Examination of *Salmonella Typhi* Bacteria in Thai Tea Beverages Sold in Poasia and Baruga District, Kendari City

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Abstract. Nowadays, the public consumes a lot of Thai tea drinks, which are among the most well-liked drink varieties. Alcohol serves as both a suitable substrate for the development of microorganisms and a good mediator in the spread of illness. The application of sanita-tion hygiene that does not meet the requirements in the processing process up to serving Thai tea drinks can cause bacterial contamination. The Salmonella typhi bacteria is one of the microbes that contaminates beverages. At 1,628 instances overall in 2021, typhoid fever ranked ninth among the top 10 most common illnesses, according to statistics from the Southeast Sulawesi Provincial Health Office. In Poasia District and Baruga District of Kendari City, this study seeks to determine if Thai tea beverages contain Salmonella typhi bacteria in 2022. With a comprehensive sample methodology, this study design combines descriptive observational research with a sampling strategy. The study's findings show that, out of the ten samples of Thai tea beverages sold in Poasia District, four of those samples tested positive for Salmonella typhi bacteria, while one of the ten samples sold in Baruga District tested positive for the same bacterium. The conclu-sion of this study is that there are 5 positive samples containing *Salmonella typhi* bacte-ria.

Keywords: Thai tea, *Salmonella typhi*, Typhoid fever.

1. Introduction

Thai Tea is a typical drink of Tea from Thailand mixed with ice, sugar, condensed milk and cream, which makes it a popular drink among students and the community. The characteristics of *Thai Tea* processed drinks that are commonly found are tea flavored and sweet with added milk and sugar, also orange in color which attracts consumers to buy it. The orange color of *Thai Tea* drinks is due to the addition of spices typical of tea drinks from Southeast Asian countries. Spices used include cloves, pekak flowers, tamarind seeds, cardamom and *orange blossom*. *Thai Tea* is one of the ready-to-eat processed drinks that is currently widely sold in Kendari City. Given that iced *Thai Tea* is one of the ready-to-drink processed drinks and is susceptible to microbial contamination, it is very important to know and monitor the safety of these processed drinks [1].

Drinking water is defined as water that has been treated before consumption or has not been treated, under Republic of Indonesia Decree of the Minister of Health No. 492 (No. 492 Year 2010) on Drinking Water Quality Requirements. Drinking water must be safe for human consumption, which includes satisfying all necessary and extra

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standards as well as the microbiological, physical, chemical, and radioactive requirements. Drinking water providers are required to meet standards for drinking water quality. These are called parameters, and local governments determine extra parameters based on the environmental quality circumstances in their communities and the Minister's additional criteria. Republic of Indonesia Ministry of Health No. 492 Year 2010 on Drinking Water Quality Standards. Drinking water that can be consumed must be tasteless, odorless, colorless (maximum 15 TCU), clear (maximum 5 NTU), have a maximum temperature of ± 3°C above ambient temperature and have a maximum amount of dissolved solids of 500 mg/l [2]. A bacteria called Salmonella typhi resides in the human stomach. Typhoid fever can be brought on by consuming tainted food or drink that contains Salmonella typhi [3]. Gram-negative Salmonella typhi bacteria can induce systemic infections that result in persistent fever. Clinically, septicemia (a bloodstream bacterial infection), gastroenteritis, and typhoid fever are caused by Salmonella typhi. In developing countries, typhoid fever is transmitted via the fecal-oral route and remains a public health problem. In addition to causing fever in those with low incomes who use contaminated food and water and practice poor hygiene, visitors to endemic nations are also very susceptible to contracting Salmonella typhi [4].

Acute fever is what typhoid fever is. The stomach and intestines are affected by typhoid fever, which can spread either directly or indirectly. Directly, the disease is transmitted from person to person. While indirect transmission is transmission through food, drink, and animal intermediaries. Typhoid fever is a disease that is influenced by the environment, clean and healthy living behavior, personal hygiene which includes the use of clean water, and hand washing [5].

Information derived from the World Health Organization's (WHO) Surveillance Perishable Disease Typhoid fever and other invasive salmonellosis instances suggest that 11–12 million cases of the disease and 128.000–161.000 deaths were predicted for 2019. On the other hand, each year there were an estimated 54.000 deaths and 6 million cases of paratyphoid fever [6], [7].

The Republic of Indonesia's Ministry of Health reported that there were 500 cases of typhoid fever on average per 100,000 people in 2019, with a 0.6–5% fatality rate. According to gender-specific data from the Global Burden of Disease (GBD) for Indonesia in 2019, males had 187.06 DALYs per 100,000, while women had 122,99 DALYs per 100,000. In Indonesia, typhoid fever is prevalent and is frequently encountered in large cities. Around 350–810/100.000 people in Indonesia are affected by typhoid fever; the incidence there is 1.6%, making it the country's fifth most common infectious illness across all age groups (6.0%). It is also the 15th leading cause of death in all ages (1.6%) [8].

According to information from the Southeast Sulawesi Provincial Health Office's annual report for 2020, typhoid fever ranks sixth out of the ten most common illnesses in Southeast Sulawesi with 4,467 cases. Typhoid fever continued to rank sixth the next year with the same number of cases, but in 2021 it had a decline in instances, placing ninth out of the ten greatest cases with a total of 1,628 cases. Typhoid fever is the most common illness in Southeast Sulawesi, despite a decrease trend in incidence [9].

