microbiology, Snacks for School Children, Contamination Microbial Pathogens.

1 Introduction

UU No.36/ 2009 concerning health and nutrition improvement efforts to improve the nutritional quality of individuals and society. Nutrition consumption for children is from breakfast and snacks for school children. Food snacks for school children can be found in various schools and routinely consumed by most children to fulfill their needs. The average consumption of nutrition is from snacks 22.9% and 15.9% of the overall energy and protein.

Based on UU RI No. 18/2012, food safety must be a priority and need efforts to make sure that the food is free from biological, chemical, and other contaminants.

Biological contamination appeared when microbes contaminated the foods. It releases exotoxin, which will be a poison. Although it does not always cause illness, it will affect the nutritional value of food [14]. Food quality can decrease when contaminated with bacteria. In most cases, it also could bring an illness [18]. Among the factors of biological contamination are sanitation, personal hygiene, and food processing, which uses unhygienic equipment.

Sanitation and hand hygiene are also important factors in the spread of bacteria [22]. Unhygienic snacks may contain pathogenic bacteria, such as *Staphylococcus aureus* and

Salmonella sp [12]. In addition, Escherichia coli, Bacillus cereus, and Pseudomonas sp are also frequently found in the food [14]. Food contaminated by pathogenic microbes can cause disease to call foodborne [21]. Foodborne diseases are caused by Salmonella sp, Shigella dysenteriae, Staphylococcus aureus, Campylobacter jejuni, Clostridium botulinum, Clostridium perfringens, E. coli, and Listeria monocytogenes [24]. Besides other food contaminating microbes, Salmonella, Vibrio parahemolyticus, B. cereus, Proteus sp, and fungi.

The Ministry of Health states, diseases caused by bacteria through food occur because of cross-contamination, food handlers, and animals and insects. Food contaminating microbes usually enter the body through the digestive tract.

2 Materials and Method

This study was a quantitative study with a cross-sectional approach. This type of research was analytic descriptive. The research describes the relationship between integrated supervision, the presence of microbiology, and the type of contamination that predominately contaminates snacks for elementary school children. Types of food in the form of dry food and drinks in the Koto Tengah District of Padang.

Data were collected direct interviews. The tools used in the study were from the manufacturing and sterilization stages autoclaves, 250 mL Erlenmeyer, 300 mL, 500 mL, and 1000 mL, balance sheets, pH meters, hot plate stirrers, 3 mL measuring pipettes, 5 mL and 10 mL, and petridis. The sample processing stage uses Laminar Air Flow, stomacher, measuring pipette, vortex mixer, ose, electronic pipette, and tip. □

The material used is divided into liquid media and solid media and a Gram staining set. Liquid media for the S. aureus test are Pepton Dilution Fluid (PDF), Tryptic Soy Broth (TSB), Baird Parker Agar (BPA) solid media, Tryptic Soy Agar (TSA), EDTA plasma and Staph Profile Analysis (Index) Staph. The media for the Salmonella test are Buffered Pepton Water (BPW), Muller Kauffmann Tetrathionate Novobiocin broth (MKTTn), Rappaport, and Vassiliadis (RVS), and the Brilliant Green Agar (BGA) solid media and the 20 E. Media API kit for the E. coli MPN test. in the form of Mac Conkey Broth (MCB), E.Coli Broth (ECB), Pepton Dilution Fluit (PDF), Eosin Methylene Blue Agar (EMB), TSA and API 20 E kits. The media for the B. cereus test are BPBDW (Butterfield Phosphate Buffered Dilution Water), TS Polymyxin, MYP (Mannitol Egg Yolk Polymyxin Agar), TSA, Bacillus cereus Selective Supplement, Tellurite, Egg yolk, and API 50 CH kit and E. coli ATCC bacteria. 25922, S. aureus ATCC 6538, Salmonella typhimurium ATCC 14028, and B. cereus ATCC 11778 as positive controls.

Research Procedure

Sterilization of tools The glassware is sterilized using an oven at 180oC for 2 hours. The media is sterilized using an autoclave according to the packing instructions on the media. Examination of snacks for school children was carried out positive control using E. coli ATCC 25922, S. aureus ATCC 6538, Salmonella typhimurium ATCC 14028, and B. cereus ATCC 11778. For biochemical tests using API after Gram staining was done first.

The examination found 8.14% of pathogenic bacteria-contaminated snacks with E. coli and S. aureus, while B. cereus and Salmonella were not found. In addition to pathogenic bacteria, other bacteria also found 91.84% contaminating PJAS include B. thuringensis, which

grows in MYP media as well as other types of bacteria that thrive in EMB, BGA, and BPA media.

Other bacteria contaminating PJAS can come from the environment, raw materials, or from a handler, including sanitation, equipment, hygiene, and processing traders⁴. A small amount of the total sample examined still will affect the quality of snacks in microbiology because it can cause poisoning.

E. coli is a normal intestinal flora and can be found in other body tissues. The presence of these bacteria in food and drinks is an indication of the presence of other pathogenic bacteria that can cause vomiting and diarrhea. *Most Probable Number* (MPN) is an analysis method for estimating the amount of bacterial contamination. *E. coli* can be detected among Coliform bacteria by conducting 3 test stages, namely presumptive test, confirmed test, and completed test [8]. Temperature is one of the factors that influence the growth and development of bacteria. By heating it to a boil for a few minutes, it will kill the bacteria, but not to destroy the toxin [12].

E. coli can contaminate food caused by intrinsic factors and extrinsic factors. Internal factors, such as nutrient content, pH, redox potential, and water activity. It has a relationship with extrinsic factors, such as temperature, relative humidity, and gas atmosphere, which will cause it to occur. Food sampling is done in the morning before break time, it is found in the examination results that *E. coli* dominates more than *S. Aureus*, while *B. cereus* and *Salmonella* do not dominate contamination in school children's snacks.

3. Result

Table 1. Percentage of School Children Snack Foods sold in 19 Primary School Canteens contaminated with *E. Coli*.

Contamination <i>E. coli</i>	Wet food	%	Dry food	%	Drink with Ice Cube	%
Contaminated	0	0	0	0	3	6,12
No contaminated	16	100	18	100	12	93,88

Based on Table 1, it can be concluded that there was 6,12% contaminated and 93,88% not contaminated by *E.coli*

4. Discussion

4.1 Blood glucose levels

Examination results from snacks school children is the discovery of *E. coli* and *S. aureus*, which are bacteria that cause food poisoning. Although *E. coli* and *S. aureus* were found in the contamination, so it needs to be done strict quality control on food [9].

Besides the intrinsic and extrinsic processing factors that use equipment that is not washed clean and store equipment that is not feasible has a relationship with the presence of this bacterium. Another factor is that the raw water used must meet health requirements [15].

According to the RI Minister of Health No. 942 / Menkes / SK / VII / 2003 article 4 concerning Guidelines for Snack Food Hygiene Sanitation Requirements states that the water used in handling

hawker food must meet health requirements⁷. The value of MPN *E. coli* obtained in the results of this study were 43 MPN / mL, 93 MPN / mL and 460 MPN / mL based on MPN table with a variety of 3 tubes. Values are obtained from presumptive, confirmative and complex tests. All positive tubes from the MCB proceed to the ECB. While the positive ECB will be cultured into the EMB media. The positive results for *E. coli* are read using the MPN table. While the requirements set by SNI no. 7388 of 2009 was <3 MPN / mL, meaning that samples of drinks containing ice cubes did not meet health requirements as stipulated by the Republic of Indonesia Decree No. 942 / Menkes / SK / VII / 2003.

Staphylococcus aureus is often found in foods with high protein content such as products containing eggs and meat. *Staphylococcus aureus* is a normal flora of the skin and mucous membranes of humans, even so these bacteria can cause infection⁸.

Food poisoning by *Staphylococcus aureus* is closely related to the cleanliness of the handlers in processing, storing and serving food to be a major contributing factor, because it is related to the presence of these bacteria on the surface of the skin and mucous membranes. This bacterium produces enterotoxins in food and can cause gastroenteritis and inflammation of the intestinal tract [15].