Salmonella infection poses a major risk to consumer health throughout the manufacture and processing of food [10]. The incidence of typhoid fever at Poasia Health Center in 2022 in January 38 cases, in February 33 cases, in March 19 cases, in

April 26 cases, in May 20 cases, in June 7 cases, in July 8 cases, and in August was 40 cases [11]. To avoid contaminating food and beverages, including Thai tea, laboratory testing concerning the presence of Salmonella typhi bacteria is essential. This study aims to identify the presence of Salmonella typhi bacteria in Thai tea drinks in order to prevent consumer or human sickness.

2. Method

The research used a descriptive observational methodology. In January 2023, this study was carried out in the Poasia District of Kendari City and at the Halu Oleo University Faculty of Public Health Laboratory. Total sampling, in which the number of samples was equal to the population, was the sampling strategy utilized in this investigation. Fifteen workers who handle Thai tea beverages in Kendari City's Poasia District served as the study's sample. The study's sample consisted of 15 vendors who sold Thai tea beverages at the stalls of Thai tea consumers in Kendari City's Poasia District. Data analysis in this study is using the SPSS 16.0 application which is done by univariate analysis, namely describing each variable with analysis and frequency distribution.

A heated plate, petri dish, stirring rod, bunsen lamp, analytical balance, erlenmeyer, measuring cup, test tube, autoclave, oven, refrigerator, ose needle, tube rack, test tube, durham tube, suction rubber, and measuring pipette (10 ml and 1 ml) are among the equipment used in this investigation. The ingredients were distilled water, 70% alcohol, Lactose Broth, Salmonella Sigella Agar, and Brilliant Green Lactose Bile Broth. This study was conducted based on 3 stages of test tests, namely presumptive tests, confirmatory tests, and complementary tests. Colonies that are suspected of containing *Salmonella typhi* bacteria show a concentrated blackish color inoculated on SSA media.

3. Results

Table 1 below displays the findings of the analysis of the 15 samples that were used to determine if Salmonella typhi bacteria were present:

Table 1. Dispersion of Salmonella typhi bacteria in Thai tea beverages in the Kendari City, Kambu District

No.	*The presence of Salmonella typhi bacteria*	Number (n)	Percent (%)
1.	Exist	5	33,3
2.	None	10	66,7
	Total	**15**	**100**

Of the 15 samples of Thai tea beverages tested, Table 1 demonstrates that 5 samples had a percentage of 33.3% positive for Salmonella typhi bacteria and 10 samples had a percentage of 66.7% negative for the bacterium.

4. Discussion

The bacterium that causes typhoid fever is Salmonella typhi. This bacteria is gram negative which is motile and has the ability to infect humans or animals if ingested. Salmonella typhi bacterial infection is a cause of morbidity and mortality throughout the world [12]. Gram-negative Salmonella typhi is a bacteria that can produce a persistent fever and systemic illness. Clinically, Salmonella typhi infection causes typhoid fever, septicemia (bacterial infection in the bloodstream) and gastroenteritis. In developing countries, Salmonella typhi infection, which is transmitted through the fecal-oral route, is still a public health problem. This microorganism can cause fever in poor people with poor sanitation, and consuming contaminated food and water [4].

In this study, microbiological tests were carried out to determine the presence of *Salmonella typhi* bacteria in *thai tea* drink samples in Poasia District, Kendari City totaling 15 samples which were carried out in several stages starting from sampling, preparation of tools and materials, making media, to sample examination carried out in accordance with applicable operational standards, the examination was carried out at the Laboratory of the Faculty of Public Health, Halu Oleo University.

Five of the fifteen samples tested—or 33.3% of the total—tested positive for Salmonella typhi, according to the findings of a laboratory analysis of Thai tea beverages in Poasia District, Kendari City. According to the Republic of Indonesia's Minister of Health's Regulation No. 492/MENKES/PER/IV/2010 concerning Drinking Water Quality criteria, this demonstrates that the Thai tea beverages under investigation do not fulfill the microbiological quality criteria for drinking water. There are several factors that cause thai tea drinks to be contaminated with Salmonella typhi bacteria including the application of unqualified handler hygiene characterized by the handler not washing hands with soap and running water before processing the drink, the handler does not use an apron and head cover, the handler of thai tea drinks stores raw materials in a place that is not clean and not free from flies or insects, handlers have a sewage channel that is not smooth and not closed and do not have a trash can that is transported every 24 hours and lifted by a garbage officer, where these things can result in the possibility of contamination of salmonella typhi bacteria in thai tea drinks that are traded to the public and cause adverse effects on public health such as typhoid fever.

This study supports studies by Mellynia showing that preserving food or beverages to avoid contaminants requires careful consideration of sanitary hygiene parameters. *Salmonella typhi* bacteria can occur from washing places, spoons and other tools, and are thought to be contaminated by the surrounding air, especially dust. In addition, personal hygiene of the handler is the key to success in managing drinks so as not to be contaminated. Handlers who do not wash their hands before processing drinks and from flies that have been infected with *Salmonella typhi* bacteria and con-taminate the tools and materials used by handlers [13].

5. Conclusion

According to the findings of laboratory tests conducted in Poasia District, Kendari City, five samples of Thai tea beverages tested positive for Salmonella typhi bacteria, accounting for 33.3% of the 15 samples examined.

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