Salmonella and *Bacillus cereus* were not found in snacks in this study. The existence of *Salmonella* in food is influenced by raw materials, water, and environmental cleanliness. The entry of *Salmonella* into food and drink can also be through cross-contamination in food storage and transmission through animal experiments⁶. In addition, the presence of *Salmonella* in snacks is also related to the cafeteria environment which is near the trench and near the garbage, the food being sold is not covered, and the traders do not wash their hands first when serving food [11].

The sanitation factor of the school canteen is determined by the trash, the distance of the pollutant source, and the presence of vectors. The presence of pollutant sources is closely related to *Salmonella* contamination³. Raw materials including water and basic food used, sanitation, equipment, hygiene measures for traders, and processing are also related to the presence of these bacteria in snacks [3].

Oversight by BPOM has been carried out continuously. Integrated supervision involves the police, the Provincial Health Office, Padang City Health Office, besides that it also involves the media and other relevant SKPD. Routine supervision every year, especially in the time before fasting, Eid and new year. Besides monitoring is also carried out if there is a case of poisoning, the officers also get out of the field. This can be seen from the decrease in poisoning cases each year. In increasing supervision at present there are representatives in the regions such as Dharmasraya, Sawahlunto. The approach in this policy includes, among others, the implementation of the Risk Management Program independently and continuously by drug and food producers. The availability of supervisors is the responsibility of the producer. But BPOM needs to facilitate the fulfillment of the quality of the supervisor's resources through coaching and guidance, training, as well as information media, as well as verification of that independence. Other problems in the community after being formed by the working group of the community are sometimes interrupted due to other factors such as officers who have received training to move, etc. Information and Education Communication Materials in the community need to be standardized so that they have informative content and clearly describe the message being campaigned.

5. Conclusion

From the results of the examination on children's snack schools in Koto Tengah Subdistrict were

found *E. coli* and *Staphylococcus aureus*. While *Bacillus cereus* and *Salmonella* were not found. Contamination bacteria in food can cause food poisoning because these bacteria produce toxins.

The presence of pathogenic bacteria contaminating snacks for school children even though they do not cause illness will still reduce the quality of the school children's snacks. Need further research on efforts to improve guidance and guidance in order to encourage the independence of businesses and increase community participation in providing security guarantees, especially food for school children.

References

- [1] RI POM Agency. 2013. School Children Snack Food Guidelines For Achieving Balanced Nutrition. Jakarta: Indonesian POM Agency.
- [2] BPOM. 2016. Annual Report on Drug and Food Control Agency in Padang. Padang: Balai POM Padang.
- [3] Citra Kumalasari, Ririh., Martini. Purwantisari, Susiana. 2017. "The Relationship of Sanitation with Coliform Bacteriological Status and the Presence of *Salmonella* Sp in Snacks in the Elementary School District of Tembalang District, Semarang." *Application of Food Technology* 6 (1): 19–22.
- [4] MOH RI. 2010. National Report on Basic Health Research (Riskesdas). Jakarta: Ministry of Health.
- [5] Djajaningrat, Husjain., Mirawati, Mega., Setawan, Heru. 2012. "Salmonella Contamination Level in Cincau Cappuccino Ice Drinks Sold in Pondok Gede-Bekasi Area." *Journal of Health VI* number 2: 160-66.
- [6] Herlina, Nina., Afiati, Fifi., Dwi Cahyo, Aditia., Dwie Herdiyani, Poppy., Qurotunnada., Tappa, Baharuddin., 2015. "Isolation and Identification of *Staphylococcus aureus* from Subclinical Mastitis Milk in Tasikmalaya, West Java". *Biotechnology Research Center, Indonesian Institute of Science. Pros Sem Nas Masy Biodiv Indon. Volume 1. Number 3. Page 413 - 417*
- [7] Irianto, K. 2006. *Microbiology Reveals the World*. Microbiology. Bandung: CV. Yrama Widya.
- [8] Jawetz, Melnick. and Adelberg. 2008. *Medical Microbiology*. Jakarta: EGC.9
- [9] Juwita, U., Haryani, Y., Jose C., 2014. "Number of Coliform Bacteria and Detection of *Escherichia coli* in Chicken Meat in Pekanbaru". *JOM FMIPA Volume 1 No. 2*
- [10] Health, Minister. 2003. Decree of the Minister of Health Number 942 / Menkes / SK / VII / 2003. Indonesia.
- [11] Kuswiyanto. 2017. *Bacteriology 2 Textbooks*. Health analyst. Jakarta: EGC.
- [12] Majumdar, Arnab., Neha Pradhan., Jibin Sadasivan., Ananya Acharya., Nupur Ojha., Swathy Babu., Sutapa Bose. 2018. *Microbial Contamination And Food Degradation*. India: Indian Institute of Science Education and Research (IISER).
- [13] Marhamah Huda Misbahul. 2014. "The Quality of Microbiology of Snack Drinks (Ice, Syrup) in Public Elementary Canteens in Bandar Lampung City Region." *Health Analyst 3 No.1*: 321-26.
- [14] Mirawati, M. Lestari, E. Djajaningrat, H. 2014. "Identification of *Salmonella* For Sale in Canteens and Outside Primary School Canteens." *Journal of Health Science and Technology* 1: 141–47.
- [15] Ningsih, Riyan. 2014. "Guidance on Food and Beverage Sanitation Hygiene, and Food Quality Provided by Traders in Samarinda City Public Elementary School." *Journal of Public Health* 10 (1): 64–72.
- [16] Okolie, N.P, Omonigbehin, E., Badru O, A. And Akande, I.S. 2012. "Isolation of Pathogenic Bacteria from Some Foods Sold at Selected Private School in Akoka Area of Yaba Lagos." *African journal of Food Science* 6: 65–69.
- [17] Pelczar, Michael. E.C.S.CHAN. 2014. *Fundamentals of Microbiology 2*. Jakarta: UI-Press.
- [18] Puspadewi, R. P. Adirestuti, A. Abdulbasith. 2017, "Detection of *Staphylococcus aureus* and *Salmonella* in Syrup Snacks". *The scientific journal Manuntung*, 3 (1), 26 - 33, 2017

- [19] Rahmi, AA. Muis, SF. 2005. "Contribution of Snack Food to Energy and Protein Adequacy Level and Nutritional Status of Children in Siliwangi Elementary School Semarang." *Media Young Medicans* 1 (1858–3318): 55–9.
- [20] Rahmawita Rahmawita, Dwi Hilda Putri, Linda Advinda. Quality snacks for elementary school children.<http://journals.ums.ac.id/index.php/biomedika/article/view/7020>
- [21] SNI. 2009. "Maximum Limits of Microbial Contamination Food."
- [22] Soemarno. 2000. *Isolation and Identification of Bacteria Clinic*. Yogyakarta: AAK
- [23] Suguna, M. R, Bhat, and W, Nadiah, W.A. 2012. "Microbiological Quality Evaluation of Goat Milk Collected from Small Scale Dairy Farms in Penang Island, Malaysia." *Internatoinal Food Research Journal* 19 (3): 1241 - 1245
- [24] Susanna, D and B, Hartono. 2003. "" Monitoring the Quality of Ketoprak and Gado-Gado Foods in the UI Campus Depok Through Bacteriology Examination "" *Makara Health Series* 7 (1): 21-29.
- [25] Vitria, Elnovriza. Art, Azrimaidaliza. 2013. "The Relationship of Sanitation Hygiene and How to Process Chicken Noodle with Germ Figures in the City of Padang." *Public Health* 7 ..
- [26] Yunaenah.2009. "Contamination of E. coli in Snack Food in Central Jakarta Region School Canteen in 2009". Faculty of Public Health Thesis
- [27] WHO. 2004. "Diagnosis and Management of Foodborne Illnesses." In *America: American Medical Association*